

9.1 Appendix 1 - Consultation Responses

DCRP/PC/18/02 Appendix 1

Stakeholder's Responses to the Consultation, and DNOs treatment of the responses:

- 1 AMPS and ADE
- 2 Electricity North West
- 3 Northern Powergrid
- 4 RES Ltd
- 5 Deep Sea Electronics
- 6 TESLA
- 7 Western Power Distribution

Distribution Code Consultation Response Proforma AMPS and ADE

DCRP/PC/18/02: Implementation of the EU Network Code Requirements for Generators

Stakeholders are invited to respond to this consultation, expressing their views or providing any further evidence on any of the matters contained within the consultation document. Stakeholders are invited to supply the rationale for their responses to the set questions.

Please send your responses and comments by **17:00 on 01 February 2018** to dcode@energynetworks.org and please title your email 'Consultation Response DCRP/PC/18/03 RfG'. Please note that any responses received after the deadline may not receive due consideration by the DNOs.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5124, or to dcode@energynetworks.org

Respondent	Bernard Gospel
Company Name	The Association of Manufacturers of Power generating Systems (AMPS) The Association for Decentralised Energy (ADE)
No. of DCode Stakeholders Represented	No. of stakeholders unknown, but association membership is: 118 (AMPS) 135 (ADE)
Stakeholders represented	See above
Role of Respondent	Technical Secretary (AMPS)
We intend to publish the consultation responses on the DCode website. Do you agree to this response being published on the DCode website? [Y/N]	Yes

Distribution Code Consultation Response Proforma AMPS and ADE

	Question	Response	DNOs response
Q1	Comments are welcome on any part of the draft Distribution Code, G98 and G99. Please comment in the manner that is most convenient to you. Specific word templates are available in the consultation pack for making detailed drafting comments on, but please do not feel constrained to use them.	Please see the table below	
Q2	Do you have any general comments on how effectively the RfG requirements have been incorporated into GB documents and is there any aspect that needs modifying before final publication?	<p>It is very unfortunate that the compliance process is not the one intended by the RfG. It is self-certification by manufacturers to Engineering Recommendation G99 and as such is GB specific and not at all harmonised across member states. The RfG clearly intends harmonisation using formal laboratory testing to a harmonised European Standard to facilitate cross border trade. This GB specific approach will do nothing to facilitate cross border trade and may well increase trade barriers.</p> <p>We should emphasise that this is in no way the fault of GB authorities who have done their utmost to resolve the problems caused by a fundamentally flawed piece of EU legislation that fails to specify the QA level required for Accredited Laboratories to issue Equipment Certificates. The failure to ensure an appropriate harmonised European standard is in place is the other obstacle to implementing the RfG as intended.</p> <p>While the proposed compliance system is a pragmatic solution to the problem for GB, it does raise fundamental concerns;</p>	<p>We know that BEIS is aware of these issues. DNOs agree that there appears to be a gap in the legal implementation in relation to harmonization of requirements at this level of detail.</p> <p>The DNOs now believe that G99 is effectively finished and fit for purpose. It was certainly in a less complete state in earlier consultations, but with one or two exceptions those issues have all been sufficiently resolved, not least with the conscientious help of AMPS and ADE members through workshops and drafting help.</p> <p>It is the DNOs view that the remaining issues, shared with National Grid, need to be raised as further modifications without delay, not least to ensure that all stakeholders are able to comment fully on the proposed solution. This includes the defect referred to re LFMS-O compliance.</p>

Distribution Code Consultation Response Proforma AMPS and ADE

		<ol style="list-style-type: none"> 1. The criteria for acceptance of a manufacturer's self-declaration of compliance with G99 is not clear and could lead to disputes between manufacturers, generators and DNOs. 2. When a dispute does arise, the only arbitrators are Ofgem and the courts. 3. With no formal laboratory involvement and not even a British Standard never mind a European one it could be very hard to resolve disputes. <p>It has been suggested that once a harmonised European standard does become available in one to two years time G99 should be reworked to reference it. Unfortunately, this will do nothing to resolve the lack of a QA level so Certified Laboratories will still not be able to issue Equipment Certificates. There is also doubt that there would be a good enough financial case to create the Notified Body that would probably be required for this process.</p> <p>Reworking G99 like this will add a significant additional burden to an industry still coming to terms with the changes caused by the RfG. It should be subject to full scrutiny by a cost-benefit analysis like any other code changes and only be carried out if financially justifiable.</p> <p>We are concerned that G99 is still unfinished and includes errors that are acknowledged by the authors. This inevitably means it will have to be completed after this last opportunity for scrutiny which is far from ideal.</p> <p>We have discovered what we believe is a serious defect in the drafting of ECC 6.3.7.1.2 and ECP A.5.8 as far as Type B PGMs is 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). We believe you understand the unmeetable challenge that this drafting</p>	
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Distribution Code Consultation Response Proforma AMPS and ADE

		<p>makes for diesel/gas driven synchronous PGMs in the 1-5MW size range.</p> <p>We believe that more work is urgently needed to modify the legal text here (and the consequential requirements in G99).</p> <p>We would be happy to work with NG and the DNOs to achieve a rapid modification of this text as soon as possible given the necessary change processes.</p>	
Q3	Are there any comments on the G99 drafting points that are listed in section 2.3.3 above?		
Q4	Do you have any comments on the draft common application form included in the consultation pack, or on the envisaged connexion and compliance assessment process?		
Q5	Please indicate (ASAP, ie before the closing date of 01/02/18 if possible) if you have any views relating to the logic or re-ordering etc of the forms in G99's annexes		
Q6	Guidance Note 3 in the Distribution Code relating to Stirling engines had expired. It is proposed to extend this now until the RfG is effective from 18/05/19.		

Distribution Code Consultation Response Proforma AMPS and ADE

Please provide comments relating to the specific technical content of EREC G99

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	22		2 Scope and Structure	General	Read literally, this says there is a hard changeover on 17/5/2019, you can only use G99 from that day and not before i.e. there is no transition period.	For practicality, there has always to be a transition period during which you can use either G59 or G99.	The foreword explains that compliant kit be connected anytime in advance of the date The second para of the foreword has been added as a footnote to the first para of 2.1 to address this comment.
	2289			Editorial	Sentence is truncated	Complete it	Completed with the word "protection"
	2692			Editorial	No full stop, is the sentence complete?	Complete it	Full stop added. The sentence is complete
	2791		11.3 Fault Ride Through and Phase Voltage Unbalance	Technical	The RfG does not require band A to provide FRT. G59 only requires Medium and Large power stations to provide FRT. The Distribution code does require it "where it has been agreed" but does not specify any specific curve leaving it an open-ended requirement.	Clarify that no band A PGM will be compelled to provide FRT type requirements against their wishes. Compelling a PGM to meet an unspecified FRT curve is unreasonable.	Rephrased as: Any Power Generating Module or Power Generating Facility connected to the DNO's Distribution Network, where <u>Where</u> it has been <u>specifically</u> agreed between the DNO and the Generator that the a Power Generating Facility will contribute to the DNO's Distribution Network security, (eg for compliance with EREC P2) <u>the Power Generating Module(s)</u> may be required to withstand, without tripping, the effects of a close up three phase fault and the Phase (Voltage) Unbalance imposed during the clearance of a close-up phase-to-phase fault ,in both cases cleared by the DNO's main protection.

Distribution Code Consultation Response Proforma AMPS and ADE

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	2854		12.1.3.2 The DNO will provide details of the method to be employed on a site by site basis. Protocols currently in use between DNOs and Generators include simple current loop; DNP3; IEC 61850.	General	It is unfortunate that this opportunity to standardise the communications protocols between DNO and PGM has been missed. We have been trying to start a discussion on this for two years but with no response from the DNOs. This clause is prescriptive yet subsequent clauses 12.1.3.3, 12.1.3.5 and 12.2.3.6 are cooperative "the DNO will agree with the generator"	Change this clause to be cooperative as in subsequent clauses.	1 st sentence of 12.1.3.2 has been deleted leaving text in 12.1.3.3.

Distribution Code Consultation Response Proforma AMPS and ADE

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	3033		12.3.2 ...close-up phase-to-phase fault...		This is an open-ended requirement to meet a more onerous but unspecified curve beyond that in Table 12.1.	Clarify that no band B PGM will be compelled to provide FRT type requirements beyond those in Table 12.1 against their wishes. Compelling a PGM to meet an unspecified FRT curve is unreasonable.	In addition to paragraphs 12.3.1.1 – 12.3.1.7 any Power Generating Module or Power Generating Facility connected to the DNO's Distribution Network , where it has been <u>specifically</u> agreed between the DNO and the Generator that the Power Generating Facility will contribute to the DNO's Distribution Network security (eg for compliance with EREC P2), <u>the Power Generating Module(s)</u> may be required to withstand, without tripping, the effects of a close up three phase fault and the Phase (Voltage) Unbalance imposed during the clearance of a close-up phase-to-phase fault , in both cases cleared by the DNO's main protection.
	3054		12.3.4 Other Fault Ride Through Requirements b)	Technical	What is the acceptance criteria for being able to withstand multiple events? E.g. does two FRT events per hour demonstrate their "repeated ability"? Does this paragraph intend to refer to 12.4.1 because it confuses between FRT events in 12.3 and a wider than normal voltage range in 12.4		It has been agreed with National Grid that this sub para (b) is not required. It has been deleted.

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Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	4156		15.4.1 b) second bullet point	Technical	This states that the operating time will be measured by stepping from 50.0Hz to 0.2Hz past the threshold. It should be from 0.3Hz before the threshold to 0.3Hz after the threshold as in A2-4 and in G59.	Correct it. Note some bullets in this section duplicate some of the numbers from the A2-4 but others give up and don't duplicate any, just referring to the annex. Wouldn't it be better to drop all duplication and only refer to the annex?	There is an existing conflict in G59 between the step in 12.4 which is given as 0.2 Hz which corresponds with the site test requirements and the 0.3 Hz which is detailed in the type testing section 13.8. 15.4.1 has been aligned with the A2-4 commissioning annex at 0.3 Hz and the historic differences between the type testing forms and the commissioning forms removed. This section is an existing section in G59 which has similar drafting. It has a description of the additional tests for non-type tested interface protection rather than the Annex descriptions which are methodologies for type testing/ compliance verification. Hence it is important that it remains in the document and refers to the site compliance and commissioning forms
	4182		15.4.1 d)	Technical	There is no description of the VS immunity test	Describe it.	New text added to 15.4.1.d to point to the relevant tests in the testing and commissioning forms.
	4294		16.3.4	Technical	This seems to be saying that the equipment manufacturer must prevent the generator from modifying the type-tested parameters, but that will also prevent the DNO and installer from modifying them. DNOs have objected to this in discussions.	Clarify how access is to be restricted.	It is intended that the access to protection settings is locked off for type tested. No change proposed at this time.

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	4964		20.2.2	General	If the replacement equipment is type-tested then the DNO should not be able to request compliance testing.	Clarify that it doesn't apply to type-tested equipment unless the DNO has good cause to believe the type-test report is invalid.	Additional sentence added: Note that where the replacement equipment is itself Type Tested or supported by appropriate Manufacturers' Information , tests and checks on site can be limited to functional checks such as to comply with paragraph 15.2.
	4969		20.3.1	General	If the replacement equipment is type-tested then the DNO should not be able to request compliance testing.	Clarify that it doesn't apply to type-tested equipment unless the DNO has good cause to believe the type-test report is invalid.	Type tested complies with G99 so no compliance testing would be requested. No change proposed
	4973			Editorial	Incomplete sentence	Complete it.	The last sentence in 20.3.1 is erroneous and has been deleted.
	5017		A2-1 Compliance Verification Report –Tests for Type A Synchronous Power Generating Modules up to and including 50 kW	Technical	In sections 4 and 5 the interface protection parameters are more demanding than in A2-4 i.e. the type tests for a protection relay are more demanding than the site tests. As they are more demanding than the requirement in G59 they would lead to the redesign of protection relays, but there has been no discussion about any need to increase these requirements. Also, some requirements such as trip level acceptance windows are missing making the tests pointless.	Copy the requirements from A2-4 (which match those in G59) into A2-1 for consistency and completeness.	There is a historic discrepancy from G59 between the interface protection testing parameters in the type testing annex which matched those in the type testing forms and the site testing form. There was a missing note from G59 about trip threshold and trip time under the schedule which has been reinstated.

Distribution Code Consultation Response Proforma AMPS and ADE

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	5024		A2-3: Compliance Verification Report for Inverter Connected Power Generating Modules	Technical	The same issue as for A2-1, the interface protection parameters need to be consistent regardless of whether this is synchronous or asynchronous as the same protection relays are used in all installations.	Copy the requirements from A2-4 (which match those in G59) into A2-3 for consistency and completeness.	As above
	5026		A2-4: Site Compliance and Commissioning test requirements for Type A Power Generating Modules	Technical	Frequency stability test "Inside normal band" should be 50.8Hz not 50.3Hz i.e. 0.2Hz from the trip. The description of the test should also say that it steps from 50.8 and back to 50.8	Correct it.	Corrected to 51.8 Hz in 3 places
	5026		A2-4: Site Compliance and Commissioning test requirements for Type A Power Generating Modules	Technical	No boxes for VS stability test	Add them after those for LOM stability test	The test for + 50 deg ad -50 deg had lost their initial column defining them as Positive Vector Shift and Negative Vector Shift. This has been rectified.
	5359		A7.1.2.2 Over / Under Voltage	Technical	This annex contains the more onerous tests for interface protections also seen in A2-1	Bring them in line with A2-4 and G59 or better still remove the unnecessary duplication of values.	There is a historic discrepancy from G59 between the interface protection testing parameters in the type testing annex which matched those in the type testing forms and the site testing form. The tests have now been aligned.

Distribution Code Consultation Response Proforma AMPS and ADE

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	5929		Figure A.7.8: LFSM-O step response test		Shouldn't the lines be defined numerically to avoid dispute?	Define them numerically	DNOs agree that more needs to be done to define better the performance requirements. This necessitates work with National Grid as it is the TSO that specifies LFSM-O parameters
	6409		Figure B.5.1: LFSM-O step response test	Technical	Shouldn't the lines be defined numerically to avoid dispute?	Define them numerically	As above
	6609		Figure B.6.3: LFSM-O BC3 step response test	Technical	Shouldn't the lines be defined numerically to avoid dispute?	Define them numerically	As above

Distribution Code Consultation Response Proforma Electricity North West

DCRP/PC/18/02: Implementation of the EU Network Code Requirements for Generators

Stakeholders are invited to respond to this consultation, expressing their views or providing any further evidence on any of the matters contained within the consultation document. Stakeholders are invited to supply the rationale for their responses to the set questions.

Please send your responses and comments by **17:00 on 01 February 2018** to dcode@energynetworks.org and please title your email 'Consultation Response DCRP/PC/18/03 RfG'. Please note that any responses received after the deadline may not receive due consideration by the DNOs.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5124, or to dcode@energynetworks.org

Respondent	<i>Name</i>
Company Name	<i>Steve Cox</i>
No. of DCode Stakeholders Represented	1
Stakeholders represented	Electricity North West
Role of Respondent	Distribution Network Operator
We intend to publish the consultation responses on the DCode website. Do you agree to this response being published on the DCode website? [Y/N]	Yes

Distribution Code Consultation Response Proforma Electricity North West

	Question	Response
Q1	Comments are welcome on any part of the draft Distribution Code, G98 and G99. Please comment in the manner that is most convenient to you. Specific word templates are available in the consultation pack for making detailed drafting comments on, but please do not feel constrained to use them.	Electricity North West has been involved in the drafting of G98 and G99 and was represented at several workshops toward the end of 2017. Electricity North West commented on the drafts at this time and is now fully supports the final text.
Q2	Do you have any general comments on how effectively the RfG requirements have been incorporated into GB documents and is there any aspect that needs modifying before final publication?	The RfG requirements have been incorporated in a logical and clear manner.
Q3	Are there any comments on the G99 drafting points that are listed in section 2.3.3 above?	No further comments
Q4	Do you have any comments on the draft common application form included in the consultation pack, or on the envisaged connexion and compliance assessment process?	Is it proposed to include a 'G59 Fast Track' process in a future revision of the CAF?
Q5	Please indicate (ASAP, ie before the closing date of 01/02/18 if possible) if you have any views relating to the logic or re-ordering etc of the forms in G99's annexes	Electricity North West supports the proposed restructure of the document.
Q6	Guidance Note 3 in the Distribution Code relating to Stirling engines had expired. It is proposed to extend this now until the RfG is effective from 18/05/19.	Agree.

Distribution Code Consultation Response Proforma Northern Powergrid

DCRP/PC/18/02: Implementation of the EU Network Code Requirements for Generators

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Respondent	<i>Alan Creighton</i>
Company Name	<i>Northern Powergrid</i>
No. of DCode Stakeholders Represented	
Stakeholders represented	
Role of Respondent	<i>Distributor</i>
We intend to publish the consultation responses on the DCode website. Do you agree to this response being published on the DCode website? [Y/N]	Y

Distribution Code Consultation Response Proforma Northern Powergrid

	Question	Response	DNOs' response
Q1	Comments are welcome on any part of the draft Distribution Code, G98 and G99. Please comment in the manner that is most convenient to you. Specific word templates are available in the consultation pack for making detailed drafting comments on, but please do not feel constrained to use them.	Comments, predominantly editorial, provided on copies of the pdf versions of : DCode EREC G98 EREC G99 A general comment is that consistent use of the terminology 'connected' and 'commissioned' in terms of when the new documents apply would be helpful.	Extremely valuable and comprehensive comments. DNOs have standardized on Commissioned.
Q2	Do you have any general comments on how effectively the RfG requirements have been incorporated into GB documents and is there any aspect that needs modifying before final publication?	We are of the view that the development of G98 and G99 will significantly assist with the GB implementation of RfG. Both documents have been developed over several months in conjunction with a variety of stakeholders with feedback being used to address stakeholder issues. Hence we are of the view that the documents provide a sound basis for GB implementation of RfG, although given the scope of the change it is likely that further clarification and improvements will need to be incorporated as the documents start to be applied in practice.	
Q3	Are there any comments on the G99 drafting points that are listed in section 2.3.3 above?	Re point (d) re automatic reconnection, we agree that the intent remains unchanged, but there is now a requirement for the installation of automatic reconnection equipment to be agreed by the DNO. Our	Noted.

Distribution Code Consultation Response Proforma Northern Powergrid

		expectation is that this will be included in each connection agreement.	
Q4	Do you have any comments on the draft common application form included in the consultation pack, or on the envisaged connexion and compliance assessment process?	The revised version represents an improvement over the current version, although there are some development required e.g. capturing a customer's import requirement that are still to be incorporated into the final version.	DNOs will continue to review and improve these forms.
Q5	Please indicate (ASAP, ie before the closing date of 01/02/18 if possible) if you have any views relating to the logic or re-ordering etc of the forms in G99's annexes	The ordering of the forms in G99 seems to be sensible. We have embedded some minor comments in the attached version of G99.	Noted with thanks.
Q6	Guidance Note 3 in the Distribution Code relating to Stirling engines had expired. It is proposed to extend this now until the RfG is effective from 18/05/19.	We agree with this proposal.	

Distribution Code Consultation Response Proforma Northern Powergrid

Please provide comments relating to the specific technical content of the **Distribution Code**

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	135			T	<p>'connected' used here, 'commissioned' used on DPC7. Consistency of terminology would be good.</p> <p>It's not clear what the difference is between 'connection' and 'commissioning' is and whether commissioning is only complete once the FON (Types B-D) are issued. The point of commissioning for Type A is not specifically defined.</p> <p>We can just see that clarity in this area will be important May 2019.</p>		Commissioned, although subject to its own definitional vagaries, is believed to be a more important stage than just being connected and will therefore be adopted
	1284			T	ditto		
	1298			T	ditto		
	1339			T	ditto		
	General			E	Other minor editorial comments advised separately.		

Distribution Code Consultation Response Proforma Northern Powergrid

Please provide comments relating to the specific technical content of **EREC G98**

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	55			T	Reference here is made to 'first commissioned' in G99, the terminology is 'first installed' and 'connected'. DPC7 uses the term 'commissioned'. Consistency between these documents would be good.		Agree that documents should be consistent. Suggest G98 is amended to "commissioned" (not " first commissioned") and G99 is amended to "commissioned".
	844			E	Should this be the same text as page 34? Manufacturer's Ref No (this number should be registered on the ENA Type Test Verification Report Register as Product ID)		Agree – amended as suggested.
	General			E	Other minor editorial comments advised separately.		G98 has been amended accordingly

Distribution Code Consultation Response Proforma Northern Powergrid

Please provide comments relating to the specific technical content of EREC G99

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	32		2.1 last para	T	Art 4 modification only applies to types C & D rather than to all. We can see that a general principle that materially modified plant should comply with current requirements, but can this legally be applied to the specific RfG requirements?		Was G59 12.6.1 now G99 20.3.2 If during the lifetime of the Power Generating Modules it is necessary to replace a component of a Power Generating Module, its protection system or Interface Protection, the Generator shall notify the DNO before the Modification is initiated. The DNO and the Generator will agree whether the nature of the Modification is such that the Generator is only required to reconfirm the compliance with the requirements in this EREC G99 in relation to the affected component, or whether the Modification is sufficiently material (eg with a higher Registered Capacity) such that the Generator should submit a new Standard Application Form for the new equipment and a Decommissioning Form for the old equipment. Where a Generating Unit or Power Generating Module is replaced, the replacement must comply with this EREC G99 (rather than the EREC G59 if it originally complied with EREC G59).
	40		2.3	E		better to say 16 A/phase or less	Change made
	1019		6.3.7	T	Would it be worth confirming that the new storage would still need to comply with G99 (apart from the exempt items). How about:	The new storage units form an independent Power Park Module which needs to comply with EREG G99 although is exempt from certain requirements as listed in Annex A4.	Change made

Distribution Code Consultation Response Proforma Northern Powergrid

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	1838			T	9.5.4 is from G59 which does seem to water down the requirement in 9.5.5 which is from the DCode. 9.5.5 implies desirability whilst 9.5.4 is just a recommendation that should only consider scenarios that have a reasonably high probability of occurrence - this doesn't seem to align with the 'desire' in 9.5.5. This hasn't changed from the current drafting, but it would be good to clarify the requirement.		The two paras retained as complementary, with 9.5.5 providing more detail. DNOs agree this could probably be tightened up in any future redrafting.
	1870		9.5.6		The DCode version of this text used the word 'must' rather than 'should'. we think 'must' or 'shall' would be a better word here than should.		Changed to shall
	3801		13.8.4.1	T	We wondered how the timing of presenting this information to NETSO fit in to the EON ION & FON process - presumably this transfer and confirmation from NETSO is required before a FON is issued by the DNO.		Discussed at the 06/02/18 feedback review workshop. No change proposed at this time
	4103			E		Add.....where automatic re-connection is permitted under 10.3.3	Done
	4376			T	Can the Generator declare compliance this at this stage - isn't this done in 17.3.5?		Yes agree – deleted here

Distribution Code Consultation Response Proforma Northern Powergrid

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	4648	19.3.3(e)		T	It would be good to clarify when in the ION / FON process the Interface Protection should be witness tested. This should really be before the ION is issued as DNOs need to be sure that the interface protection will work before the generation is run for any material period of time. As a minimum it would need to be an early scheduled test post issue of the ION	Could we either: i) include an extra item f) confirmation that the Interface Protection meets the requirements of this EREC G99 - although we can see the sequence of the forms doesn't really facilitate this, or ii) include in 19.3.6: The DNOs would expect the Interface Protection to be tested early in this test sequence.	There is always the expectation that the exact sequence of events will be agreed between the DNO and the Generator. The consensus from the 06/02/18 feedback review workshop was that compliance was the Generator's responsibility and that it was inefficient to witness early in the commissioning process.

Distribution Code Consultation Response Proforma Northern Powergrid

Please provide comments relating to the specific technical content and usability of the Standard Application Form

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	4656			T	These scheduled tests are those that the generator will carry out once an ION is issued but before a FON is issued - so many / most of the tests in the schedule won't have been carried out or completed -they won't start until the ION is issued. Isn't this step the DNO and the Generator simply agreeing the test schedule.		It is about agreeing the test schedule. The order of some of these paras has been changed - should be clearer
	5049			E		Clarify that NA applies to all cells – poss merge cells in the form	Change made
	5031			T	Part 2 is to be completed for each PGM. There needs to be something on the form to record which of the PGMs in the installation (as recorded in Part 1) this Part 2 relates to.		Change made
	5032			T	The Declaration needs to be consistent with Form B3 declaration - Should be the same as for B3, but with the option to strike out that if the Interface Protection tests haven't been witnessed		Redrafted
	6066			T		Add footnote to the effect that this only needs to be tested if required as per 10.3.3	Text modified

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Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	6074			T	Is this appropriate for HV connections or just LV For LV installations we'd want to see the Electrician's Certificate.		No change proposed at this point in time
	6075			T		Add footnote to the effect that this only applies where auto reconnection has been agreed as per 10.3.3	Text modified
	6075			T	Need to be clear which 'tests' are being signed off. I think its only the Interface Protection tests as per B2 and that the checks in this form have been carried out	Change to: I confirm that I have witnessed the Interface Protection tests and the checks in this document on behalf of.....	Redrafted
	6899			T	shouldn't this be : ...specified by the DNO in coordination with the NETSO.		Change made
	General			E	Other minor editorial comments advised separately.		Minor editorial changes made throughout G99

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DCRP/PC/18/02: Implementation of the EU Network Code Requirements for Generators

Stakeholders are invited to respond to this consultation, expressing their views or providing any further evidence on any of the matters contained within the consultation document. Stakeholders are invited to supply the rationale for their responses to the set questions.

Please send your responses and comments by **17:00 on 01 February 2018** to dcode@energynetworks.org and please title your email 'Consultation Response DCRP/PC/18/03 RfG'. Please note that any responses received after the deadline may not receive due consideration by the DNOs.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5124, or to dcode@energynetworks.org

Company Name	Renewable Energy Systems Limited
No. of DCode Stakeholders Represented	One
Stakeholders represented	Chanura Wijeratne
Role of Respondent	Generator
We intend to publish the consultation responses on the DCode website. Do you agree to this response being published on the DCode website? [Y/N]	YES

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	Question	Response	DNOs' Response
Q1	Comments are welcome on any part of the draft Distribution Code, G98 and G99. Please comment in the manner that is most convenient to you. Specific word templates are available in the consultation pack for making detailed drafting comments on, but please do not feel constrained to use them.	Please see annotated PDF version of EREC G99 for detail review comments.	A very helpful set of comments
Q2	Do you have any general comments on how effectively the RfG requirements have been incorporated into GB documents and is there any aspect that needs modifying before final publication?	No comment	
Q3	Are there any comments on the G99 drafting points that are listed in section 2.2.3 above?	Propose to combine External controls (Active Power) and Operational Metering under one heading [e.g. Operational Control and Metering]. The document should identify it is DNO's responsibility to provide detail specification of 'external control and operational metering signals' at the Offer stage.	At present the DNOs' responsibility is limited to the MW control signal for Type B and above – and DNOs are proposing to alleviate some of the Generators' obligations for operational metering by the DNOs' fitting their own SCADA at the interface. This remains a developing area to be kept under review. At the consultation response workshop held by DNOs with stakeholders on 06/02/18 it was agreed that it would be sensible for the ENA to consider resurrecting the DG Technical Forum to progress issues like this.
Q4	Do you have any comments on the draft common application form included in the consultation pack, or on the envisaged connexion and compliance assessment process?	Common application form – Not reviewed	
Q5	Please indicate (ASAP, ie before the closing date of 01/02/18 if possible) if you have any views relating to the logic or re-ordering etc of the forms in G99's annexes	Comments embedded in the annotated version	
Q6	Guidance Note 3 in the Distribution Code relating to Stirling engines had expired. It is proposed to extend this now until the RfG is effective from 18/05/19.	No comments	

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Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
				Please see annotated PDF version of EREC G99 attached			
Detailed review in annotated PDF. Nonetheless, RES would like to draw your attention to the following major points:							
p29, p30, p156		Clause 6.1.31, clause 19.2.2			Using both “Large/Medium/Small” and “Type A/B/C/D” classifications leads to unnecessary confusion and conflict.	Please use only Type A/B/C/D; if really necessary add a single clause which relates Type A/B/C/D to Large/Med/Small for read across to other documents (e.g. BSC).	National Grid has not removed the definitions of large, medium and small from its drafting. DNOs have done as much as possible to remove the terms, but at the moment it is necessary to keep the term embedded medium power station due to the licence exemption process. Explanation of L/M/S and embedded MS from S6 added to S2 to provide early clarity of this issued.

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p113		Clause 13.1			<p>Power Generating Module Performance and Control Requirements</p> <p>External Active Power Control should be accompanied with a set of other signals for fault investigation, health monitoring, data recording and to avoid unnecessary constraint on Power Generation Facility. Without them, it would not be possible to implement Active Network Management.</p>	<p>Interface signals including fail safe set points during system or communication fault, ramp rates, communication protocols, action during none responding generator should be agreed between the Generator and the DNO at the Offer stage.</p> <p>If a Generator is subject to Active Power control, the DNO shall provide a Control Philosophy document explaining the ANM system including estimated energy yield loss based on the ANM model and the best practice reliability (99.9% etc). This can be done at post Offer (could be chargeable).</p> <p>We recognise the DNOs currently are developing ANM approaches, but a minimum additional signal requirements should be specified in the EREC G99 document.</p> <p>Minimum of interface signals for ANM:</p> <ul style="list-style-type: none"> • Local controllers' health status – DNO to generator and vice versa • Common system fault or communication fault signals • Digital signals to indicate MW curtailment and circuit breaker trip. 	Small mods, as suggested during the 06/02/18 feedback workshop, made to text in 12.1 and 13.1 to reflect these concerns.
p113		Clause 12.1.3.2				Protocols – Add Modbus	Agreed at the 06/02 feedback workshop that this change was not necessary

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p113 and p134		Clause 13.1 and 13.9			Both operational metering and control signals are “interface signals” that are exchanged between DNO and the Generators. Physically, all interface signals will be wired to a single interface panel (hard wired marshalling kiosk or ethernet patch panel).	Suggest combining Control and operational signals under a single title “Control and Operational Metering interface signals”.	This remains a developing area to be kept under review. At the consultation response workshop held by DNOs with stakeholders on 06/02/18 it was agreed that it would be sensible for the ENA to consider resurrecting the DG Technical Forum to progress issues like this
		Clause 12.7 (Type B) Clause 13.9 .1(Type C&D)			<p><i>“The DNO, in coordination with the NETSO, shall specify the content of information exchanges including a precise list of data to be provided by the Power Generating Facility”</i></p> <p>Significant time is spent during the construction stage due to incomplete DNO signal list. A specification or a reference to a DNO specification shall be provided at the Connection Offer to timely incorporate them into Generator design.</p>	<p>EREC G99 shall define minimum Control and operational metering signal requirement i.e. Description, resolution, communication protocol (Like F5 Schedule2 of NGET Offers in respect of Grid Code CC.6.5)</p> <p>DNO shall provide a reference to a detail technical signal specification (precise list) at the <u>Connection Offer stage</u>.</p> <p>Provision shall be given to send these signals as hardwired or ethernet communication protocol (i.e.DNP3, IEC 61850, Modbus; like control signal Clause 12.1)</p> <p>G99 should recognise that DNO will pass-through the operational metering signals to NETSO, if they are required under the Grid Code.</p>	Words have been added to 13.9.2 to link this to the connection offer

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		Clause 13.9.3 (a)			<p>Fault recording and Dynamic monitoring.</p> <p>They should <u>not</u> be real-time signals. It should be clear that these data will be recorded locally only on a trigger and sent DNO after the event.</p>	<p><i>Proposed words:</i></p> <p>Generator shall enable Fault Recorder and Dynamic System monitoring equipment to locally record of system data on a trigger.</p> <p>If requested by DNO, the Generator shall provide Fault recording and Dynamic monitoring recorded data.</p> <p>Suggest to change title "13.9.3 Additionally each Power Generating Facility... " to</p> <p>"13.9.3 Fault recording and Dynamic monitoring"</p>	<p>Ref to is to Annex C.6 where the requirements are clear –in relation to triggering etc.</p> <p>No change proposed</p>
		Clause 13.9.3 (b)			<p>Fault recording and Dynamic monitoring data resolution.</p> <ul style="list-style-type: none"> • 1 Hz for reactive range tests • 10 Hz for frequency control tests • 100 Hz for voltage control tests <p>Above resolutions are different to Accuracy and Resolution defined in C.6.1 table</p>	<p>Please delete 13.9.3 (b).</p> <p>[Grid Code 'CC6.6 - System Monitoring' is applicable only for Witnessing Testing.]</p>	<p>removed - DNOs agree that this was a drafting error.</p> <p>Dynamic monitoring is defined by App C6</p>
p135		Clause 13.9.4 and 13.9.5			<p>0-8V DC signals are used by NGET to download real time data from witness panel. Not applicable for operational metering.</p>	<p>Please delete 13.9.5</p> <p><i>Clause 13.9.4 – Please move after 13.9.2 and amend</i></p>	<p>Removed - DNOs agree that this was a drafting error.</p>

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p134		Clause 13.9			<p>General - Operational Metering, fault recording, dynamic Monitoring, FSM monitoring</p> <p><i>"...requirement including the parameters to be monitored would be specified by the DNO in the Connection Agreement".</i></p> <p>It is too late in the PGM design process to incorporate Connection Agreement's technical requirements. Should be defined in the Connection Offer.</p>	Monitoring equipment to be installed, communication protocols, signal resolutions and information to be recorded shall be defined in the <u>Connection Offer</u> .	Words have been added to 13.9.2 to line this to the connection offer
p135		Clause 13.9.7			<p>Real time recording and monitoring of "Frequency Sensitive Mode" data.</p> <p>It is too much data to stream continuously.</p>	It should be clear that this requirement is only applicable if a Generator agreed to enable FSM. A detail specification of FSM data shall be provided by the DNO at the Connection Offer stage.	Added words as in C.10 ...if the Generator has chosen to enter into an appropriate ancillary services commercial contract with the NETSO.
p154		Clause 18.3			<p>Witnessing and Commissioning</p> <p>Which test are to be witnessed by the DNO? Does DNO expect to download real-time data from the test (like Grid Code OC5 Appendix1)?</p> <p>It would be practically prohibiting for a PPM to organise a witness test with both NETSO and DNO in presence.</p>	<p>Tests required by DNO for witnessing to be specified in G99.</p> <p>If real-time download is required, G99 shall provide signals' speciation (Like Grid Code)</p> <p>Where a test required to be witness by both NETSO and DNO, then G99 shall give provision to conduct such test once under the witness of DNO representative.</p>	<p>The current arrangements for Large Embedded and LEEMPS remain unchanged.</p> <p>Apart from the possibility of addressing process imperfections in a reinstated ENA DG technical forum, this is an issue that could also fall under WS2 of the Open Networks project.</p>

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					<p>Duplication of NETSO/DNO compliance processes</p> <p>Most of the new D- generators requires BEGA with NETSO to gain access to transmission system via non-firm connection. Those generators should follow onerous compliance process set out by both G99 and Grid Code, which could lead to unnecessary duplication of work.</p>	<p>An approach need to be agreed between DNOs and NESTO to avoid duplication of compliance process required by G99 and Grid Code.</p>	<p>As above</p>
p129		Clause 13.5.1			<p>Reactive Power compliance: Type B - provision is given to comply at Generator Unit Terminal or at Connection Point, but Type C and D compliance required at Connection Point.</p> <p><i>Also, G99 does not allow generators to reduce MW to meet Reactive Power demands.</i></p> <p>Additional unjustified reactive power demands put unnecessary cost on electricity consumers.</p>	<p>Suggest provision for Generator's to reduce MW to meet Reactive Power demands.</p>	<p>Following discussion at the 06/02 feedback workshop it was agreed that RES might consider this issue further and possibly escalate it through normal governance if thought by RES to be appropriate</p>

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p106		Clause 12.3.1.7 .c			<p>Information to be provided by DNO: Like Generator providing DDRC schedule 5 data, the DNO shall provide system fault level, transformer data, protection settings, earthing details and background harmonic information to the Generator to carry out compliance studies and therefore to design the electrical system. Usually, timely obtaining complete information is challenging (several iterations).</p> <p>There is no pro-forma available in G99 for DNO to provide grid information in a structured way.</p>	<p>G99 shall incorporate a proforma that should be completed by the DNO for Generator to obtain necessary Grid information.</p> <p>e.g.: Minimum/maximum credible fault level: 3ph and Ph-E (Ip, I" k, ib and X/R), 95% percentile 1-50 harmonics etc.</p>	<p>Feedback from stakeholders at the 06/02/18 feedback workshop was mixed – some stakeholders thought that this was already adequate. However it is an area that could merit improvement – and again a relaunched technical forum, or Open Networks improvements might be a route to progress these points.</p>
p102		Clause 12.2.3			<p>As per the Grid Code CC6.1.3: <i>"..frequency or speed based relays is not permitted within the frequency range 47.5Hz to 51.5Hz, unless agreed with NGET in accordance with CC.6.3.12"</i></p> <p>However, provision of RoCoF protection is allowed in G99 which could be contradicting to Grid Code if a Generator, holding a BEGA, requires complying with both Grid Code and G99.</p>	<p>Provision shall be allowed in Grid Code CC 6.3.12 to use frequency sensitive relays in Embedded Generators.</p> <p>Alternatively, DNO shall remove RoCoF LoM obligation from those Generators holding a (BEGA) contract with NETSO.</p>	<p>Post meeting the background on the 50MW limit for RoCoF protection in G59 was explained. The DNOs think this is an issue in how NG creates BEGA contracts and maybe forget its own RoCoF protection policy when doing so. RES agreed to take this up with NG in the first instance.</p>

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168/169	5034 and 5055	Clause 21.1.5 / 21.4			Manufacturer reference numbers should not be kept secret.	<p><i>The DNO may shall maintain and publish a register of that Manufacturers' Information".</i></p> <p>Provision shall be allowed for Generator to provide a letter from the Manufacturer to demonstrate the authority/accuracy of the manufacturer's mathematical models and their subsequent variants. (rather than Generator having to update the DDRC every time when there is a variant).</p>	Some agreed modifications made to the text – although may has NOT been changed to shall.
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The following comments have been extracted from RES's detailed annotated PDF of G99:

8	19-21			E	Define scope of G98		Title of G98 included to make clear who the document is applicable to.
	287			E	Definition of connection point – single connection point	clarify	This was developed with stakeholders in workshops in late 2017– no change proposed
	367			E	<p>Definition of FSM</p> <p>As per section 13.2.7.3 this requirement only applies for the frequency band where PGMs are required to operate continuously (49.8 - 50.2Hz or adjusted due to slope). Should that be explained in the definition for clarity? If FSM is limited to a frequency band, should it be Limited FSM?</p>		Definition is deliberately simple – detail of requirements in S13.2.7. No change proposed

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	703			T	Storage unit – clarify if the standalone storage unit could be classified as part of the PPM		DNOs have deliberately shown the standalone storage unit as a separate PPM because the RfG requirements do not apply to storage, hence it is a separate PPM in contrast to the storage unit that is included in a PPM in the same diagram. No change proposed
	722			G	G99 should explain when the Generator should expect the draft connection agreement		This is covered in DG Guides.
	817 Table 6.1 ref and 6.2.1			G	Para related to G98 should be is out of scope	Delete para	Statements in respect of G98 is helpful to ensure users are in correct document. No change proposed
	843			T	Compliance as a separate PGM Does this mean separate control and protection will be required for the new PGM?		It is the Generator's choice how compliance of the new PGM is achieved. It will be treated separately for compliance purposes, but that does not mean that it cannot share interface protection with the existing PGM, if that is a suitable arrangement for the Generator.
	848		6.1.4.1	E	Combine para wrt single and multiple PGM	<i>Where an installation comprises a single or multiple Synchronous Power Generating Module, the application process, technical and commissioning requirements are based on the Registered Capacity of each Synchronous Power Generating Module.</i>	Suggested change made

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		Table 6.1	871	G	Comments on table headings, columns, content		Change to headings partially accommodated. Some mods to text in table. Inverter capacity clarified. Table has been discussed on several occasions with stakeholders and has not been significantly altered at this stage
			6.4	T	Should they demonstrate compliance independently? Where is the point of compliance?		The diagram has been provided to illustrate the grouping of GUs into PPMs both pre and post G99. Compliance for each module needs to be demonstrated for the whole PPM including at the point of connection. No change proposed
			6.1.6.2	G	How to avoid duplication of work when presenting compliance information to DNO and NGET?		This is no different to existing situation where D connection generators may also have a relationship with NGET. No change proposed
	962			E	Should Standard Application Form be a defined term? Should DDRC, ECC be defined?		Not thought necessary to define these terms. No change proposed.
	968		6.2.3.2	E	Add on successful completion of all the compliance requirements. Add commissioning test records to PGMD as a new item		The completed PGMD releases the FON, no change proposed. Commissioning form completion is part of the PGMD so text has been simplified here
			6.2.3.3	E	Suggest reword 6.2.3.3 to explain staged approach of EON/ION/FON		Added staged in front of process in last sentence
			6.3	E	Suggest removes unnecessary clauses / explanations		No change proposed

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	980			E	Requirements of this document – are they defined?		This para is about the common application form which had been jointly developed by the DNOs to allow easy submission of the data required for most installations –there is more data detailed in the DDRC hence the need to have this paragraph in G99. No change proposed
		6.3.2		E		Extra information. Suggest deleting. (Also 132kV is Transmission System in Scotland)	This is G59 text which is helpful explanation if more data is required. No change proposed.
		6.3.3		T	Clarify who build this model? DNO or the Generator?		Added DNO in sentence
	995	6.3.3		T	Only from Asynchronous?		Equivalent source not needed for synchronous plant modelling.
		6.3.8		E	It is DNO's responsibility to request appropriate information from the Generator. Time? Should be included in PGMD. DDRC accepts all models, but not DNO; DNO requirement should be specified in the Offer.		This clause could be clearer Reworded to 6.3.8 Where the DNO deems it necessary to ensure System Stability and security, validated detailed models of the Power Generating Module are required, in accordance with the Distribution Code DDRC.
		6.3.9.2		E		delete and add to 6.3.9.3	Type B requirements are separated from C and D as the confidentiality requirements – black box models needs to be allowed for Type C and D. No change proposed
	1039	6.3.9.3		E		propose rewording: "Subject to following items are resolved and agreed with the DNO..."	This is G59 existing text. No change proposed
	1060			E	what is defined in DPC5? describe		Text expanded

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	1067			E	Are they refers to G98? if yes delete. Out of scope		No – these sizes are not G98. No change proposed
		6.4.2.1		E	Repeat?		This section provides more detail about what data is in the DDRC. It has come from the Distribution Code. Lines 1122 – 1124 removed as superfluous, standard application form referenced
		6.4.3.1 and 6.4.3.2		E	Repeat		As above
		6.4.4.1		E		Include this clause to 6.4.4 to make the scope clear at the start	Clause moved to 6.4.4.1
		6.4.4.3		E	Additional?		May not be additional, could be same data as DNO requires. No change proposed
	1142			E	Move ref to DPC 4.5		Moved
		7.3.3.1		E	Drafting: subject to clause 7.3.3.x... generators should not operate no more than 5min.		This is a sub clause so clear it relates to short term parallel. No change proposed
	1186			G	Remainder of document		Replaced with this EREC G99
	1208	7.3.4(a)		T	Does DNO has ability to request additional protection? Who specify settings of a multifunctional relay? Who specify sensitive settings? DNO?		Settings for infrequent parallel operation are given in Table 10.2. This is G59 text. No change proposed
	1218			E	Voltage rise at the connection point? TBC Please separate voltage rise from step voltage change.		At the connection point added This para covers the reconnection of a site with standby generation to the network where both voltage rise and step voltage change are a consideration.

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	1234			E	Not sure what does this mean?		Added word switch in front of gear. It is a warning to customers that when retrofitting a generator they need to be aware of the required duty of their CBs wrt out of phase situations
			12.1.1	T	Should each PGM meet the compliance requirements separately and independently? i.e if storage PGM included in the facility, it shall meet storage compliance requirements		Yes, that is the intention, and why we included figure 4.6
			12.2.1	E	Use Grid Code words	The System Frequency could rise to 52Hz or fall to 47Hz in exceptional circumstances.	These are existing G59 (9.3.2) words No obvious merit in making the change.
			12.2.2	E	Circular reference. Delete		Deleted
			Table 12.2	E	Explain abbreviations		This drafting follows GC drafting. The points in the table match those used on figure 12.4. No change proposed
	2997	12.3.1.7			Leading pf only - no lagging pf?		This is G Code text ECC.6.3.15.8 (i) and is leading because this is the more onerous case from the consideration of retaining angular stability.
	3015	12.3.1.7 (e)			Is this correct compared to fig12.4?		Figure 12.4 is about the PGM's ability to ride a fault through. This para is about what happens once the system voltage is restored.

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		12.5.2			Why other than Registered capacity? Not sure As per def: Always there is one Gen Unit in a Sync Gen Module Also: Separate Performance Charts for individual module. (remove "s" in modules)		12.5.1 details pf requirements at registered capacity. Then the capability chart is used to define it as the MW is reduced. Re written: At Active Power output levels other than Registered Capacity , all Synchronous Power Generating Modules or Generating Units within a Power Park Module must be capable of continuous operation at any point
			12.5a		Better to define Forbidden and Blocking		No change proposed – DG Guides to pick up explanation of FFCI
	3188	12.6.2 (c)			Reference to s9.3 is incorrect		Reviewed NG drafting and changed to : Where the Generator is able to demonstrate to the DNO that blocking is required in order to prevent the risk of transient over voltage excursions arising following clearance of the fault....
	3199	12.6.2 (e)			Repeat 12.3.4 (b). Suggest to combine		12.3.4(b) has been removed 12.6.2 (e) also removed
	3206	12.7.1			Does not read correct		Removed PGM, just left PGF
	3308	13.2.5.1			(b) added only for Type C/D. Isn't it repeating 13.2.5.1, 13.2.5.2 and (c)?		This is not a repeat – the requirement in this para is for continuous and linear which is not covered elsewhere
		13.2.5.1 (c)			Two sentences in (c) swapped		Order in 12.2.4 swapped. Both 12 and 13 now align and align with GCode
	3333& 3434	13.2.6.1			Does it read correct? What does this mean?		This is long standing GCode wording and compliant with the RfG.

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	3339-3344	13.2.6.1 (a)			Would be useful to have an example how this pro-rata achieved for PPM		ΔP /Pref taking into account units not in service – explained in Figure 13.3. Text added in 13.2.6.1
		13.2.6.1 (b)			LFSM-O requires the the action must be achieved in 10sec of freq exceed the threshold. No such criteria mentioned in LFSM-U.		Not an RfG requirement for LFSM-U. No change proposed
	3356 3360	13.2.6.1 (c)			Are 2 nd Bullet point and next para contradictory?		Words are as the long standing GCode requirements ,but now stated in ECC.6.3.7.2.2
	3365		Fig 13.3		What is the reference active power? Is it running MW or rated MW Difference between “Output with falling frequency” Vs LFSM-U		Changed “Reference Active Power” into “Registered Capacity, taking into account any Generating Units not in service”. Output power with falling freq ensures that a generator at 100% output continues at at least 95% output as the freq falls. However if the generator wasn’t already operating at 100% output LFSM-U would mean they would increase their output.
	3388	13.2.7.1 a)			Generator would not have information about the frequency control device at the connection application stage. Appropriate timing would be at DRC- DPDII (equivalent compliance statement)?		Added to application form – then can be updated throughout submission
		13.2.7.4			Circular ref to S 13.2.7		This is intentional part of the drafting to refer reader to Annex C.10 as well as this Section 13.2.7. No change proposed
	3759	13.6.2 (c)			Para 13.6.1 (d) ref incorrect		Ref modified to 13.6.2 (d)

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	4332 4334	17.1.2			Expect such charge is included in the Offer cost?		Agree, but no change to drafting proposed
	4433	17.4.3			What does it mean by “..FON as part of Connection Agreement”?		Agreed at the 06/02/18 stakeholder feedback workshop to put a FON proforma in to the Connection Agreement to be signed at the end of the process by the DNO. Connection Agreement is document that will be kept safe by the Generator.
	4481	18.2.3 (c)			Simulation models as per section...? reference		Added ref to Section 6.3 and Section 21 as applicable
		18.3.5			Annex C.3 and C2-1 check these annex Why PGMD and separate installation & commissioning document? Include tp PGMD		Form C3 is referenced in the PGDM. It is a large form used only at time of commissioning and has not been directly included in the PGMD
		18.4.2			18.3.5 refers to installation & comm document, why?		18.3 is the witness and commissioning section – site tests etc 18.4 is the final wrap up section to make sure all data and information given is in order before a FON is issued.
		19.1.2			Does this mean DNO will witness Type Test or just commissioning test?		Text clarified that it is the commissioning tests the DNO will witness

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		19.2.2			Remove.large gens: Only Grid Code or GC+G99? BECA sh5 normally request Gen to discuss with host DNO Why not apply for Type C? 25MW gen in SHEPD is Type C but large? two classifications. Suggest to remove reference to Large PS to avoid confusion.		Deal with in the response on Large, Medium and Small.
	4598	19.2.3			DNO initiates SRS	Delete "to the DNOs satisfaction	But the SRS needs input from the Generator. No change proposed
		19.2.3			Forecast data Connection offer – suggest defining		Not thought necessary to define these terms. No change proposed.
		19.2.4			19.2.3 (a) requires DDRRC schedule Why two options here?		Standard Application form is convenient way for generator to submit data – it may not have prompt for absolutely everything that the DNO / NG might need about the larger generators hence ref to DCode retained here. No change proposed
		19.2.5			Unclear. Does this refer to self declaration? Why DNO need 28days? Does DNO need anything other than protection settings?		This is normal operational practice – and the drafting does allow for less than 28 days which in many cases would be the norm.
		19.2.6			Circular reference		This is intentional part of the drafting to result in an EON. No change proposed
		19.3.3			Remove and bring up para below		Modification made

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		19.3.3 (c)			report(s) Frequency sensitive Mode is defined in 13.2.7 Why not refer to compliance statement		One report desirable no change proposed This text should follow GCode, however checked and NG ref the FSM not FSM-O and U. Our appendix with study requirements lists all three so drafting has been modified to include reference to LFSM.
	4622	19.3.3.1 (d)			Ref to Annex incorrect for PPM		Modified ref to Annex C.9
		19.3.4			move 19.3.6 : a Notification of Gen's intention to synchronise		19.3.5, 6 and 7 re-ordered
		19.3.6			Simulation studies, not test..?		Tests as well – 19.3.3.3 (d)
		19.3.7			Moderators to tidy up para suggested		Para simplified
		19.3.8			Module not facility? Conditions not terms?		ECP.6.3.6.3 NG use PGM Changed to module Terms is used by GCode
	4686	19.3.9 (a) (ii)			Add: "...successful completion of this test DNO will revise the ION to 100% output allowing additional generations...		This text mirrors the NG approach and goes on to say that the restriction is only until completion of the relevant tests.
		19.3.9 (b)			Incorrectly worded		On review this text is OK. No change.
		19.3.11			Witness test should be able to carry out prior to harmonic validation or model validation		Agree -19.3.11 does not appear to prevent this.
		19.4.2			Remove and bring up para below		Modification made
		19.4.2.2			Delete heading sentence		Done

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		19.4.2.2 (b)			Excitation system – change to voltage control system Ref to C7 and C8 wrong		Ref updated
		19.4.2.2 (b)			Para 13.1.3, Section 13.2 wrong ref		13.1.3 is about active power setpoint, 13.2 is freq response – these are correct ref. No change proposed
		19.4.2.2 (b)			Incorrect Annex refs. Delete governor and load controller response performance		Annex refs updated. No change proposed to text wrt governor and load controller response performance as this helps reader find their way into the Annexes
		19.4.2.3			Delete first sentence as repeat 19.4.2		It is a catch all sentence followed by agreement about alternative – no change proposed.
		19.4.3.1 (b)			Not read correct		Changed to The items required....updated as necessary by the Generator
		19.4.5			PGF owner – Undefined. Correct term "Generator"		Correction made
4982 4985		20.3.2			Replacement – subject to clause 20.3.3 and 20.3.4 TBC - re-powering. Whole WF to be complied with G99 if one of the turbines replaced with a higher capacity.		Agree, but no change proposed
		C2			EON not ION		PGMD first required at ION stage – data required at EON common app form and SRS only. No change proposed

Distribution Code Consultation Response Proforma Deep Sea Electronics

DCRP/PC/18/02: Implementation of the EU Network Code Requirements for Generators

Stakeholders are invited to respond to this consultation, expressing their views or providing any further evidence on any of the matters contained within the consultation document. Stakeholders are invited to supply the rationale for their responses to the set questions.

Please send your responses and comments by **17:00 on 01 February 2018** to dcode@energynetworks.org and please title your email 'Consultation Response DCRP/PC/18/03 RfG'. Please note that any responses received after the deadline may not receive due consideration by the DNOs.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5124, or to dcode@energynetworks.org

Respondent	<i>Greg Middleton MSc Principal Engineer</i>
Company Name	Deep Sea Electronics plc
No. of DCode Stakeholders Represented	1
Stakeholders represented	Deep Sea Electronics plc
Role of Respondent	<i>Equipment Manufacturer</i>
We intend to publish the consultation responses on the DCode website. Do you agree to this response being published on the DCode website? [Y/N]	Yes

Distribution Code Consultation Response Proforma Deep Sea Electronics

	Question	Response	DNOs' Response
Q1	Comments are welcome on any part of the draft Distribution Code, G98 and G99. Please comment in the manner that is most convenient to you. Specific word templates are available in the consultation pack for making detailed drafting comments on, but please do not feel constrained to use them.	Please see the table below	
Q2	Do you have any general comments on how effectively the RfG requirements have been incorporated into GB documents and is there any aspect that needs modifying before final publication?	<p>It is very unfortunate that the compliance process is not the one intended by the RfG. It is self-certification by manufacturers to Engineering Recommendation G99 and as such is GB specific and not at all harmonised across member states. The RfG clearly intends harmonisation using formal laboratory testing to a harmonised European Standard to facilitate cross border trade. This GB specific approach will do nothing to facilitate cross border trade and may well increase trade barriers.</p> <p>We should emphasise that this is in no way the fault of GB authorities who have done their utmost to resolve the problems caused by a fundamentally flawed piece of EU legislation that fails to specify the QA level required for Accredited Laboratories to issue Equipment Certificates. The failure to ensure an appropriate harmonised European standard is in place is the other obstacle to implementing the RfG as intended.</p> <p>While the proposed compliance system is a pragmatic solution to the problem for GB, it does raise fundamental concerns;</p> <ol style="list-style-type: none"> 1. The criteria for acceptance of a manufacturer's self-declaration of compliance with G99 is not clear and could lead to disputes between manufacturers, generators and DNOs. 2. When a dispute does arise, the only arbitrators are Ofgem and the courts. 	<p>We know that BEIS is aware of these issues. DNOs agree that there appears to be a gap in the legal implementation in relation to harmonization of requirements at this level of detail.</p> <p>The DNOs now believe that G99 is effectively finished and fit for purpose. It was certainly in a less complete state in earlier consultations, but with one or two exceptions those issues have all been sufficiently resolved, not least with the conscientious help of AMPS and ADE members through workshops and drafting help.</p> <p>It is the DNOs view that the remaining issues, shared with National Grid, need to be raised as further modifications without delay, not least to ensure that all stakeholders are able to comment fully on the proposed solution. This includes the defect referred to re LFMS-O compliance.</p>

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		<p>3. With no formal laboratory involvement and not even a British Standard never mind a European one it could be very hard to resolve disputes.</p> <p>It has been suggested that once a harmonised European standard does become available in one to two years time G99 should be reworked to reference it. Unfortunately, this will do nothing to resolve the lack of a QA level so Certified Laboratories will still not be able to issue Equipment Certificates. There is also doubt that there would be a good enough financial case to create the Notified Body that would probably be required for this process.</p> <p>Reworking G99 like this will add a significant additional burden to an industry still coming to terms with the changes caused by the RfG. It should be subject to full scrutiny by a cost-benefit analysis like any other code changes and only be carried out if financially justifiable.</p> <p>We are concerned that G99 is still unfinished and includes errors that are acknowledged by the authors. This inevitably means it will have to be completed after this last opportunity for scrutiny which is far from ideal.</p>	
Q3	Are there any comments on the G99 drafting points that are listed in section 2.3.3 above?		
Q4	Do you have any comments on the draft common application form included in the consultation pack, or on the envisaged connexion and compliance assessment process?		
Q5	Please indicate (ASAP, ie before the closing date of 01/02/18 if possible) if you have any views relating to the logic or re-ordering etc of the forms in G99's annexes		
Q6	Guidance Note 3 in the Distribution Code relating to Stirling engines had expired. It is		

Distribution Code Consultation Response Proforma Deep Sea Electronics

	proposed to extend this now until the RfG is effective from 18/05/19.		
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Please provide comments relating to the specific technical content of EREC G99

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/ Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	22		2 Scope and Structure	General	Read literally, this says there is a hard changeover on 17/5/2019, you can only use G99 from that day and not before i.e. there is no transition period.	For practicality, there has always to be a transition period during which you can use either G59 or G99.	The foreword explains that compliant kit be connected anytime in advance of the date The second para of the foreword has been added as a footnote to the first para of 2.1 to address this comment.
	2289			Editorial	Sentence is truncated	Complete it	Completed with the word "protection"
	2692			Editorial	No full stop, is the sentence complete?	Complete it	Full stop added. The sentence is complete
	2791		11.3 Fault Ride Through and Phase Voltage Unbalance	Technical	The RfG does not require band A to provide FRT. G59 only requires Medium and Large power stations to provide FRT. The Distribution code does require it "where it has been agreed" but does not specify any specific curve leaving it an open-ended requirement.	Clarify that no band A PGM will be compelled to provide FRT type requirements against their wishes. Compelling a PGM to meet an unspecified FRT curve is unreasonable.	Rephrased as: Any Power Generating Module or Power Generating Facility connected to the DNO's Distribution Network, where Where it has been <u>specifically</u> agreed between the DNO and the Generator that the a Power Generating Facility will contribute to the DNO's Distribution Network security, (eg for compliance with EREC P2) <u>the Power Generating Module(s)</u> may be required to withstand, without tripping, the effects of a close up three phase fault and the Phase (Voltage) Unbalance imposed during the clearance of a close-up phase-to-phase fault ,in both cases cleared by the DNO's main protection.

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Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/ Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	2854		12.1.3.2 The DNO will provide details of the method to be employed on a site by site basis. Protocols currently in use between DNOs and Generators include simple current loop; DNP3; IEC 61850.	General	It is unfortunate that this opportunity to standardise the comms protocols between DNO and PGM has been missed. We have been trying to start a discussion on this for two years but with no response from the DNOs. This clause is prescriptive yet subsequent clauses 12.1.3.3, 12.1.3.5 and 12.2.3.6 are cooperative "the DNO will agree with the generator"	Change this clause to be cooperative as in subsequent clauses.	1 st sentence of 12.1.3.2 has been deleted leaving text in 12.1.3.3.
	3033		12.3.2 ...close-up phase-to-phase fault...		This is an open-ended requirement to meet a more onerous but unspecified curve beyond that in Table 12.1.	Clarify that no band B PGM will be compelled to provide FRT type requirements beyond those in Table 12.1 against their wishes. Compelling a PGM to meet an unspecified FRT curve is unreasonable.	In addition to paragraphs 12.3.1.1 – 12.3.1.7 any Power Generating Module or Power Generating Facility connected to the DNO's Distribution Network, where it has been <u>specifically</u> agreed between the DNO and the Generator that the Power Generating Facility will contribute to the DNO's Distribution Network security (eg for compliance with EREC P2), <u>the Power Generating Module(s)</u> may be required to withstand, without tripping, the effects of a close up three phase fault and the Phase (Voltage) Unbalance imposed during the clearance of a close-up phase-to-phase fault , in both cases cleared by the DNO's main protection.

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Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/ Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	3054		12.3.4 Other Fault Ride Through Requirements b)	Technical	What is the acceptance criteria for being able to withstand multiple events? E.g. does two FRT events per hour demonstrate their "repeated ability"? Does this paragraph intend to refer to 12.4.1 because it confuses between FRT events in 12.3 and a wider than normal voltage range in 12.4		It has been agreed with National Grid that this sub para (b) is not required. It has been deleted.
	4156		15.4.1 b) second bullet point	Technical	This states that the operating time will be measured by stepping from 50.0Hz to 0.2Hz past the threshold. It should be from 0.3Hz before the threshold to 0.3Hz after the threshold as in A2-4 and in G59.	Correct it. Note some bullets in this section duplicate some of the numbers from the A2-4 but others give up and don't duplicate any, just referring to the annex. Wouldn't it be better to drop all duplication and only refer to the annex?	There is an existing conflict in G59 between the step in 12.4 which is given as 0.2 Hz which corresponds with the site test requirements and the 0.3 Hz which is detailed in the type testing section 13.8. 15.4.1 has been aligned with the A2-4 commissioning annex at 0.3 Hz and the historic differences between the type testing forms and the commissioning forms removed. This section is an existing section in G59 which has similar drafting. It has a description of the additional tests for non-type tested interface protection rather than the Annex descriptions which are methodologies for type testing/ compliance verification. Hence it is important that it remains in the document and refers to the site compliance and commissioning forms

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Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/ Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	4182		15.4.1 d)	Technical	There is no description of the VS immunity test	Describe it.	New text added to 15.4.1.d to point to the relevant tests in the testing and commissioning forms.
	4294		16.3.4	Technical	This seems to be saying that the equipment manufacturer must prevent the generator from modifying the type-tested parameters, but that will also prevent the DNO and installer from modifying them. DNOs have objected to this in discussions.	Clarify how access is to be restricted.	It is intended that the access to protection settings is locked off for type tested. No change proposed at this time.
	4964		20.2.2	General	If the replacement equipment is type-tested then the DNO should not be able to request compliance testing.	Clarify that it doesn't apply to type-tested equipment unless the DNO has good cause to believe the type-test report is invalid.	Additional sentence added: Note that where the replacement equipment is itself Type Tested or supported by appropriate Manufacturers' Information , tests and checks on site can be limited to functional checks such as to comply with paragraph 15.2.
	4969		20.3.1	General	If the replacement equipment is type-tested then the DNO should not be able to request compliance testing.	Clarify that it doesn't apply to type-tested equipment unless the DNO has good cause to believe the type-test report is invalid.	Type tested complies with G99 so no compliance testing would be requested. No change proposed
	4973			Editorial	Incomplete sentence	Complete it.	The last sentence in 20.3.1 is erroneous and has been deleted.

Distribution Code Consultation Response Proforma Deep Sea Electronics

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/ Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	5017		A2-1 Compliance Verification Report –Tests for Type A Synchronous Power Generating Modules up to and including 50 kW	Technical	<p>In sections 4 and 5 the interface protection parameters are more demanding than in A2-4 i.e. the type tests for a protection relay are more demanding than the site tests.</p> <p>As they are more demanding than the requirement in G59 they would lead to the redesign of protection relays, but there has been no discussion about any need to increase these requirements.</p> <p>Also, some requirements such as trip level acceptance windows are missing making the tests pointless.</p>	Copy the requirements from A2-4 (which match those in G59) into A2-1 for consistency and completeness.	<p>There is a historic discrepancy from G59 between the interface protection testing parameters in the type testing annex which matched those in the type testing forms and the site testing form.</p> <p>There was a missing note from G59 about trip threshold and trip time under the schedule which has been reinstated.</p>
	5024		A2-3: Compliance Verification Report for Inverter Connected Power Generating Modules	Technical	The same issue as for A2-1, the interface protection parameters need to be consistent regardless of whether this is synchronous or asynchronous as the same protection relays are used in all installations.	Copy the requirements from A2-4 (which match those in G59) into A2-3 for consistency and completeness.	As above

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Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/E ditorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	5026		A2-4: Site Compliance and Commissioning test requirements for Type A Power Generating Modules	Technical	Frequency stability test "Inside normal band" should be 50.8Hz not 50.3Hz i.e. 0.2Hz from the trip. The description of the test should also say that it steps from 50.8 and back to 50.8	Correct it.	Corrected to 51.8 Hz in 3 places
	5026		A2-4: Site Compliance and Commissioning test requirements for Type A Power Generating Modules	Technical	No boxes for VS stability test	Add them after those for LOM stability test	The test for + 50 deg ad -50 deg had lost their initial column defining them as Positive Vector Shift and Negative Vector Shift. This has been rectified.
	5359		A7.1.2.2 Over / Under Voltage	Technical	This annex contains the more onerous tests for interface protections also seen in A2-1	Bring them in line with A2-4 and G59 or better still remove the unnecessary duplication of values.	There is a historic discrepancy from G59 between the interface protection testing parameters in the type testing annex which matched those in the type testing forms and the site testing form. The tests have now been aligned.
	5929		Figure A.7.8: LFSM-O step response test		Shouldn't the lines be defined numerically to avoid dispute?	Define them numerically	DNOs agree that more needs to be done to define better the performance requirements. This necessitates work with National Grid as it is the TSO that specifies LFSM-O parameters
	6409		Figure B.5.1: LFSM-O step response test	Technical	Shouldn't the lines be defined numerically to avoid dispute?	Define them numerically	As above

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Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/E ditorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
	6609		Figure B.6.3: LFSM-O BC3 step response test	Technical	Shouldn't the lines be defined numerically to avoid dispute?	Define them numerically	As above

Distribution Code Consultation Response Proforma Tesla

DCRP/PC/18/02: Implementation of the EU Network Code Requirements for Generators

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Stakeholders are invited to respond to this consultation, expressing their views or providing any further evidence on any of the matters contained within the consultation document. Stakeholders are invited to supply the rationale for their responses to the set questions.

Please send your responses and comments by **17:00 on 01 February 2018** to dcode@energynetworks.org and please title your email 'Consultation Response DCRP/PC/18/03 RfG'. Please note that any responses received after the deadline may not receive due consideration by the DNOs.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5124, or to dcode@energynetworks.org

Respondent	<i>Name</i>
Company Name	<i>Martin Cottrell</i>
No. of DCode Stakeholders Represented	1
Stakeholders represented	TESLA
Role of Respondent	User
We intend to publish the consultation responses on the DCode website. Do you agree to this response being published on the DCode website? [Y/N]	Yes

Distribution Code Consultation Response Proforma Tesla

	Question	Response	DNOs' comments
Q1	Comments are welcome on any part of the draft Distribution Code, G98 and G99. Please comment in the manner that is most convenient to you. Specific word templates are available in the consultation pack for making detailed drafting comments on, but please do not feel constrained to use them.	<p>The language of G99 (and G89) describes three operating regimes (eg section 7.1):</p> <ul style="list-style-type: none"> a) Long-term parallel operation b) Infrequent short-term parallel operation c) Switched alternative-only operation. <p>As you know, storage systems are increasingly being designed for long-term parallel operation, but with the facility to swap to providing an alternative supply if/when the grid is lost. This mode of operation isn't really described very well by the above three options – and I think we need to add some notes to describe this at the start of section 7.1 (saying that a system can be designed to switch between modes – its gets clearer the more you read into the document, but it isn't obvious at the start). For “backup-enabled” systems we need to ensure installers know how our grid codes apply and whether to apply the rules for a, b or c (above) and what to do when requirements contradict (which takes priority) – I'm sure we all know what is appropriate, but a fresh reader may not.</p>	This is a valid comment and has been addressed below in the detailed section on G99
Q2	Do you have any general comments on how effectively the RfG requirements have been incorporated into GB documents and is there any aspect that needs modifying before final publication?		
Q3	Are there any comments on the G99 drafting points that are listed in section 2.3.3 above?		
Q4	Do you have any comments on the draft common application form included in the consultation pack, or on the envisaged		

Distribution Code Consultation Response Proforma Tesla

	connexion and compliance assessment process?		
Q5	Please indicate (ASAP, ie before the closing date of 01/02/18 if possible) if you have any views relating to the logic or re-ordering etc of the forms in G99's annexes		
Q6	Guidance Note 3 in the Distribution Code relating to Stirling engines had expired. It is proposed to extend this now until the RfG is effective from 18/05/19.		

Distribution Code Consultation Response Proforma Tesla

Please provide comments relating to the specific technical content of EREC G99

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
45	1151	7.1		E	As you know, storage systems are increasingly being designed for long-term parallel operation, but with the facility to swap to providing an alternative supply if/when the grid is lost. This mode of operation isn't really described very well by the above three options – and I think we need to add some notes to describe this at the start of section 7.1 (saying that a system can be designed to switch between modes – its gets clearer the more you read into the document, but it isn't obvious at the start). For “backup-enabled” systems we need to ensure installers know how our grid codes apply and whether to apply the rules for a, b or c (above) and what to do when requirements contradict (which takes priority) – I'm sure we all know what is appropriate, but a fresh reader may not.		7.1 additional text added “In the case that a Power Generating Module is designed to switch between these modes of operation, it must be designed to comply with the requirements for each mode.”

Distribution Code Consultation Response Proforma Tesla

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
219	5067	A.4.2		T	<p>For example, line 5067 states as an exemption: “<i>The constant Active Power output requirement in 11.2.4</i>”.</p> <p style="margin-left: 40px;">➤ <i>I don't think it's clear if this just means 11.2.4.1 (a)</i></p> <p>The same goes for all the other exemptions in this section – I don't think its crystal clear what exactly is not required.</p>		<p>A.4.2 amended as follows:</p> <p>Type A -less than 1 MW:</p> <ul style="list-style-type: none"> The constant Active Power output requirement <u>contained in the whole of paragraph</u> 11.2.4; The Limited Frequency Sensitive Mode – Overfrequency requirements <u>contained in the whole of paragraph in</u> 11.2.5; <p>And similar amendments to Types B and C/D</p>

Distribution Code Consultation Response Proforma WPD

DCRP/PC/18/02: Implementation of the EU Network Code Requirements for Generators

Stakeholders are invited to respond to this consultation, expressing their views or providing any further evidence on any of the matters contained within the consultation document. Stakeholders are invited to supply the rationale for their responses to the set questions.

Please send your responses and comments by **17:00 on 01 February 2018** to dcode@energynetworks.org and please title your email 'Consultation Response DCRP/PC/18/03 RfG'. Please note that any responses received after the deadline may not receive due consideration by the DNOs.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5124, or to dcode@energynetworks.org

Respondent	<i>Andrew Hood</i>
Company Name	Western Power Distribution
No. of DCode Stakeholders Represented	
Stakeholders represented	<i>Western Power Distribution</i>
Role of Respondent	<i>Distributor</i>
We intend to publish the consultation responses on the DCode website. Do you agree to this response being published on the DCode website? [Y/N]	Yes

Distribution Code Consultation Response Proforma WPD

	Question	Response	DNOs' comments
Q1	Comments are welcome on any part of the draft Distribution Code, G98 and G99. Please comment in the manner that is most convenient to you. Specific word templates are available in the consultation pack for making detailed drafting comments on, but please do not feel constrained to use them.	Comments are provided in the template, below	
Q2	Do you have any general comments on how effectively the RfG requirements have been incorporated into GB documents and is there any aspect that needs modifying before final publication?	-	
Q3	Are there any comments on the G99 drafting points that are listed in section 2.3.3 above?	Please see the detailed comments on G98 and G99, below	
Q4	Do you have any comments on the draft common application form included in the consultation pack, or on the envisaged connexion and compliance assessment process?	-	
Q5	Please indicate (ASAP, ie before the closing date of 01/02/18 if possible) if you have any views relating to the logic or re-ordering etc of the forms in G99's annexes	It is unclear whether generators rated above 50kW may be type tested. The forms do not seem to apply to asynchronous non-inverter type generators. Further detailed comments are provided on specific G98 and G99 below.	There is now no upper limit, apart from that of practicality, on type testing. Induction generators are generally treated as synchronous machines for some aspects of compliance etc. This is dealt with in the text at the start of A2 in G99.
Q6	Guidance Note 3 in the Distribution Code relating to Stirling engines had expired. It is proposed to extend this now until the RfG is effective from 18/05/19.		

Distribution Code Consultation Response Proforma WPD

Please provide comments relating to the specific technical content of **G99**

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
G98 p8	149-152	2.9	1	T	What do out of scope generators need to comply with?	Out of scope generators shall comply with EREC G99	Text modified
G98 p10	191	3.1	1	E	BS7671 - Should the edition number be specified? This will become out of date quickly.	Omit edition number	Text modified
G98 p11	242	3.1	15	E	IEC 60909-1 – Should the edition number be specified?	Omit edition number	Text modified
G98 p11	245	3.1	16	E	IEC 62282-3-2 – Should the edition number be specified?	Omit edition number	Text modified
G98 p11	259	3.2	2	E	G5 – should the issue number be specified? This document is currently being modified.	Omit issue number	Text modified
G98 p13	308	4	(a)	T	The “area typically served by a single Low Voltage feeder circuit” is ambiguous	Replace with “the area served by a single Low Voltage feeder circuit”	Text changed
G98 p14	347	4		T	Droop – the words do not make sense to me. The “change in frequency” is not referred to as “nominal frequency”. The change in Active Power is not “referred to as Registered Capacity”.	Use the definition in G99	Definitions aligned

Distribution Code Consultation Response Proforma WPD

Page No	Line No	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
G98 p15	381	4		T	LFSM-O – No definition has been provided	Provide definition	Definition aligned with G99
G99 p8	22	2.1	2	T	This statement seems to contradict the Forward which allows generators to be connected under G99 prior to 17 th May 2019.	Re-word to allow generators to be connected to G99 in advance of 17th May 2019	Footnote added to provide clarification
G99 p8/9	39	2.3		G	Some <16A generators are out of scope of G98. What are the requirements for these generators?	Please clarify	They are either type tested, or they cannot be connected in parallel – lines 41-43 make this clear. Suggest no change.
G99 p11	102	3.2		E	BS7671 - Should the edition number be specified?	Omit edition number	Edition number deleted
G99 p11	135	3.2		T	BS EN 60044-1 has been superseded by BS EN 81869-2	Please update	Replaced with BS EN 61869 Instrument transformers. Additional requirements for current transformers.
G99 p12	183	3.3		E	G12 - should the issue number be removed?	Omit issue number	Issue number deleted
G99 P13				G	A definition for Rapid Voltage Change (in accordance with P28/2) should be added	Add the P28/2 definition for Rapid Voltage Change.	It is not obvious that we need to do this. If we make reference to P28, it is covered in there. Suggest no change.
G99 p21	539	4.1		T	Step Voltage Change – the definition from P28/2 should be used	Replace definition with the P28/2 version.	It is very close (albeit not identical) to the new P28. It is not clear what benefit would be achieved by the substitution. Suggest no change at this time.

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G99 P23	618	4.1?		E	Should the following section (Examples) have a dedicated clause number and title?	Consider creating a section called “4.2 Examples of Power Generating Module Types”	Heading included:: 4.2 Illustrative examples of Power Generating Module types and categorisation
G99 p25	646	4.1?	Fig 4.3 a)?	E	Diagram does not have a reference or title	Add reference / title	They are part of Figure 4.2 title which is at the bottom of the a), b) and c).
G99 p25	652	4.1?	Fig 4.3 b)?	E	Diagram does not have a reference or title	Add reference / title	As above
G99 p35	882	6.1.5.2	Fig 6.2	E	Existing generator should be commissioned to G98 or G99	Correct Figure	Correct figure included
G99 p43	1067	6.4.1.4		T	The DNO will almost certainly need additional information to assess the power quality impact of HV connected generators rated below 300kW and non-type tested LV generators rated below 50kW.	Remove the final paragraph of 6.4.1.4	This is long standing DPC7.3 text. Concern that harmonic data is needed for smaller generators. This may need to be addressed in a future modification.
G99 p49	1323	7.5.2	2 nd sentence	G	“this will result in voltage rises of a 6 th of those created by a single phase connected Power Generating Module”. The preceding statement is not necessarily correct. The relative voltage rise will depend on a number of factors including the network configuration, the location, magnitude and phasing/ balancing of other load / connections and the relative impedance of the phase conductors and neutral conductors.	“this is likely to result in significantly lower voltage rises than those created by a single phase connected Power Generating Module”	Change to text made

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G99 p50	1368 and 1370	7.7.1		G	The use of “Generator” suggests that Voltage Management Units are only applicable to Generator installations	Replace Generator with Customer	Whilst G59 referred to Customer in this area we have attempted to be consistent with the use of the terms Generator and Customer in G99. We only use Customer where we are referring to someone other than the Generator. In this case this text is applicable to the Generator (only Generators will be reading this document) and hence we do not propose to change the text.
G99 p51	1372	7.7.2		G	As previous comment	Replace Generator with Customer	As above
G99 p57	1490	78.3.1		E	The term “ESI” is no longer used. Normally the document issue number is omitted	“EREC G12”	Replaced with ENA and removed issue number.
G99 p65	1700	9.3		E	Should this section be moved under the Power Quality section?	Consider moving to the power quality section.	Arguably it’s separate issue. Pros and cons of moving it – so on balance no change at this time.
G99 p65	9.3	1700	9.3	G	The new version of P28, P28/2, specifies planning levels and compatibility levels for step voltage change and rapid voltage change	Change title to Step Voltage Change and Rapid Voltage Change	Rapid V change added. Added definition of RVC from draft P28: rapid voltage change (RVC): change in root mean square (RMS) voltage over several cycles
G99 p65	9.3.1	1701		G	“Step Voltage Change”	Replace with Step Voltage Change and Rapid voltage Change	RVC included

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G99 p65	9.3.2	1707		G	The limits in P28/2 are not “typical”. Also “Step Voltage Change” should be replaced by “Step Voltage Change and Rapid Voltage Change”	Remove “typical” Replace with “Step Voltage Change” with “Step Voltage Change and Rapid voltage Change”	Typical deleted, RVC included
G99 p65	9.3.3	1710		G	This phenomenon is captured by the term Rapid Voltage Change	Replace “is not easily captured by the definition of Step Voltage Change used in this document” with: “is captured by the term Rapid Voltage Change”	Reworded as: The voltage depression arising from transformer magnetising inrush current is a short-time phenomenon captured by considerations of rapid voltage change. In addition the size of the depression is dependent on the point on wave of switching and the duration of the depression is relatively short in that the voltage recovers substantially in less than 1 s.
G99 p65	9.3.4	1715		G	Requirements for transformer energisation are now explicitly covered by P28/2.	“Requirements for the energisation of transformers are defined in EREC P28”	P28 Issue 2 not yet published.
G99 P65	1714	9.3.3		T	Insert ‘may’ as the time taken may exceed 1s.	“...voltage may recovers substantially in less than 1s.	This change because it changes the sense of the sentence. Can be addressed in a future review of G99 to reflect P28 issue 2.
G99 p65	1715	9.3.4		G		Replace ‘should’ with ‘shall’.	Change made

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G99 p65	1715	9.3.4		T	Need to cover all normal operating conditions, including G59 auto-closing. EREC P28/2 defines normal operating conditions as 'variation of generation/demand, the energisation/de-energisation of plant and equipment as a consequence of temporal, seasonal and operational variability, including credible outages, under which the supply system is designed to operate'.	Revise text accordingly.	P28 issue 2 has not been adopted yet so we cannot legitimately use it. Another reason to prompt a review of G99 to align better with P28/2 when it is published.
G99 p65	1721	9.3.5		G		Replace 'should' with 'shall'.	Change made
G99 p65	1725	9.4.1		T	Strictly, voltage unbalance can occur without distortion of the voltage waveform.	Revise text accordingly.	Change made: The connection and operation of Power Generating Modules may cause Phase (Voltage) Unbalance and/or a distortion of the Distribution Network voltage waveform resulting in voltage fluctuations and harmonics.
G99 p65	1729	9.4.2.1		T	P28 has different limits for Stage 2 and Stage 3 and so the ext could e misconstrued to allow Stage 3 limits without attempting to comply with Stage 2. Which limits do we mean? You only get to Stage 3 limits if all practical means to comply with Stage 2 limits have been exhausted.	' shall not result in flicker that breaches the limits for flicker that is non-compliant with EREC P28'.	Change made

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G99 p65	1734	9.4.2.2		T	Fault level in isolation may not be sufficient. X/R ratio may also need to be considered. The voltage change that is proportional to the flicker severity depends on $R\cos \theta$ and $X\sin \theta$.	Replace 'fault level' with 'supply impedance'.	Change made
G99 p66	1747	9.4.3.1		T	The explanation omits the impact that the Generator's internal network cable susceptance can have on changing the harmonic impedance and creating a resonance, NB This is the same issue reference in 9.4.3.3.	Harmonic currents produced within the Generator's system and modification of the harmonic impedance caused by the addition of the Generator's installation may cause excessive harmonic voltage distortion in the Distribution Network.	Change made
G99 p66	1747	9.4.3.1		T	The third sentence refers to additional equipment but not new. EREC G5 applies to new connections and modified connections. Further, the Connection Agreement may impose ongoing conditions.	Delete third sentence.	New equipment is additional by definition, and there could be any specific requirement on any topic in the connexion agreement. I would rather stay as it is because it communicates an important point.
G99 p66	1753	9.4.3.2		E		Add 'Detailed testing requirements are described in Annex A.7'.	Change made
G99 p66	1745	9.4.2.3		E	Should this refer also to Annex A.2 which includes Compliance Verification Reports for flicker/voltage fluctuations?		Ref to form A2-1 or A2-3

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G99 p66	1753	9.4.3.2		E	Should this refer also to Annex A.2 which includes Compliance Verification Reports for harmonic emissions and Annex A.7 which describes detailed testing requirements?		Ref to form A2-1 or A2-3
G99 p66	1763	9.4.3.3		T	The text is not accurate.	Delete text and rely on text added to 9.4.3.1.	I believe this para exists because of specific issues some DNOs have had. The wording can doubtless be improved but removing it and just relying on 9.4.3.1 seems to lose an important point.
G99 p66	1771	9.4.4		E	Use correct term.	'Voltage Unbalance'	Imbalance is better English, even if less common in this context. I imagine we should be conventional and wrong rather than correct but confusing.
G99 p66	1772	9.4.4.1	1 st sentence	T	P29 does not set Distribution Network compatibility levels for voltage unbalance. The scope of P29 states "The limits relate specifically to the voltage un-balance attributable to the proposed new load and are not intended to be applied as generalised network limits"	Amend the first sentence accordingly.	Suggest replace with: EREC P29 is a planning standard which provides limits for voltage unbalance caused by uneven loading of three phase supply systems.
G99 p66	1773	9.4.4.1	1 st sentence	T	EREC P29 sets Planning Levels (Limits) not Compatibility Levels. The latter are set at LV and MV in IEC 61000-2-2 and IEC 61000-2-12.	Replace 'compatibility levels' with planning levels'.	Sentence has been modified as above

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G99 p66	1774	9.4.4.1	2 nd sentence		The text should refer to BS EN 50160. See DCode DPC 4.2.3.1. Note that to avoid nuisance tripping of the Generator equipment due to current imbalance or voltage unbalance it is critical that the levels that may occur on the Network are taken into account. De-rating or oversizing Generator equipment may be necessary to reduce the likelihood of nuisance tripping.	'BS EN 50160:2010 'Voltage Characteristics of Electricity Supplied by Public Distribution Systems' contains details of the variations and disturbances to the voltage which shall be taken into account in selecting Equipment from an appropriate specification for installation on or connected to the System .'	Included: BS EN 50160 contains details of the variations and disturbances to the voltage which shall be taken into account in selecting equipment from an appropriate specification for installation on or connected to the Distribution Network .
G99 p66	1774	9.4.4.1	2 nd sentence	T	P29 does not provide network limits	"Power Generating Modules should be specified, designed and operated so as to perform satisfactorily under the local network unbalance conditions.	P29 does provide limits at the pcc which anyone connecting a load has to comply with – this is something tangible that the generator can base a design on. The proposed change is open ended from a generators design perspective. This would be a new requirement which we shouldn't make at this stage
G99 p66	1775	9.4.4.1	3 rd sentence	T	LV voltage unbalance can be substantially higher than the values quoted (due to single phase connections and unbalanced 3 phase and split phase loads). Values at 11kV and 6.6kV may also be substantially higher than 1% where the local network includes sections of HV single phase line or cables	Add caveats	It is caveated already, albeit softy "rarely exceeds" This is existing G59 text which we should not change at this point in the consultation
G99 p67	1781	9.4.5		E	Should this be clause 9.4.4.2?	Renumber?	Was wrong in G59 – but have renumbered now

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G99 p67	1781	9.4.5		T	This clause does not align with 4.3 of EREC P29.	Clarify that these values apply at the point of common coupling in respect of the unbalance caused by the proposed load	This is existing G59 text which we should not change at this point in the consultation. It could be added to a review of G99 prompted by P28 and P29.
G99 p67	1789	9.4.5.2		G	This doesn't seem to have anything to do with un-balance.	Should this be included in the protection section?	It is the same format as in G59.except para numbering was incorrect now - resolved
G99 p74	2049	10.1.1		G	A 2 stage approach is only used for over voltage and under frequency	Remove the second sentence.	It does say "where practicable" – on balance leave as is.
G99 p77	2194	10.3.6		T	BSEN 60044 (Instrument Transformers) has been superseded by BSEN 61869	Update reference	Reference updated
G99 p84	2442	10.6.7.1	Table 10.1	T	Should LoM protection for Type Tested generation align with G59/3-3?	Change to 1.0Hz/s time delay 0.5s	Not yet – only when G59 changes.
G99 p88	2580	10.6.17		G	In what sense are the functions organised, ranked or prioritised? What is this trying to achieve	Please clarify	RfG requirement. It is an inappropriate piece of legislation and we are stuck with it. Currently it will help demonstrate GB's compliance with the RfG.
G99 p96	2685	11.1.3.1		E	Is the binary output provided by the DNO?	"By default the DNO logic interface will the form of a"	DNO added in text
G99 p98	2750	11.2.4.2		G	What impact does the inconsistent power input have?	Please explain	RfG requirement – but I think it's fairly clear. I'm not sure how we could reword to make it clearer.

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G99 p98	2762	11.2.5.1 a)		G	The paragraph seems to be contradictory. If the droop must be a minimum of 10% (i.e. a 2% reduction in Active Power for each 0.1Hz above 50.4Hz) how can a Generator design their Generating Module with a Droop as low as 2% (i.e. a 0.4% change for each 0.1Hz above 50.4Hz)	Please clarify	Droop is a maximum of 10% (ie minimum rate). No change.
G99 p98	2768	11.2.5.1 b)		G	What is deemed to be an acceptable justification?	Please clarify	The RfG provides no clarification.
G99 p99	2787	11.2.5.3		G	When does the Generator return the output to "not less than the Minimum Generation"? Is this on request of the DNO or NETSO?	Please clarify	This is something the generator is allowed to do in real time to protect against operation below minimum level.
G99 P100	2822	11.4.4		T	The statement is not necessarily correct. Circulating current schemes do not necessarily require power flow (or reactive power flow) in the forward direction	"schemes employed by the DNO often assume.." "..AVC referenced to the low voltage side may not operate correctly ..."	Modification to (G59) text made
G100 p101	2859	12.1.3.4		G	Reactive Power may also be controlled/specified	Consider adding a requirement for a 4-20mA signal for Reactive Power	RfG A 14.2 Active Power only. This could be the subject of a future modification if it is required
G100 p101	2862	12.1.3.5		G	Add Reactive Power option	Replace "Active Power" with "Active Power and Reactive Power"	RfG A 14.2 Active Power only.
G100 p103	2919	12.2.4.2		G	What impact does the inconsistent power input have?	Please explain	As above

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G100 p103	2931	12.2.5.1 a)		G	The paragraph seems to be contradictory. If the droop must be a minimum of 10% (i.e. a 2% reduction in Active Power for each 0.1Hz above 50.4Hz) how can a Generator design their Generating Module with a Droop as low as 2% (i.e. a 0.4% change for each 0.1Hz above 50.4Hz)	Please clarify	As above
G99 p103		12.2.5.1 b)		G	Does this mean that an initial delay above 2s is acceptable? What is deemed to be an acceptable justification?	Please clarify	RfG A13.2.e NG will decide on acceptable justification
G99 p104	2957	12.2.5.3		G	When does the Generator return the output to “not less than the Minimum Generation”? Is this on request of the DNO or NETSO?	Please clarify	As above
G99 p108	3062	12.3.4c)		E	Should this clause be numbered as 12.3.5 as it seems to be relevant to the whole of 12.3	Renumber as 12.3.5	The 1st para should have also been for the whole section (2 nd para has been deleted). Mod to 12.3.4a) makes 12.3.4c) make more sense. Follows NG layout
G99 P109	3105	12.4.5		T	The statement is not necessarily correct. Circulating current schemes do not necessarily require power flow (or reactive power flow) in the forward direction	“schemes employed by the DNO often assume..” “..AVC referenced to the low voltage side may not operate correctly ...”	Modification to (G59) text made
G99 p110	3145	12.6.2a)	1 st sentence	E	Figure 12.5a) and 12.5b) show the requirements for reactive current injection but the term “reactive” is not used within 12.6.2.	Please clarify	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future

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G99 p110	3152	12.6.2a)	3 rd sentence	E	The example uses MW / MVA when the requirement is to inject reactive current. 1.05MVA would only be applicable for a 3 phase voltage depression.	Use values of current rather than MW / MVA for the example: If the voltage is 11kV, 1MW equates to 52.49A per phase. Since the generator can produce 1MW over the 0.95 lag to 0.95 lead power factor range its rated current is $52.49A / 0.95 = 55.25A$. The required reactive current injection is therefore based on a value of 55.25A per phase (as modified by Figure 12.5(a) and 12.5(b))	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p110	3156	12.6.2a)	Final sentence		Should the reactive current injection be in proportion or inverse proportion to the retained voltage (see also clause 12.6.2b) The sentence also seems to be ambiguous. For example, if the retained voltage is 0.3pu, at a time of 60mS should the injected current be $0.65 \times 0.3 = 0.195pu$ or 0.65pu?	Please clarify Please clarify	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p111	3161	12.6.2a)	Figure 12.5a)	G	What is meant by "blocking permitted". See also comment on 12.6.2 c) "Blocking" is only used where the generator demonstrates that this is required to prevent transient over-voltage excursions (12.6.2c)). This should made clear.	Please clarify Please add note to Fig 12.5a).	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future

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G99 P111	3165	12.6.2.a)	Figure 12.5.a)	T	How does the control scheme know whether the voltage depression will last for less than 140mS or not (before 140mS has elapsed) and hence whether to apply blocking from 80mS onwards, or not (assuming the voltage has recovered to ≥ 0.85 pu)	Please clarify.	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p111	3165	12.6.2a)	Figure 12.5b)	G	What is meant by "blocking permitted". See also comment on 12.6.2 c) "Blocking" is only used where the generator demonstrates that this is required to prevent transient over-voltage excursions (12.6.2c)). This should made clear.	Please clarify Please add note to Fig, 12.5b) to make this clear.	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p112	3169	12.6.2b)	1 st sentence	T	How will the injected current remain in phase with the change in voltage, given that Figure 12.5.a) and 12.5.b) specify reactive current? Should the current be proportional to the change in voltage? This seems to contradict 12.6.2a).	Please clarify Please clarify	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future

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G99 p112	3171	12.6.2b)	2 nd sentence	T	<p>This sentence suggests the injected current is not entirely reactive (except for a retained voltage of zero). If this is correct this seems to contradict Fig 12.5a) and 12.5b).</p> <p>The sentence states that the reactive component of current will fall in inverse proportion to the retained voltage. Does this means that for a retained voltage of zero the injected current will be a maximum (presumably the value derived from Fig 12.5a) and b). If the retained voltage is 0.75pu the injected current will be 0.25 x the value derived from Figure 12.5a) and b). Note this seems to contradict 12.6.2a).</p> <p>In the above example, after 60mS the injected current for a retained voltage of 0.75pu would be 0.65 x 0.25 = 0.1635pu. In this case should the injected value be 0.1635 or 0.65 (i.e. above the shaded area)?</p>	<p>Please clarify.</p> <p>Please clarify. An example would help</p> <p>Please clarify. Again, an example would help.</p>	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future

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G99 p112	3174	12.6.2b)	3 rd sentence	T	The voltage generated by the injected current will depend on the phase angle of the injected current and the impedance into which it is injected. This requirement seems to conflict with the first sentence of this clause and with Figure 12.5a) and 12.5b) which require i) the injected current to be in phase with the change in voltage and ii) which specify reactive current, respectively.	Please clarify	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p112	3181	12.6.2.c)	1 st sentence	T	<p>The term “block” is not the same as “reduce the current injection”.</p> <p>The sentence seems to assume that the initial voltage depression is below 0.85pu, but clause 12.6.2a) requires current injection for retained voltages below 0.9pu.</p>	<p>Please clarify. Possibly use “reduction of current injection” instead of “block”. See also the key for Fig12.5.a) and Fig12.5b)</p> <p>Clarify the requirement for voltage depressions between 0.9 and 0.85pu where “blocking” is required.</p>	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p113	3229	13.1.3.4		G	Reactive Power may also be controlled/specified	Consider adding a requirement for a 4-20mA signal for Reactive Power	As above
G99 P113	3232	13.1.3.5		G	Add Reactive Power option	Consider replacing “Active Power” with “Active Power and Reactive Power	As above
G99 P113	3236	13.1.3.6		G	Add Reactive Power option	Consider replacing “Active Power” with “Active Power and Reactive Power	As above
G100 p115	13.2.4.2	13.2.4.2		G	What impact does the inconsistent power input have?	Please explain	As above

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G100 p115	3302	13.2.5.1 a)		G	The paragraph seems to contradict itself. If the droop must be a minimum of 10% (i.e. a 2% reduction in Active Power for each 0.1Hz above 50.4Hz) how can a Generator design their Generating Module with a Droop as low as 2% (i.e. a 0.4% change for each 0.1Hz above 50.4Hz)	Please clarify	As above
G99 p115	3312	13.2.5.1 c)		G	What is deemed to be an acceptable justification?	Please clarify	As above
G99 p116	3326	13.2.5.3		G	When does the Generator return the output to “not less than the Minimum Generation”? Is this on request of the DNO or NETSO?	Please clarify	As above
G99 p116	3337	13.2.6.1 a)		G	The paragraph seems to be contradictory. If a droop of 10% (min.) is required how can a drop of 3 to 5% be acceptable	Please clarify	As above
G99 p116	3351	13.2.6.2 b)		G	What is deemed to be an acceptable justification?	Please clarify	As above
G99 p121	3446	13.2.7.3 d)		G	What is deemed to be an acceptable reason for extending the response time?	Please clarify	RfG Article 15 2 d) (iv) Doesn't actually say the tech evidence is for the TSO like 13 2 (e) does. But have now included words to say the DNO will pass this evidence to the NETSO

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G99 p128	3644	13.4.7		T	The statement is not necessarily correct. Circulating current schemes do not necessarily require power flow (or reactive power flow) in the forward direction	“schemes employed by the DNO often assume..” “...AVC referenced to the low voltage side may not operate correctly ...”	Modification to (G59) text made
G99 p131	3717	13.6.2a)	1 st sentence	E	Figure 13.14.a) and 12.14.b) show the requirements for reactive current injection but the term “reactive” is not used.	Please clarify	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p131	3723	13.6.2a)	3 rd sentence	G	The example uses MW / MVA when the requirement is to inject reactive current. 10.53MVA would only be applicable for a 3 phase voltage depression.	Use values of current rather than MW / MVA for the example: If the voltage is 33kV, 10MW equates to 174.95A per phase. Since the generator can produce 10MW over the 0.95 lag to 0.95 lead power factor range its rated current is $174.959A / 0.95 = 184.16A$. The required reactive current injection is therefore based on a value of 184.16A per phase (as modified by Figure 13.14.(a) and 13.14.(b))	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p132	3727	13.6.2a)	Final sentence	G	Should the reactive current injection be in proportion or inverse proportion to the retained voltage (see also clause 13.6.2b) The sentence also seems to be ambiguous. For example, if the retained voltage is 0.3pu, at a time of 60mS should the injected current be $0.65 \times 0.3 = 0.195pu$ or 0.65pu?	Please clarify Please clarify	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future

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G99 p132	3732	13.6.2a)	Figure 13.14a)	G	What is meant by “blocking permitted”. See also comment on 13.6.2 c) “Blocking” is only used where the generator demonstrates that this is required to prevent transient over-voltage excursions (13.6.2c)). This should made clear in the diagram.	Please clarify Please add note to Fig 13.14.a).	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 P132	3732	13.6.2.a)	Figure 13.14.a)	T	How does the control scheme know whether the voltage depression will last for less than 140mS or not (before 140mS has elapsed) and hence whether to apply blocking from 80mS onwards, or not (assuming the voltage has recovered to ≥ 0.85 pu)	Please clarify.	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p132	3737	13.6.2a)	Figure 12.5b)	G	What is meant by “blocking permitted”. See also comment on 13.6.2 c) “Blocking” is only used where the generator demonstrates that this is required to prevent transient over-voltage excursions (13.6.2c)). This should made clear in the diagram	Please clarify Please add note to Fig, 13.14.b) make this clear.	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p133	3740	13.6.2b)	1 st sentence	T	How will the injected current remain in phase with the change in voltage, given that Figure 13.14.a) and 13.14.b) specify reactive current? Should the current be proportional to the change in voltage? This seems to contradict 13.6.2a).	Please clarify Please clarify	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future

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G99 p133	3742	13.6.2b)	2 nd sentence	T	<p>This sentence suggests the injected current is not entirely reactive (except for a retained voltage of zero). If this is correct this seems to contradict Fig 13.14.a) and 13.14.b).</p> <p>The sentence states that the reactive component of current will fall in inverse proportion to the retained voltage. Does this means that for a retained voltage of zero the injected current will be a maximum (presumably the value derived from Fig 13.14.a) and b). If the retained voltage is 0.75pu the injected current will be 0.25 x the value derived from Figure 13.14.a) and b). Note this seems to contradict 13.6.2a).</p> <p>In the above example, after 60mS the injected current for a retained voltage of 0.75pu would be 0.65 x 0.25 = 0.1635pu. In this case should the injected value be 0.1635 or 0.65 (i.e. above the shaded area)?</p>	<p>Please clarify.</p> <p>Please clarify. An example would help</p> <p>Please clarify. Again, an example would help.</p>	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future

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G99 p133	3745	13.6.2b)	3 rd sentence	T	The voltage generated by the injected current will depend on the phase angle of the injected current and the impedance into which it is injected. This requirement seems to conflict with the first sentence of this clause and with Figure 13.14.a) and 13.14.b) which require i) the injected current to be in phase with the change in voltage and ii) which specify reactive current, respectively.	Please clarify	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p133	3181	13.6.2.c)	1 st sentence	T	The term “block” is not the same as “reduce the current injection”. The sentence seems to assume that the initial voltage depression is below 0.85pu, but clause 13.6.2a) requires current injection for retained voltages below 0.9pu.	Please clarify. Possibly use “reduction of current injection” instead of “block”. See also the key for Fig13.14..a) and Fig13.14.b) Clarify the requirement for voltage depressions between 0.9 and 0.85pu where “blocking” is required.	It is intended that the FFCI requirements are reviewed with NG as part of a separate modification in the near future
G99 p142	4063	15.3.1.a)		G	I believe BS7671 is applicable to LV installations only	“, the Electricity Safety Quality and Continuity Regulations 2002 and the Electricity at Work Regulations 1989”	The installation into which the generator is connected is likely to be LV irrespective of the connexion voltage... these words are G59. Propose we don't change them.
G99 p143	4117	15.4.1	1 st para.	G	Do these tests need to be carried out on site?	“.. on site protection commissioning tests are required..”	“On site” added

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G99 p146	4206	16.1.3		G	It appears that asynchronous generators (other than inverter connected) cannot be Type Tested. Is this the intention?	Address, if necessary.	Added text from Annex: Form A2-3 caters for all asynchronous and inverter technologies of any size, with the exception of conventional induction Generating Units. Manufacturers of induction Generating Units may find it more appropriate to use forms A2-2 or A2-1 in preference to A2-3.
G99 p417	4220	16.1.3	Fig. 16-1	G	Asynchronous non-inverter generators are excluded from 16.1.3 but are referenced in Figure 16-1	Address this anomaly	As above
G99 p170	5075	22.1		G	What are the requirements for asynchronous non inverter type generators?	Address, as necessary	As above
G99 p171	5078	22.2		G	What are the requirements for asynchronous non inverter type generators?	Address, as necessary	Additional words have been added to 16.1.3 to address this.
G99 p175	5084	Annex A		E	It is not clear that Annex A is dedicated to Type A.	Change title to "Annex A – Type A Generators"	Type A added
G99 p175	5091	A.0		G	5. Compliance – what are the requirements for asynchronous non inverter type generators?	Address, as necessary	Believe this is already covered by note in table at bottom of 5: Form A2-3 is designed for Power Park Modules (excepting induction generators who are advised to use A2-1 or A2-2 as appropriate).

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G99 p178	4999	A.2		G	The document seems to allow generators rated above 50kW to be type tested or partially type tested. Why is it assumed that they a <50kW?	Consider removing the “assumed to be <50kW” statement. See also the comment on A7.2 below.	Line 4990. 50 kW is left over from G59. It appears that whilst we had a process for Type testing synchronous machines < 50 kW nobody used it. The synchronous machine community have been working with us to produce Form A2-2 and it is this which we think they will use.
G99 P178	5002	A.2		G	Asynchronous non-inverter generators are not mentioned in 16.1.3 or on the forms themselves	Amend this sentence or alternatively widen the scope of 16.1.3 and the A2-3 form.	16.1.3 has been amended
G99 p179	5008	A2	Fig A.2.1	G	See comments on Fig 16-1	See comments on Fig 16-1	This should be OK now 16.1.3 has been amended
G99 p196	5022	A2	Form A2-3	G	Should this form also be applicable to asynchronous non-inverter generators?	Consider making this form applicable to asynchronous non-inverter generators.	It's not so easy... induction generators look more like synchronous for some aspects of testing. We have left it open to the manufacturer to chose an appropriate route
G99 P203	5024	A2	Form A2-3	T	For >50kW generators the Vector Shift stability requirements should be +/-50 degrees. (i.e. in accordance with G59/3-3 and A2-4)	Include additional section for >50kW generators	Type tested gens = old VS settings at the moment, hopefully this will have moved on my May 18 and we will have 50 deg and 1 Hz/s everywhere
G99 P204	5024	A2	Form A2-3	T	For >50kW generators the RoCoF stability requirements should be +/- 0.95Hz/s (in accordance with G59/3-3 and A2-4)	Include additional section for >50kW generators	As above
G99 p226	5262	A7.1.1		T	BSEN 60044 (Instrument Transformers) has been superseded by BSEN 61869	Update reference	Text replaced BS 61869-2:Instrument Transformers. Additional requirements for current transformers.

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G99 p230	5452	A7.1.2.6		T	Vector shift and RoCoF stability tests are required. See A2-3 (and A2-4). In the case of >50kW generators the stability tests specified in A2-4 should be completed (i.e. +/-50 degrees and +/-0.95Hz/s)	Please add requirements for these tests.	VS and RoCoF stability tests are in all the forms. The site forms were missing column with Positive and negative VS in them which may have caused confusion. The requirements will be reviewed when the GC0079 mods can be completed
G99 p234	5609	A7.2		G	Section A7.2 only applies to <50kW synchronous power generating modules. Can >50kW synchronous power generating modules be type tested?	Please clarify in A7.2 and elsewhere in the document (e.g. A2). If necessary include specify additional type test requirements for >50kW synchronous power generating units	Use of A2-3 is explained I the introduction to A-2.
G99 p234	5626	A7.2.1		T	BSEN 60044 (Instrument Transformers) has been superseded by BSEN 61869	Update reference	Done
G99 p239	5856	A7.2.2.6		T	Vector shift and RoCoF stability tests are required. See A2-1 (and A2-4)	Please include details of these stability tests.	Ref to annex to record results made
G99 p245	6060	Annex B		E	It is not clear that Annex B is dedicated to Type B generators.	Change title to "Annex B – Type B Generators"	Type B added
G99 p283	6622	Annex C		E	It is not clear that Annex C is dedicated to Type C and Type D generators.	Change title to "Annex B – Type C and D Generators"	Type C and Type D added