

## DCRP/18/11/PC: Housekeeping Modifications to G98 and G99

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 23 November 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/11/PC '. Please note that any responses received after the deadline may not receive due consideration by the Working Group.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5174, or to [dcode@energynetworks.org](mailto:dcode@energynetworks.org)

<b>Respondent</b>	Bernard Gospel - Technical Secretary
<b>Company Name</b>	AMPS – Association of Manufacturers of Power Generating Systems
<b>No. of DCode Stakeholders Represented</b>	AMPS is the primary Association for Manufacturers and suppliers of Power Systems (generating sets) and ancillary equipment, with 122 members representing 80% of the UK industry.
<b>Stakeholders represented</b>	<i>Please see our website <a href="http://www.amps.org.uk">http://www.amps.org.uk</a></i>
<b>Role of Respondent</b>	UK Generating set manufacturer trade body
<b>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]</b>	Y

	Questions		DNOs' Response
Q1	Do you agree that all these modifications should be made?	Yes	
Q2	If not, please explain which you think should not be made and the reasons for your view.		
Q3	Would you suggest any alternative wording etc to any of the proposed amendments? And if so, please include the text you suggest.	<p>In Annex A2.4 the additional tripping test at 2.5Hz/s should ideally be at the maximum rate available with the DVS3 test set i.e. 3.0Hz/s to maximise the effectiveness of the test in ensuring immunity to tripping by short lived, high rate events. The frequency range used for this test needs to be wider even if it remains at 2.5Hz/s, for example 48.5 to 51.5Hz.</p> <p>In Annex A2.4 the additional RoCoF stability test that injects 2.5Hz/s for 450ms is unachievable and should be replaced with 1.2Hz/s which is achievable and more consistent with similar tests for the voltage and frequency tests. The range of frequencies used for this test should be specified to ensure consistency.</p> <p>All these RoCoF corrections should be copied to all the following sections as appropriate:</p>	Having had some discussions with AMPS members on this point, DNOs agree with these points and these changes have been made to the next consultation version of G99

		<p>15.4.1 c Should be 0.1Hz/s over the operating point</p> <p>A2-1 section 7 needs updating</p> <p>A2-3 section 7 needs updating</p> <p>Form B2-2 needs updating</p> <p>Form C2-2 needs updating</p> <p>Section 10.1.5 only seems to add to the existing uncertainties over how protection settings should be protected from change:</p> <p>It singles out voltage settings when existing equipment typically has the same mechanism for all settings.</p> <p>It introduces the term “appropriately authorised personnel” without explaining who they are.</p> <p>It introduces the term “additional electronic device” without defining what it is but implying that the status quo of password entry on the module or sealed switches may no longer be sufficient.</p>	
Q4	Are there any other housekeeping or minor corrections you believe should also be made at this time?	Section 7.4 “Switched alternative operation” could be interpreted as meaning that a PGM which is prevented from grid parallel operation by an interlock could still be subject to all the provisions of this standard. Therefore, the scope in section 2.5 should be revised to clarify that only section 7.4 applies to this situation and no other parts of G99.	DNOs agree and have made this change.

## DCRP/18/11/PC: Housekeeping Modifications to G98 and G99

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 23 November 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/11/PC '. Please note that any responses received after the deadline may not receive due consideration by the Working Group.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5174, or to [dcode@energynetworks.org](mailto:dcode@energynetworks.org)

<b>Respondent</b>	Awais Lodhi
<b>Company Name</b>	Centrica Plc
<b>No. of DCode Stakeholders Represented</b>	
<b>Stakeholders represented</b>	
<b>Role of Respondent</b>	Supplier Representative (Lead Electrical Engineer)
<b>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]</b>	No

	Questions		DNOs' response
Q1	Do you agree that all these modifications should be made?	Yes	
Q2	If not, please explain which you think should not be made and the reasons for your view.		
Q3	Would you suggest any alternative wording etc to any of the proposed amendments? And if so, please include the text you suggest.	No	
Q4	Are there any other housekeeping or minor corrections you believe should also be made at this time?	In Form B2-2 few references are not matching to the word. Please review them.	Thank you for spotting these. We have undertaken a review and made some changes.

## DCRP/18/11/PC: Housekeeping Modifications to G98 and G99

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 23 November 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/11/PC '. Please note that any responses received after the deadline may not receive due consideration by the Working Group.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5174, or to [dcode@energynetworks.org](mailto:dcode@energynetworks.org)

<b>Respondent</b>	Tobias Gehlhaar
<b>Company Name</b>	Brand name: DNV GL – Energy, Renewables Certification Legal name: Germanischer Lloyd Industrial Services GmbH.
<b>No. of DCode Stakeholders Represented</b>	Difficult to say
<b>Stakeholders represented</b>	<i>Type B synchronous power generating equipment</i>
<b>Role of Respondent</b>	Principal Engineer
<b>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]</b>	Y

	Questions		DNOs' Response
Q1	Do you agree that all these modifications should be made?	Yes	
Q2	If not, please explain which you think should not be made and the reasons for your view.		
Q3	Would you suggest any alternative wording etc to any of the proposed amendments? And if so, please include the text you suggest.	<p>Yes. See attached and below.</p> <p>Annex B, page 270 please clarify if simulation only is requested. If so, please add “<b>Testing is optional.</b>” to the sentence: “ <b>Reactive Power capability</b> Confirm compliance with Section 12.5 by carrying out simulation study in accordance with B.4.2 and by submission of a report. <b>Testing is optional.</b>”</p> <p>Annex B, page 294 the test description has been deleted. Please clarify if the test is still required. If yes, please add the old description to B.5.2.1 or update the description. This is the old one: “<b>The open circuit step response of the Excitation System will be tested by applying a voltage step change from 90% to 100% of the nominal Synchronous Power Generating Module terminal voltage, with the Synchronous Power Generating Module on open circuit and at rated speed.</b>”</p>	<p>We have reviewed the tests for the Type B PGMs and made the following amendments to the text on G99:</p> <p>Synchronous:</p> <ul style="list-style-type: none"> <li>Deleted excitation system tests for Type B in PGMD</li> <li>Deleted excitation system and voltage tests in B.5</li> </ul> <p>PPMs:</p> <ul style="list-style-type: none"> <li>Deleted PGMD req for reactive power test for Type B.</li> <li>Deleted PGMD req for Voltage control test for Type B</li> <li>Deleted tests in B.6.2, B.6.3 and B.6.4</li> </ul>

Q4	Are there any other housekeeping or minor corrections you believe should also be made at this time?	<p>Yes. See attached and below.</p> <p>Page 110 last lines: deleted double word the.  12.4.3.1<b>Generating Module</b> shall be equipped with a permanent automatic <b>Excitation System</b> that <del>that</del> has the capability to provide constant terminal voltage (assuming a high enough <b>Network</b> source impedance to allow the <b>Power Generating Module</b> to achieve this while remaining within its ratings) at a selectable setpoint</p> <p>Annex B, page 269, clarify if DNO will accept tests done once as type tests not to be re-tested or witnessed by DNO. If so, please add: “<b>unless done as type test</b>” and “<b>DNO will not request re-testing</b>” forming the following changed sentence:</p> <p>“T - Indicates that the <b>DNO</b> would expect to see results of, and/or witness, tests or monitoring which demonstrates compliance <b>unless done as type test</b>”</p> <p>TV - Indicates Type Test reports (if <b>Generator</b> pursues this compliance option <b>DNO will not request re-testing</b>)”</p> <p>Annex B, page 271 add “<b>remotely or</b>” to the sentence: “Confirm the <b>Active Power</b> set point can be adjusted <b>remotely or</b> in accordance with instructions issued by the <b>DNO</b> “</p>	<p>Noted – thank you.</p> <p>17.1.2, 18.1.2 and 19.1.2 cover this generally. This should be covered by the Equipment Certificate regime so no change is proposed at present.</p> <p>No change - – there is no requirement to prove it can be done remotely</p>



		<p>Annex B, page 271 please clarify if really no FRT type testing is required. If so, please add “<b>Testing of FRT is not required</b>” to the sentence “<b>Fault Ride Through</b> Confirm the compliance with 12.3 by carrying out simulation study in accordance with B.4.4 and by submission of a report. <b>Testing of FRT is not required.</b>”</p> <p>Annex B, page 271 please clarify if really no hardware testing shall be performed. If so, please add: “<b>A hardware test is not required</b>” to the sentence: “Confirm the compliance with 12.2.4 by carrying out simulation study in accordance with B.4.5 and by submission of a report. <b>A hardware test is not required.</b>”</p> <p>Annex B, page 288 please clarify if simulation models should be validated against test results. If so, please add: “<b>Simulation models used shall be validated against corresponding test results.</b>” to the sentence: “B.4.4.1 This section applies to <b>Power Generating Modules</b> to demonstrate the modules <b>Fault Ride Through</b> and <b>Fast Fault Current</b> injection capability. <b>Simulation models used shall be validated against corresponding test results.</b>”</p> <p>Annex B, page 294 please clarify if testing is required or not. If not required, please change the sentence like this (changes are marked in red): “B.5.2.1 The test shall normally be carried out prior to synchronisation <b>or as a type test. Manufacturers’</b></p>	<p>“Testing of Fault Ride Through is not required” has been added to Type B PGM for Synch and PPM</p> <p>Injection tests are required at a later stage as Annex B5 and B6. No change made.</p> <p>This is not required for Type B so not included</p> <p>B.5 excitation, voltage control and reactive power tests have been deleted – see above.</p>
--	--	--	--

		<p><b>Information</b> may be used where appropriate and may be used if agreed with the <b>DNO</b>.” If the test is required, please add a sentence like “<b>testing is mandatory</b>” and keep in mind, that using MI might be understood as testing is optional and manufacturer can confirm compliance without a test.</p>	
--	--	--	--

## DCRP/18/11/PC: Housekeeping Modifications to G98 and G99

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 23 November 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/11/PC '. Please note that any responses received after the deadline may not receive due consideration by the Working Group.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5174, or to [dcode@energynetworks.org](mailto:dcode@energynetworks.org)

<b>Respondent</b>	Alan Creighton
<b>Company Name</b>	Northern Powergrid
<b>No. of DCode Stakeholders Represented</b>	
<b>Stakeholders represented</b>	
<b>Role of Respondent</b>	Senior Smart Grid Development Engineer
<b>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]</b>	Y

	Questions		DNOs' response
Q1	Do you agree that all these modifications should be made?	Yes, subject to the points identified on the marked up versions G98 and G99 being considered	
Q2	If not, please explain which you think should not be made and the reasons for your view.	N/A	
Q3	Would you suggest any alternative wording etc to any of the proposed amendments? And if so, please include the text you suggest.	Please see the attached marked up versions G98 and G99	Most of these suggestions are very helpful and we have discussed any which are not obvious.
Q4	Are there any other housekeeping or minor corrections you believe should also be made at this time?	Please see the attached marked up versions G98 and G99	

## DCRP/18/11/PC: Housekeeping Modifications to G98 and G99

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 23 November 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/11/PC '. Please note that any responses received after the deadline may not receive due consideration by the Working Group.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5174, or to [dcode@energynetworks.org](mailto:dcode@energynetworks.org)

<b>Respondent</b>	Torben Damgaard
<b>Company Name</b>	Orbital A/S Denmark
<b>No. of DCode Stakeholders Represented</b>	0
<b>Stakeholders represented</b>	1
<b>Role of Respondent</b>	CTO/Control Engineer M.Sc.
<b>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]</b>	Y

	Questions		DNOs' Response
Q1	Do you agree that all these modifications should be made?	-	
Q2	If not, please explain which you think should not be made and the reasons for your view.	-	
Q3	Would you suggest any alternative wording etc to any of the proposed amendments? And if so, please include the text you suggest.	-	
Q4	Are there any other housekeeping or minor corrections you believe should also be made at this time?	Please see below.	<p>Subsequent to Orbital's points below, the ENA has had an email dialogue with Orbital, culminating thus:</p> <p>Hi Mike and Richard</p> <p>Thanks a lot for the fast reply.</p> <p>I see the difference and that it actually allows to choose either one of the two, I missed that part somehow. We mainly compared it with the requirements in Denmark and Germany where the TSO's has chosen to use the actual output power. From a control perspective I would think that it would be better to have all power plants reducing the output power, but I am no grid expert.</p>

			<p>It is not a big issue for us, but we will have to implement an additional parameter to change the functionality, so I just wanted to make sure that it was intentional.</p> <p>Please disregard the housekeeping comments I sent, and thanks again.</p> <p>Med venlig hilsen/Kind regards</p> <p><b>Torben Damgaard</b> CTO Orbital Drives</p>
--	--	--	---

G99 states that the power reduction should always be from the registered capacity (Pref = Nominal Power), regardless of the actual output power when activating the function.

This is in contrast to the Commission Regulation (EU) 2016/631, which I believe is the background for the G99. This states that the reduction should start from the actual power production when the function is activated (Pref = actual power)

Is this difference an error in G99, or is it purposely different to the EU Regulation and what would the reason be for having a different requirement? Please see pictures below from G99 and EU 2016/631.

I believe that the EU implementation is the correct way to do it, since you would want all producers to reduce power in case of high grid frequencies, not only those already running at maximum power.

Having to implement two different functionalities for G99 and other countries would be an additional and unnecessary cost and complexity factor.

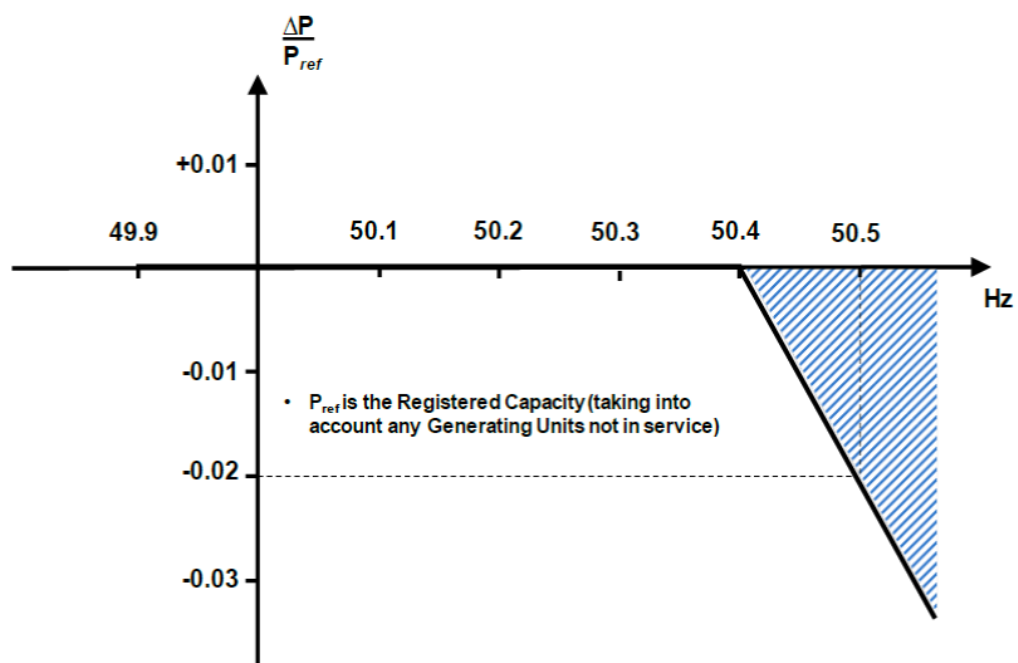
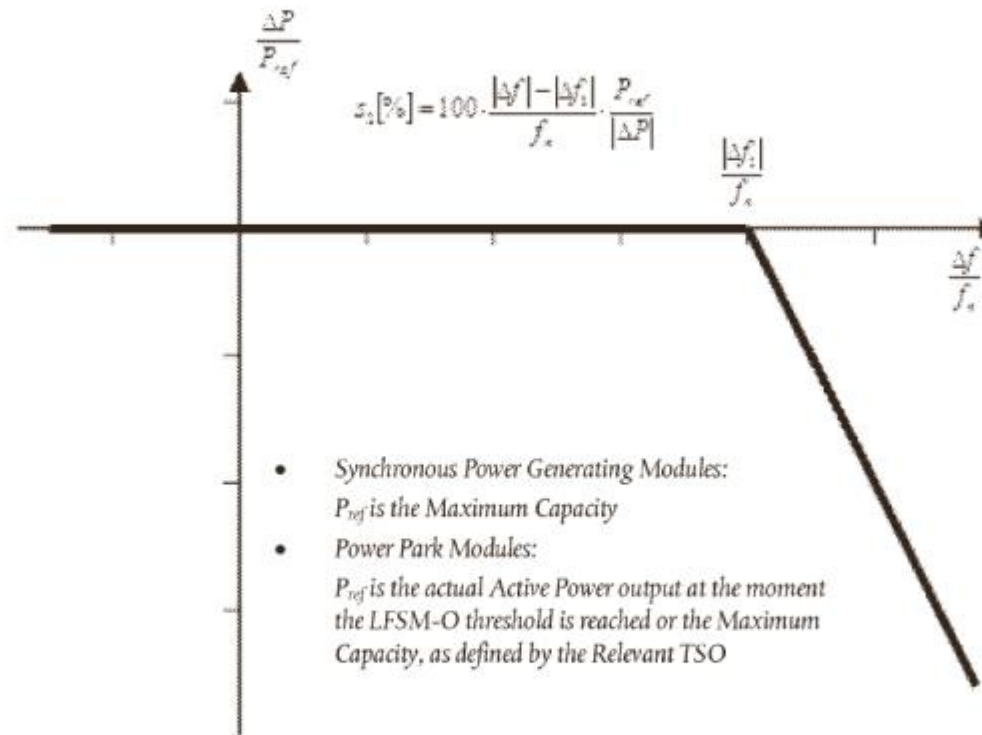




Figure 1

## Active power frequency response capability of power-generating modules in LFSM-O



$P_{ref}$  is the reference active power to which  $\Delta P$  is related and may be specified differently for synchronous power-generating modules and power park modules.  $\Delta P$  is the change in active power output from the power-generating module.  $f_n$  is the nominal frequency (50 Hz) in the network and  $\Delta f$  is the frequency deviation in the network. At overfrequencies where  $\Delta f$  is above  $\Delta f_1$ , the power-generating module has to provide a negative active power output change according to the droop  $S_2$ .



## DCRP/18/11/PC: Housekeeping Modifications to G98 and G99

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 23 November 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/11/PC '. Please note that any responses received after the deadline may not receive due consideration by the Working Group.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5174, or to [dcode@energynetworks.org](mailto:dcode@energynetworks.org)

<b>Respondent</b>	Thorsten Bülo
<b>Company Name</b>	SMA Solar Technology AG
<b>No. of DCode Stakeholders Represented</b>	1
<b>Stakeholders represented</b>	<i>PV and Storage System Components manufacturer</i>
<b>Role of Respondent</b>	System Development Engineer
<b>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]</b>	Yes

	Questions	
Q1	Do you agree that all these modifications should be made?	Yes
Q2	If not, please explain which you think should not be made and the reasons for your view.	
Q3	Would you suggest any alternative wording etc to any of the proposed amendments? And if so, please include the text you suggest.	yes
Q4	Are there any other housekeeping or minor corrections you believe should also be made at this time?	yes

## Comments on 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
7		2		General	It should be clear, that new Micro Generators replacing old Micro Generators that are compliant with G83 (e.g. due to failure of the inverter) don't need the G83 compliance but may be compliant only with the new G98.  This reduces effort on testing and documentation of new inverters.	Add to section 2 (e.g. a new paragraph after 2.6):  "2.7 Where an existing Micro-generator commissioned under EREC G83 or a part of it is replaced by a new Micro-generator, the latter may be compliant with EREC G98 instead of EREC G83."	This seems to be stating the obvious – especially since G98 only caters for wholly type tested modules. And G83 similarly doesn't cater for piecemeal replacement. Nor is there any need to be backward compatible with G83.  No change proposed.
7		2.1		General	"The requirements set out in this EREC G98 are in addition to those of European standard EN 50438 which should be complied with in full."  The EN 50438 will be replaced soon by the EN50549-1. Will then the the 50549-1 be required? Or is this paragraph dispensable at all?	Clarify, if - and if yes - which Cenelec standard's requirements have to be met additionally when the new EN 50549-1 is applicable	G98 is to be reviewed and modified to cater for the withdrawal of 50438 and its replacement with the relevant parts of 50549.

## Comments on 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
13		2.1		General	It should be clear, that new PGMs replacing old PGMs that are compliant with G59 (e.g. due to failure of the inverter) don't need the G59 compliance but may be compliant only with the new G99.  This reduces effort on testing and documentation of new inverters.	Add paragraph to 2.1 after "...in a connection agreement":  "Power Generating Modules, that replace PGMs in existing plants (that are compliant to EREC G59) to such an extent that it's Connection Agreement does not have to be substantially revised or replaced, may be compliant with EREC G99 instead of EREC G59."	G59 covers changes in Section 12.6 and similarly this is picked up in G99 Section 20.3.  Whilst there is a difference between replacement of a component and complete replacement of the PGM, there is nothing in either G59 or G99 to suggest that inverters type tested to G59 need to be sourced in the future.  Any G99 compliant component replaced into a G59 compliant module can be made as there is no conflict or shortfall in G99 performance etc requirements of those in G59.  However if a module is replaced, then it will have to be fully G99 compliant.  No change proposed.

## DCRP/18/11/PC: Housekeeping Modifications to G98 and G99

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 23 November 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/11/PC '. Please note that any responses received after the deadline may not receive due consideration by the Working Group.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5174, or to [dcode@energynetworks.org](mailto:dcode@energynetworks.org)

<b>Respondent</b>	Isaac Gutierrez
<b>Company Name</b>	Scottish Power Renewables
<b>No. of DCode Stakeholders Represented</b>	1
<b>Stakeholders represented</b>	Scottish Power Renewables
<b>Role of Respondent</b>	Generator
<b>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]</b>	Y

	Questions		DNOs' response
Q1	Do you agree that all these modifications should be made?	Partially as there is one modification that should be reviewed in conjunction with National Grid. From the list of minor defects published in the consultation paper item” <b>2.2.14 Replace Minimum Generation with Minimum Stable Operating Level</b> “requires further review as in some instances this technical term is not applicable.	We agree that these changes to be made to dispel any confusion between these terms. We intend to work with National Grid, as this confusion affects the Grid Code too, and introduce these changes as a further housekeeping mod in due course, ie we will harmonize the changes with those to the Grid Code.
Q2	If not, please explain which you think should not be made and the reasons for your view.	It seems that in some sections term <b>Minimum Stable Operating level</b> has been used instead of <b>Minimum Regulating Level</b> (formerly known as Design Minimum Operating Level DMOL). I would suggest to contact NGESO as I made this same comment to NGESO and they have acknowledged that this requires housekeeping changes in the UK Grid Code as well	
Q3	Would you suggest any alternative wording etc to any of the proposed amendments? And if so, please include the text you suggest.	SPR would like to suggest the following modification (highlighted in red below) to be included in the legal text of the following clauses: <i>11.2.4.3 Steady state operation below Minimum Stable Operating Level is not expected but if system operating conditions cause operation below Minimum Stable Operating Level which</i>	



		<p>give rise to operational difficulties then the Generator shall be able to return the output of the Power Generating Module to an output of not less than the Minimum Stable Operating Level <i>unless the Power Generating Module reaches an operating point below its Minimum Regulating level</i></p> <p>12.2.4.2 Steady state operation below Minimum Stable Operating Level is not expected but if system operating conditions cause operation below Minimum Stable Operating Level which give rise to operational difficulties then the Generator shall be able to return the output of the Power Generating Module to an output of not less than the Minimum Stable Operating Level <i>unless the Power Generating Module reaches an operating point below its Minimum Regulating level</i></p> <p>13.2.4.3 Steady state operation below Minimum Stable Operating Level is not expected but if system operating conditions cause operation below Minimum Stable Operating Level which give rise to operational difficulties then the Generator shall be able to return the output of the Power Generating Module to an output of not less than the Minimum Stable Operating Level <i>unless the Power Generating Module reaches an operating point below its Minimum Regulating level</i></p> <p>13.2.6.3 (b) 1. in the case of overfrequency, the <b>Active Power Frequency Response</b> is limited by the <b>Minimum Regulating Level</b>  <b>Please also refer to appended pages showing extract from the following sections with suggested new text:</b>          B.6 Compliance testing of Power Park Modules          C.8.6.3 Full Frequency Response Testing Schedule          Witnessed by the DNO          C.8.6.5</p>	
--	--	--	--

		C.9.5.4 C.9.5.6 C.10.2.3	
Q4	Are there any other housekeeping or minor corrections you believe should also be made at this time?	No	