

EREC G99 Proposed Amendments – [DCRP\\_19\\_05\\_06](#)

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Ref	Issue	Suggested Solution	Type
	Figure C5.3	TBA – SRCa to help?	
	Review the use of asterisks to denote what might be best tested at the factory versus on site. This was raised in the Technical Forum as issue 79	The asterisks might be more confusing than helpful so we will remove them.	
	<p>The particular challenge of the existing practice of owners of landfill gas sites moving generation equipment around between sites as the gas volumes change over the life of the site. In general the gas production declines over the life of the site, and it has been the owners' practice to relocate smaller generating modules from one declining site to a more recently declining site, thus maximizing the utilization of generation assets.</p> <p>If a relocated generating unit was to be treated as new generation it would need to be G99 compliant. Whereas the generation is existing as G59 and connected to the network, and after location it would be replacing a larger G59 generating module.</p>	<p>The following text is proposed to deal with this case.</p> <p>2.1           The requirements set out in this EREC G99 shall apply to Generators owning any Power -Generating Module which has been modified on or after 27 April 2019 to such an extent that its <u>fundamental characteristics have changed and need to be reflected in a substantially revised Connection Agreement</u> <del>must be substantially revised or replaced for example a change to a technical appendix in a Connection Agreement</del> – see Section 20.3.4 below. For the case of an existing EREC G59 Power Generating Module being relocated to another existing site, see Section 20.3.5.</p> <p>And</p> <p><u>20.3.4 Where a Power Generating Module installed under EREC G59 is modified substantially such that its fundamental characteristics are changed (and which are reflected in a modified Connection Agreement) then it will be necessary for that Power Generating Module to be modified to be compliant with EREC G99. Modifications to a EREC G59 compliant Power Generating Module that do not result in a change of fundamental characteristics can remain compliant with EREC G59.</u></p>	J

		<p><u>20.3.5 For the special case where an existing Power Generating Module of less than 10MW Registered Capacity (ie of a size that is less than Type C) that complies with EREC G59 is being relocated to another existing site where the Power Generating Module(s) on that other site is also existing and EREC G59 compliant, then in those cases the relocated Power Generation Module will only need to comply with EREC G59 provided that the relocated Power Generating Module:</u></p> <ul style="list-style-type: none"> <li>• <u>has the same Registered Capacity as, or</u></li> <li>• <u>has a smaller Registered Capacity than the Power Generating Module it is replacing</u></li> </ul> <p><u>If an existing Power Generating Module is being relocated to an existing site where it has a bigger Registered Capacity than the Power Generating Module it is replacing, or it is being relocated to a new site, then full compliance with EREC G99 will be required in either case.</u></p> <p>This is a special case of the examples discussed in [reference]</p>	
	A particular problem was identified for owners of small and micro hydro in that it is hard to achieve a sufficiently rapid response in output power for LFSM-O. Issue34 in particular but also 22 and 24.	Following discussions with NGESO it was agreed that a system of power reduction by switched load banks would satisfy the requirement and that the DNO could agree how to prove compliance with 11.2.4 could be added to section A7.2 of G99. The proposed format of the test recommendation is attached as [appendix x]	J
	LFSM-O – tolerances to power output, droop and speed of response. This was raised in the Technical Forum as issues 54 and 86.	TBA	J
	C.5.6 and C.5.7 refer to agreement with NGESO. This is only appropriate when the Power Generating Facility is caught by the Grid Code. This was raised in the Technical Forum as issue 66.	<p>Modify these clauses thus:</p> <p>C.5.6.1 As defined in Grid Code ECC.6.3.8.3.4, Reactive Power control mode of operation is not required in respect of Power Park Modules unless otherwise specified by the <a href="#">NETSO-DNO</a> (in coordination with the <a href="#">DNONETSO for Power Park Modules that need</a></p>	N

		<p><a href="#">to comply with the Grid Code</a>). However where there is a requirement for Reactive Power control mode of operation, the following requirements shall apply.</p> <p>C.5.7.1 As defined in Grid Code ECC.6.3.8.4.3, Power Factor control mode of operation is not required in respect of Power Park Modules unless otherwise specified by the DNO (in coordination with the NETSO <a href="#">for Power Park Modules that need to comply directly with the Grid Code</a>). However where there is a requirement for Power Factor control mode of operation, the following requirements shall apply.</p>	
	<p>Stakeholders have been confused by some of the new reactive power requirements in G99. Sections 11.1.6, 12.5.1 has been cited particularly, and there has been more general confusion around reactive power requirements.</p> <p>The phrase “relate to the maximum level of Active Power delivered to the DNO’s Distribution Network” in the definition of Registered Capacity has confused stakeholders, so we propose to delete it.</p> <p>These points have been raised in issues: 42, 53, 56, 57 and 83.</p>	<p>For issue 53 a new sentence is proposed on the end of 11.1.6: “Power factor control, or voltage control, requirements will be agreed on a site by site basis and recorded in the Connexion Agreement.”</p> <p>For issue 42 a new para 12.5.3 is proposed: “Where the Power Generating Module is contained within a larger installation comprising both demand and generation the DNO will advise the Generator if it is more appropriate for the Power Factor requirements to be specified for the installation, rather than the Power Generating Module, at the Connection Point, and what those requirements are.”</p> <p>For issue 83 the following revision to the definition of Registered Capacity is proposed:</p> <p><b>Registered Capacity (<math>P_{max}</math>)</b> The normal full load capacity of a <b>Power Generating Module</b>, or of a <b>Power Generating Facility</b>, as declared by the <b>Generator</b> less the MW consumed when producing the same. <del>This will relate to the maximum level of Active Power deliverable to the DNO’s Distribution Network.</del></p> <p>For <del>Power Generating Park Modules connected to the DNO’s Distribution Network via an comprising one or more Inverters, the the Inverter rating is deemed to be the Power Generating Module’s rating</del><b>Registered</b></p>	N

		<p><u>Capacity of the Power Park Module is the lesser of the Inverter(s) rating or the rating of the energy source, allowing for the production of the required reactive power.</u></p> <p>For all of these issues, it has been agreed that the summary table of reactive power and voltage control would be a useful addition to G99. This is attached as [appendix x] and would be inserted in G99 [where].</p>	
	<p>G99 (and G98 as well as G59 and G83) have always required compliance with the CE marking legislation. This is an unnecessary imposition, and actively works against some emerging technologies. This was raised as issues 35 and 36 in the Technical Forum.</p> <p>It is accepted by DNOs that compliance with the low voltage directive and other safety legislation is primarily an issue for manufacturers and developers, and is not generally helpful to make it such a specific blanket requirement of G98 and G98.</p>	<p>It is proposed to redraft 16.1.6 in G99 as:</p> <p>16.1.6 The Power Generating Module shall comply with all relevant <u>UK and European Directives</u> and should be labelled <u>with a corresponding CE marking in accordance with those requirements.</u></p>	N
	<p>There is possible confusion between the mandatory provision of fault recording equipment and that which can be by mutual agreement for Type C and Type C PGMs. This was raised in the Technical Forum as issue 47.</p>	<p>It is proposed to modify C.6.1 as per below to tie up better with the wording in 13.9.3(c).</p> <p>C.6.1 Purpose and Scope</p> <p>This Annex describes the functional requirements for dynamic system monitoring, fault recording and power quality monitoring that Generators need to provide in accordance with the requirements of EREC G99 and the Distribution Code. It is expected that the functionality will be housed in a single recording device (RD), although other options are not discounted.</p> <p><u>The All Power Generating Facilities containing any Type C or Type D Power Generating Modules are within the scope of requirements of this Annex, apply to The exact requirements, particularly if there is a need for power quality monitoring, will be agreed bilaterally and recorded in the Connection Agreement, all Power Generating Facilities</u></p>	N

		<del>containing any Type C or Type D Power Generating Modules.</del>	
	It is not necessarily clear that validated models for simulations are required in all cases. This was raised in the Technical Forum as issue 52	It is proposed to add a new clause 6.3.9.1 and renumber the rest of 6.3.9. “All simulation models used to demonstrate compliance with this EREC G99 must be validated.”	N
	We have been asked to make it clear that Type C and Type D generators have to be capable of operating in both LFSM and FSM, but that by default they will operate in LFSM unless they have a contract (with NGESO) to operate in FSM. This was raised in the Technical Forum as issue 3.	Add a new para 13.2.6.1, and renumber (2) references to other parts of 13.2.6.  13.2.6.1 Each Power Generating Module will be capable of FSM in addition to LFSM-O and LFSM-U. By default Power Generating Modules will be set to operate in LFSM, unless the Generator has a specific contract to operate in FSM.	N
	It has been pointed out that Generators might choose a different droop for LFSM-O than that which they choose for LFSM-U.	The SAF has already been updated to allow for this. It will be necessary to add a couple of lines to the DDRC in the Distribution Code to make this formal.	N
	The forms in Appendix A have a short phrase about transformer ratings and power quality. Section 9.4.3.2 of G99 has an explanation of this transformer which is to ensure an adequate ratio between the source fault level and the size of the Power Generating Module It has been raised at the Technical Forum as issue 38, and agreed that it is misleading in A2-1 and A2-3, and therefore should be removed from A2-1 and A2-3 where it occurs.	Remove from A2-1 and A2-3 where it occurs.	N
	It has been noticed that the longstanding requirement in the site commissioning forms A3, B3, C3 for the protection tripping supplies to be monitored is not a requirement of Section 10.	Introduce a clear requirement as a new clause 10.3.8  10.3.8 The health of tripping and/or auxiliary supplies must be monitored such that any failure of these supplies is either brought to the immediate attention of the Generator via an automatic alarm that is monitored by the Generator or the Generator's agent in real time, or the failure of the supplies causes the Power	N

		Generation Module to be tripped, and reconnection prevented before restoration of the supplies that have been lost.																					
	It has been suggested that more guidance the exciter transient voltage control would be more appropriate, based on NGESO practice.	<p>Suggest add a new table as below, referenced from C.4.2.3.2</p> <table><tr><th>Type of Exciter</th><th>Typical Rise Time</th></tr><tr><td>Static</td><td>50 ms</td></tr><tr><td>Fed from machine terminals DC supply via power electronics</td><td></td></tr><tr><td>Rotating Brushless</td><td>300 ms</td></tr><tr><td>Excitation from separate DC machine fixed to main rotor</td><td></td></tr></table> <p>And new table below referenced from C4.2.3.3</p> <table><tr><th>Type of Exciter</th><th>Normal Ceiling Voltage</th></tr><tr><td>Static</td><td>2 pu</td></tr><tr><td>Fed from machine terminals DC supply via power electronics</td><td></td></tr><tr><td>Rotating Brushless</td><td>2pu</td></tr><tr><td>Excitation from separate DC machine fixed to main rotor</td><td></td></tr></table> <p>If short circuit level is low, the ceiling might need to be 3pu – this can be determined by a stability study ensuring 2pu is stable</p> <p>Significant improvement in stability result in ceiling voltage change from 2 to 3 pu, more limited between 3 and 4 pu.</p> <p>Higher pu excitation requires increased insulation</p>	Type of Exciter	Typical Rise Time	Static	50 ms	Fed from machine terminals DC supply via power electronics		Rotating Brushless	300 ms	Excitation from separate DC machine fixed to main rotor		Type of Exciter	Normal Ceiling Voltage	Static	2 pu	Fed from machine terminals DC supply via power electronics		Rotating Brushless	2pu	Excitation from separate DC machine fixed to main rotor		N
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	Sections C.6.2.5.1.2 and C.6.2.5.1.5 refer to Post Event recording – it would be useful to confirm that a recordings at a minute interval but capturing each 20 ms cycle is compliant	Add the following phrase to both these clauses:  “Alternatively capturing each 20ms cycle in a fixed repeating period (eg 1 minute) would satisfy this requirement.”	N
	There is a simple typo in C.4.2.3.4(i)	Correction as: C.4.2.3.4 If a static type <b>Exciter</b> is employed: (i) the field voltage should be capable of attaining a negative ceiling level specified in the <b>Connection Agreement</b> after the removal of the step disturbance of C.4.2.4.32. The specified value will be 80% of the value specified in C.4.2.4.32. The <b>DNO</b> may specify a value outside the above limits where the <b>DNO</b> identifies a system need.	T
	Table C.6.3 has an incorrect title (copy and paste error from Table C.6.2).	<b>Table C.6.3 Dynamic system event <del>half-cycle</del> waveform triggering</b>	T
	There is a typo in form A2-3 in the LFSM-O section – it has the phrase “Alternatively simulation results should be noted below”. “Simulation” should be “test”.	Correct	T
	National Grid have split their licence.	Replace NETSO throughout the document with NGESO.	T
	There is a typo in 11.1.5 – the term rated power is used where Registered Capacity is called for.	Replace rated power with Registered Capacity	T

	The PGMDs (forms B2-1 and C2-1 for Type B and Type C/D should have “S” added to the evidence for Power Quality		T
	The PGMDs (forms B2-1 and C2-1 for Type B and Type C/D – remove D and TV but add S to Reactive Power Simulation		T
	The term “Manufacturer’s Data and Performance Report” is only partially bold in B.6.2.1(a). It is defined term.	Make whole term bold.	T
	Some stakeholders have been wondering how to submit compliance data for components, especially interface protection relays, rather than complete generation units or modules. This was raised in the Technical Forum as issue 71.	<p>It is proposed to modify the start of forms A2-1, A2-2 and A2-3 as below:</p> <p>2. <u>To obtain <b>Type Tested</b> status for a product</u></p> <p>This form can be used by the <b>Manufacturer</b> to obtain <b>Type Tested</b> status for a product which is used in a <b>Power Generating Module</b> by registering this form with the relevant parts completed with the Energy Networks Association (ENA) Type Test Verification Report Register.</p> <p><a href="#">For interface protection devices it is recommended to use the appropriate section of Form A2-4.</a></p>	N
	For some small generation <50kW the one off nature of some developments will mean that it is more appropriate to use the SAF for collecting necessary equipment data when applying for connexion rather than form A1-1 in G99. This was raised in the Technical Forum as issue 85.	<p>It is proposed to change the last sentence of the rubric on Form A1-1 thus</p> <p>“If the Power Generating Module is neither Fully Type Tested or Type Tested then and Form A2-1 or A2-2 or A2-3 should be submitted to the DNO with this form. <u>If this is not possible then the SAF should be submitted instead of this form</u>”.</p>	N