

## Distribution Code Consultation Response Proforma

### DCRP/18/08/PC: DC0079 Frequency Changes during Large Disturbances and their Impact on the Total System - Phase 4 – All existing Generation

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 17 August 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/08/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 5124, or to [dcode@energynetworks.org](mailto:dcode@energynetworks.org)

<b>Respondent</b>	Bernard Gospel
<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>	Please see our website <a href="http://www.amps.org.uk">http://www.amps.org.uk</a>
<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>	Yes

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	Question	Response	
Q1	Do you believe that DC0079 better facilitates the appropriate Distribution Code objectives? If not, why do they fail to do so?	Yes	Noted – thanks.
Q2	Do you support the proposal to remove vector shift protection technique as loss of main protection for existing distributed generators? If not, please clarify why.	In principle yes but we have concerns over the impact upon generators from a cost and operational perspective. The workgroup report seems to focus on non-synchronous plant with little or no mention made of the impact of the proposed changes on synchronous plant	<p>The WG actually has been more concerned about the effect on synchronous machines, believing that RoCoF, and particularly out-of-phase issues, present theoretically higher risks to synchronous machines. The WG does not have any evidence that machines &lt;5MW have any lower tolerance to the relevant phenomena than machines &gt;5MW for which these changes have already been agreed; in fact suspecting that the opposite is true, ie that &lt;5MW machines are more robust in this regard than &gt;5MW machines.</p> <p><i>Dec 2018 update - However, further to bilateral discussions between AMPS and WG members in December, the WG recognizes the point that the cost saving measures of abandoning LoM protection rather than suffer an expensive refit of protection is not available to synchronous machine owners. The ability to avoid significant costs for small machine owners will be a consideration of the implementation programme, and in particular when to cease making retrospective changes to the overall population.</i></p>

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Q3	Do you support the proposed change in RoCoF settings to 1Hzs <sup>-1</sup> with a delay of 500ms for all non-type-tested distributed generators below 5MW? If not, please clarify why.	Yes	Noted – thanks.
Q4	Do you agree that RoCoF protection should be disabled, in cases where settings cannot be changed, for all non-synchronous plant except for DFIG?	We do not understand the rationale behind this. If there is a need for LoM protection then there is a need for it and as such the protection should be replaced with appropriate equipment. This should also apply for synchronous and non-synchronous plant	<p>Your comment from the perspective of a single installation is logical. However the safety case that the WG used to underpin its recommendations is based on the population of machines in GB, and not on the individual risks at each machine. If the owner of the machine believes that there is an unusual local risk to be mitigated, and that Loss of Mains protection can help in the mitigation, the owner is still free to agree this bilaterally with the DNO.</p> <p><i>Dec 2018 update - Again, as with Q 2 above, the WG now appreciates the point about prohibitively expensive changes for small plant, and again this will be picked up by the project closure analysis proposed by the current implementation plan.</i></p>
Q5	Do you support the proposal that all DFIG machines should use RoCoF protection technique set at 1Hzs <sup>-1</sup> with a 500ms time delay as loss of mains?	No comment	Noted – thanks.
Q6	Do you agree that all synchronous generation >5MW, should have a RoCoF	We presume this is a typo and it should read <5MW?	It is not a typo. The consultation paper is specifically asking for views on removing the existing option of 0.5Hzs <sup>-1</sup> that

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	setting of $1\text{Hzs}^{-1}$ with a delay of 500ms retrospectively applied?	If this is the case then yes	synchronous generation >5MW has. The DNOs do not believe that this has been applied in practice and it is less desirable from a system perspective than $1.0\text{Hzs}^{-1}$ .
Q7	Do you agree that the same approach for asynchronous generation <5MW should be applied to that >5MW in that if the existing protection cannot be reset to RoCoF of $1\text{Hzs}^{-1}$ with a delay of 500ms, then it should just be disconnected/removed?	No	The WG is recommending that when generation >5MW is revisited, if it has VS protection that cannot be reset, then the LoM protection should be disabled – which is exactly what we are proposing for <5MW. If we did not take this approach, then this could impose new costs for relay replacement on those generators.
Q8	Do you agree with the workgroup's proposal that type-tested plant, currently connected to the system, should not be modified?	No	Attempting to change the protection on type tested asynchronous plant is very challenging. The WG does not believe it is necessary.
Q9	Do you agree that where practicable on existing relays, the overfrequency setting should be changed to the current requirements (and left as-set if the relay cannot accommodate it)?	Yes	Noted – thanks.
Q10	Do the proposed changes introduce any material risks for distributed generators? What are these risks? And have they been or will they be appropriately mitigated?	<p>We see several risks:-</p> <ol style="list-style-type: none"> <li>1. The risk of damage to the equipment where it is suddenly exposed to higher RoCoF rates than previously</li> <li>2. The cost of lost generation opportunity whilst the replacement/recalibration work is undertaken – some of this equipment will be &gt;10 years old and may not be suitable for remedial works or such works</li> </ol>	<p>1 This proposal does not change this risk. That risk exists from a combination of the natural changes on the GB system, and any future action that NG might take to change the RoCoF that the system is secured to – which is non imminent – although it will probably happen in the future.</p> <p>2 The work would be programmed over a period so that it can be done during</p>

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		<p>may lead to ongoing operational issues after the event</p> <p>3. From our experience we don't believe the costs have been adequately reflected in the limited assessments undertaken by the WG.</p>	<p>normal down time. In the main the requirement is a protection setting change, which is a trivial operation. The WG has also made provisions to limit the occasions when a new relay would be required. The CBA factors these costs in – although it is currently expected that any new capital costs might need to be borne by the generator.</p> <p>3 It is true that until the work is undertaken we will not know the costs outturn, but the WG is reasonably confident, based on previous experience, that the range of costs estimated will be adequate for the programme as conceived.</p>
Q11	Do the proposed changes impose any additional material risks on the system operator, eg reduced stability margins, reduced reactive capability margins, or difficulty in managing transmission system voltages? If yes, please highlight these risks.	No comment	Noted – thanks.
Q12	Do the proposed changes impose any additional material risks on distribution network operators, eg stability and security issues safety risks, or any additional investment that might be neither economic nor efficient? If yes, please highlight these risks.	We believe the costs have not been fully identified or calculated. It may not be possible to economically convert some equipment. The WG report is not clear about the costs or how they have been calculated. More transparency is required before a proper assessment of this aspect of the report can be undertaken	<p>This question is about costs imposed on network operators. Conversion costs would be for the generator to bear in the first instance. The headline numbers used were included in the report.</p> <p><i>Dec 2018 update As per Qs 2 and 4 above, disproportionate costs for small synchronous generators will be a specific consideration of the implementation plan.</i></p>

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Q13	Do the proposed changes adequately protect the interests of all distribution network users? If not, why do they fail to do so?	We believe the costs have not been fully identified or calculated. It may not be possible to economically convert some equipment. The WG report is not clear about the costs or how they have been calculated. More transparency is required before a proper assessment of this aspect of the report can be undertaken	We accept that there is more work to do on both the funding of the work and how it is implemented.
Q14	Are there further technical considerations to be taken into account? If yes, please highlight these technical considerations.	No comment	Noted – thanks.
Q15	Is there any evidence that Users will be inappropriately or adversely affected by the changes proposed? If so, please provide details.	<p>We see several risks:-</p> <ol style="list-style-type: none"> <li>1. The risk of damage to the equipment where it is suddenly exposed to higher RoCoF rates than previously</li> <li>2. The cost of lost generation opportunity whilst the replacement/recalibration work is undertaken – some of this equipment will be &gt;10 years old and may not be suitable for remedial works or such works may lead to ongoing operational issues after the event</li> <li>3. From our experience we don't believe the costs have been adequately reflected in the limited assessments undertaken by the WG.</li> </ol>	Please see our answers to question 10
Q16	Do the modifications proposed strike an appropriate balance between the needs of generators, DNOs, transmission licensees,	No comment	Noted – thanks.

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	and other interested parties? If not, why do they fail to do so?		
Q17	Do you agree with the proposed change implementation approach? If not, please explain why it is not appropriate and what other implementation options should be considered.	<p>It is not clear how the affected parties would be compensated.</p> <p>It is not clear how the affected parties would be encouraged to make the changes necessary.</p> <p>We believe this should be driven proactively from the DNOs i.e. they should provide all the engineering resource and skills to undertake the changes at zero cost for the identified generators since many of them will have little or no understanding of the issues nor have the technical expertise to make the changes.</p>	<p>We accept that there is more work to do on both the funding of the work and how it is implemented. This will include considerations of incentives etc.</p> <p>We also note that owners of generation have duties under general and sector specify H&amp;S law to understand these issues competently and undertake such work. Nevertheless the DNOs and NG accept that the right balance needs to be drawn here, and are looking to extend as much help as is reasonable.</p>
Q18	Are there any specific additional actions you would recommend to engage small generators in the process to implement the proposed change?	As stated above the whole process should be owned by the DNOs. The suggested approach still relies too heavily upon the generators to help deliver the final outcome. It needs to be borne in mind that many of the people who will be contacted by this approach will be hotel owners, farmers and hospital engineers who have day jobs that leave them little time to become engaged to the level they need to be on this matter.	As per Q18.
Q19	What do you believe are the most important considerations in resourcing implementation of the proposals and in potentially developing new arrangements to do so?	The most important aspect here is that there should be one body totally responsible. As we read the implementation plan it appears that the body charged with this will only be	The WG is very sympathetic with this point. The WG cannot deal with implementation and compliance issues; those are for licensees. However the

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		encouraging generators to act and possibly providing some limited technical support. The implementation has to be completely owned and managed by a single body – to the extent that they employ teams of engineers to visit the identified sites and undertake the work on behalf of the DNOs/National Grid	additional work referred to above is focussed on these issues.
Q20	Please provide any other comments you feel are relevant to the proposed change.	We are concerned about the limited engagement with industry over the estimation of the costs and the apparently lack of reference in the WG report to synchronous generation	The WG has and is open to engagement from stakeholders and has used the information it has been able to glean. As per Q2 the WG believes it has covered the issues for synchronous as well as asynchronous.



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Please send your responses and comments by **17:00 on 17 August 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/08/PC '. Please note that any responses received after the deadline may not receive due consideration by the Working Group.

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<b>Respondent</b>	Andy Vaudin
<b>Company Name</b>	EDF Energy
<b>No. of DCode Stakeholders Represented</b>	1
<b>Stakeholders represented</b>	EDF Energy
<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

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	Question	Response	
Q1	Do you believe that DC0079 better facilitates the appropriate Distribution Code objectives? If not, why do they fail to do so?	Yes. We agree with the workgroup report comments on the Distribution Code objectives included in section 6.6. We would also note the significant benefit to consumers that will arise from the reduction in balancing costs (RoCoF constraint costs) enabled following implementation of the recommendations	Noted. Thanks
Q2	Do you support the proposal to remove vector shift protection technique as loss of main protection for existing distributed generators? If not, please clarify why.	Yes. We agree with the conclusions of the workgroup report included in section 4.44. The removal of use of VS relays will mitigate the risk of exceeding the largest infeed loss as a result of a transmission fault.	Noted. Thanks
Q3	Do you support the proposed change in RoCoF settings to 1Hzs <sup>-1</sup> with a delay of 500ms for all non-type-tested distributed generators below 5MW? If not, please clarify why.	Yes. Significant benefit to consumers will arise from the reduction in balancing costs enabled following implementation of the proposed changes.	Noted. Thanks
Q4	Do you agree that RoCoF protection should be disabled, in cases where settings cannot be changed, for all non-synchronous plant except for DFIG?	Yes. We support the workgroup recommendations included in section 4.10 of the report based on the risk assessment and analysis by the University of Strathclyde in annex 4.	Noted. Thanks
Q5	Do you support the proposal that all DFIG machines should use RoCoF protection technique set at 1Hzs <sup>-1</sup> with a 500ms time delay as loss of mains?	Yes. We support the workgroup recommendations included in section 4.10 of the report based on the risk assessment and analysis by the University of Strathclyde in annex 4.	Noted. Thanks
Q6	Do you agree that all synchronous generation >5MW, should have a RoCoF setting of 1Hzs <sup>-1</sup> with a delay of 500ms retrospectively applied?	Yes. We understand this question to refer to synchronous plant >5MW currently using vector shift protection, which will need to stop using vector shift.	Noted. Thanks

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Q7	Do you agree that the same approach for asynchronous generation <5MW should be applied to that >5MW in that if the existing protection cannot be reset to RoCoF of 1Hzs-1 with a delay of 500ms, then it should just be disconnected/removed?	Yes. We support the workgroup recommendations included in section 4.16 of the report based on the risk assessment and analysis by the University of Strathclyde in annex 4. It is not stated in the question but, for the avoidance of doubt, we understand that this recommendation excludes DFIG Plant.	Noted. Thanks
Q8	Do you agree with the workgroup's proposal that type-tested plant, currently connected to the system, should not be modified?	Yes. We agree with the workgroups proposal in 4.24 based on analysis by the University of Strathclyde.	Noted. Thanks
Q9	Do you agree that where practicable on existing relays, the overfrequency setting should be changed to the current requirements (and left as-set if the relay cannot accommodate it)?	Yes. We agree that these changes should be made at the same time as the LoM protection changes	Noted. Thanks
Q10	Do the proposed changes introduce any material risks for distributed generators? What are these risks? And have they been or will they be appropriately mitigated?	We are not aware of any material risks for distributed generators introduced from these proposed changes. No material risks were identified by the workgroup (noting the risk assessment conclusions in section 4.48)	Noted. Thanks
Q11	Do the proposed changes impose any additional material risks on the system operator, eg reduced stability margins, reduced reactive capability margins, or difficulty in managing transmission system voltages? If yes, please highlight these risks.	We are not aware of any material risks for the system operator introduced from these proposed changes. No material risks were identified by the workgroup. The proposals will enable mitigation of the risk of generation tripping on a 0.125Hz/sec RoCoF event.	Noted. Thanks
Q12	Do the proposed changes impose any additional material risks on distribution network operators, eg stability and security issues safety risks, or any additional investment that might be neither economic	We are not aware of any material risks for the distribution network operators introduced from these proposed changes. No material risks were identified by the workgroup (noting the risk assessment conclusions in section 4.48)	Noted. Thanks

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	nor efficient? If yes, please highlight these risks.		
Q13	Do the proposed changes adequately protect the interests of all distribution network users? If not, why do they fail to do so?	We are not aware of any areas where the interests of distribution network users will not be protected.	Noted. Thanks
Q14	Are there further technical considerations to be taken into account? If yes, please highlight these technical considerations.	Increasing the RoCoF, Loss of Mains trip settings from 0.125 Hz/sec to 1 Hz/sec will allow National Grid to increase the RoCoF Operating Limit to above its present value of 0.125 Hz/sec. There also needs to be a formal assessment that all existing plant on the distribution and transmission system is able to withstand RoCoF events of up to and beyond any new Operating Limit (the Withstand Limit). There does not appear to be a process in place or work underway to do this yet (noting that it has taken several years to do this in Ireland).	<p>This is an issue that to the extent needs to be addressed should form part of NG's ongoing modifications to operating arrangements.</p> <p>This issue was raised as part of GC0035.</p> <p>National Grid have undertaken, as part of their compliance with the requirement of the SOGL to ensure that all relevant stakeholders are briefed on any future changes to the RoCoF operating limits adopted for the GB synchronous system.</p>
Q15	Is there any evidence that Users will be inappropriately or adversely affected by the changes proposed? If so, please provide details.	We are not aware of any evidence that users will be adversely affected. We would note the significant benefit to consumers that will arise from the reduction in balancing costs enabled following implementation of the recommendations.	Noted. Thanks
Q16	Do the modifications proposed strike an appropriate balance between the needs of generators, DNOs, transmission licensees, and other interested parties? If not, why do they fail to do so?	We believe that the proposed modifications strike an appropriate balance between the needs of all interested parties. We would note the significant benefit to consumers that will arise from the reduction in balancing costs enabled following implementation of the recommendations.	Noted. Thanks

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Q17	<p>Do you agree with the proposed change implementation approach? If not, please explain why it is not appropriate and what other implementation options should be considered.</p>	<p>We do not have confidence in the implementation of this much needed reform. As it stands, all individual sub-5MW embedded generators will have to be aware of the revised requirements, carry out an assessment of their Loss of Mains protection and then implement any associated amendments including paying for the costs themselves. The modification proposal requires this work to be completed within three years following approval by the Authority of the Distribution Code and EREC G59 modifications. We are not confident that this is a robust, efficient and auditable approach to implementation for such an important change.</p> <p>The DC0079 workgroup recognised the challenges of implementing a retrospective change of this type and recommended the creation of an implementation team. This team would have the governance, resourcing and stakeholder representation necessary to assure efficient and effective implementation of the proposed changes. This would seem to be a preferable approach to implementation. We would welcome firm proposals on funding, resourcing and governance from National Grid and the DNOs to take this forward, noting that the significant consumer benefit of removing RoCoF constraint costs will not be realised until the DC0079 recommendations have been implemented.</p>	<p>Your note correctly identifies many of the issues to be addressed for implementation.</p> <p>Currently the DNOs and NG are still developing the approach that they will wish to agree with stakeholders.</p>
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Q18	Are there any specific additional actions you would recommend to engage small generators in the process to implement the proposed change?	We would recommend further communications via trade associations e.g. RUK.	Noted. We already include RUK in our mailings etc -but will consider making a specific approach.
Q19	What do you believe are the most important considerations in resourcing implementation of the proposals and in potentially developing new arrangements to do so?	See response to Q17.	Noted -thanks.
Q20	Please provide any other comments you feel are relevant to the proposed change.	None	

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### DCRP/18/08/PC: DC0079 Frequency Changes during Large Disturbances and their Impact on the Total System - Phase 4 – All existing Generation

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Please send your responses and comments by **17:00 on 17 August 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/08/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 5124, or to [dcode@energynetworks.org](mailto:dcode@energynetworks.org)

<b>Respondent</b>	Paul Graham
<b>Company Name</b>	UK Power Reserve Limited
<b>No. of DCode Stakeholders Represented</b>	Five (5)
<b>Stakeholders represented</b>	UK Power Reserve Limited, UK Capacity Reserve Limited, UK Utility Reserve Limited, District Energy Limited, Derwent Cogeneration Limited
<b>Role of Respondent</b>	<i>Generator</i>
<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

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	Question	Response	
Q1	Do you believe that DC0079 better facilitates the appropriate Distribution Code objectives? If not, why do they fail to do so?	Yes, UK Power Reserve Limited believes that the opportunity to reduce overall BM costs to customers is in keeping with the spirit and practice of the DC objectives.	Noted. Thanks.
Q2	Do you support the proposal to remove vector shift protection technique as loss of main protection for existing distributed generators? If not, please clarify why.	Yes, the research underpinning this proposal shows that Vector Shift does not provide the level of security that can be delivered by RoCoF protection.	Noted. Thanks.
Q3	Do you support the proposed change in RoCoF settings to 1Hzs <sup>-1</sup> with a delay of 500ms for all non-type-tested distributed generators below 5MW? If not, please clarify why.	Yes, on the assumption that current generation equipment is able to operate reliably and robustly with these new settings.	The WG's opinion is that the revised settings will reduce nuisance trips
Q4	Do you agree that RoCoF protection should be disabled, in cases where settings cannot be changed, for all non-synchronous plant except for DFIG?	Yes, the impact of this requirement should be minimal in overall system impact.	Noted. Thanks
Q5	Do you support the proposal that all DFIG machines should use RoCoF protection technique set at 1Hzs <sup>-1</sup> with a 500ms time delay as loss of mains?	Yes, this will ensure consistency across the GB network for rotating generation sets.	Noted. Thanks.
Q6	Do you agree that all synchronous generation >5MW, should have a RoCoF setting of 1Hzs <sup>-1</sup> with a delay of 500ms retrospectively applied?	Yes, on the assumption that current generation equipment is able to operate reliably and robustly with these new settings.	The WG's opinion is that the revised settings will reduce nuisance trips
Q7	Do you agree that the same approach for asynchronous generation <5MW should be applied to that >5MW in that if the existing protection cannot be reset to RoCoF of 1Hzs <sup>-1</sup>	Yes	Noted. Thanks.



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	1 with a delay of 500ms, then it should just be disconnected/removed?		
Q8	Do you agree with the workgroup's proposal that type-tested plant, currently connected to the system, should not be modified?	Yes	Noted. Thanks.
Q9	Do you agree that where practicable on existing relays, the overfrequency setting should be changed to the current requirements (and left as-set if the relay cannot accommodate it)?	Yes	Noted. Thanks.
Q10	Do the proposed changes introduce any material risks for distributed generators? What are these risks? And have they been or will they be appropriately mitigated?	Yes, there may be installations where RoCoF settings may not be applied that permit reliable operation	The WG does not believe this to be the case, and if there is a known problem with RoCoF withstand above that which is it expected to operate the system to, an individual setting can be negotiated on production of appropriate evidence. The WG notes that this has produced no issues for owners of generation >5MW in the four years since similar changes were introduced for such installations.
Q11	Do the proposed changes impose any additional material risks on the system operator, eg reduced stability margins, reduced reactive capability margins, or difficulty in managing transmission system voltages? If yes, please highlight these risks.	No. This proposal should reduce overall BM costs and enable more predictable network operation at times of stress and/or wide scale fault.	Noted. Thanks.
Q12	Do the proposed changes impose any additional material risks on distribution network operators, eg stability and security issues safety risks, or any additional investment that might be neither economic nor efficient? If yes, please highlight these risks.	No	Noted. Thanks.

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Q13	Do the proposed changes adequately protect the interests of all distribution network users? If not, why do they fail to do so?	Yes	Noted. Thanks.
Q14	Are there further technical considerations to be taken into account? If yes, please highlight these technical considerations.	As already indicated in Q3 and Q6, some installations may suffer from reduced stability using RoCoF protection over VS.	Noted. Our response is the same as to those questions above
Q15	Is there any evidence that Users will be inappropriately or adversely affected by the changes proposed? If so, please provide details.	No	Noted. Thanks.
Q16	Do the modifications proposed strike an appropriate balance between the needs of generators, DNOs, transmission licensees, and other interested parties? If not, why do they fail to do so?	Yes	Noted. Thanks.
Q17	Do you agree with the proposed change implementation approach? If not, please explain why it is not appropriate and what other implementation options should be considered.	Yes. operators will benefit by having independent verification of changes required and implemented.	Noted. Thanks.
Q18	Are there any specific additional actions you would recommend to engage small generators in the process to implement the proposed change?	Past endeavours in this area have underestimated the level of engagement needed and increased effort (and cost) should be devoted to communicating with affected parties. The upfront cost may deter smaller generators and hinder engagement. UK Power Reserve believes the cost of implementation should be socialised across as the industry as security of supply is an industry-wide benefit. Socialisation of the cost should also avoid any market disturbances for smaller parties.	Noted. The WG notes that DNOs and NG are still discussing how the implementation will be funded and organized.

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Q19	What do you believe are the most important considerations in resourcing implementation of the proposals and in potentially developing new arrangements to do so?	See Q18	
Q20	Please provide any other comments you feel are relevant to the proposed change.		

## Mike Kay

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**From:** Gutierrez, Isaac (HQ110768) <IGutierrez2@scottishpower.com>  
**Sent:** 21 November 2018 15:45  
**To:** Mike Kay  
**Cc:** Richard Wood; Graham.Stein@nationalgrid.com; Xiaoyao.Zhou (Xiaoyao.Zhou@nationalgrid.com)  
**Subject:** RE: SP Renewables

Hi Mike

On behalf of SPR, I would like to inform you that based on wind turbines manufacturer feedback there is no immediate major risk foreseen if RoCoF is changed to 1Hz/s and I would like to withdraw SPR objection.

Regards  
Isaac

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**From:** Gutierrez, Isaac (HQ110768)  
**Sent:** 02 November 2018 10:27  
**To:** Mike Kay  
**Cc:** Richard Wood; Graham.Stein@nationalgrid.com; Xiaoyao.Zhou (Xiaoyao.Zhou@nationalgrid.com)  
**Subject:** RE: SP Renewables

Hi Mike

Thanks for your email. SPR welcome that there is provision for individual consideration.

SPR have quite a lot of old sites protected with a RoCoF setting 0.25 Hz/s. I reckon that if the system operates at 0.3Hz/s there should be no issue with the turbines and also I agree that wind turbine sites with VS protection at are risk. I will provide further feedback once the manufacturers that I contacted provide SPR with a response. Unfortunately I am not able to attend the GC0111 meeting in person.

Regards  
Isaac

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**From:** Mike Kay [mailto:mikekay@P2Analysis.co.uk]  
**Sent:** 31 October 2018 05:18  
**To:** Gutierrez, Isaac (HQ110768)  
**Cc:** Richard Wood; Graham.Stein@nationalgrid.com; Xiaoyao.Zhou (Xiaoyao.Zhou@nationalgrid.com)  
**Subject:** RE: SP Renewables

Hi Isaac – I think the good news is that we have made some provision for individual consideration – although it is intended to be in response to proof that some specific accommodation is needed. Anything that comes from a manufacturer about existing plant could be very useful in that regard. We have had no responses from manufacturers.

It is also worth saying that the WG didn't consider that there was much actual change in risk here. Whilst it is true that higher RoCoF might be seen for an intact system (and the operating limits are likely to be closer to 0.3Hz/s rather than 1Hz/s (1 Hz/s is a protection setting, not an operating limit)), there has always been the risk of higher RoCoF caused by relatively local faults with or without islanding – and which are likely to be more frequent than high system RoCoF events – although we don't have any analysis to back up that last assertion. The old RoCoF setting might have provided some protection here... but it still requires several cycles to operate – within which the physical/mechanical issues you are worried about will have been initiated. And if you are using VS, then you probably have no protection from this at all. So our view is that the risk you're worried about already exists... and we're not really changing it that much. So the challenge would be to demonstrate that the change in risk is significant from the risk you are already running.

If you're at the GC0111 meeting next week, I might see you there.

## Distribution Code Consultation Response Proforma

### DCRP/18/08/PC: DC0079 Frequency Changes during Large Disturbances and their Impact on the Total System - Phase 4 – All existing Generation

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Please send your responses and comments by **17:00 on 17 August 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/08/PC '. Please note that any responses received after the deadline may not receive due consideration by the Working Group.

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<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

## Distribution Code Consultation Response Proforma

	Question	Response	
Q1	Do you believe that DC0079 better facilitates the appropriate Distribution Code objectives? If not, why do they fail to do so?	Yes	Noted. Thanks.
Q2	Do you support the proposal to remove vector shift protection technique as loss of main protection for existing distributed generators? If not, please clarify why.	Yes	Noted. Thanks.
Q3	Do you support the proposed change in RoCoF settings to $1\text{Hzs}^{-1}$ with a delay of 500ms for all non-type-tested distributed generators below 5MW? If not, please clarify why.	No. This setting should be applied in a case by case basis as SPR concern is that generation below 5MW might not be able to withstand a ROCOF of $1\text{Hz/s}$	<p>The WG believes that such a theoretical risk is only likely to apply to synchronous machines. Furthermore no owner of generating equipment of &gt;5MW has raised any concerns here in the four years since the changes to plant of that size was made. The WG is of the view that if there is any risk associated with RoCoF, it is much more likely to be a problem for larger plant rather than the plant sizes that are the focus of this DC0079 proposal.</p> <p>To address any remaining risks a bespoke setting is possible on production of appropriate evidence.</p> <p>In addition National Grid have undertaken, as part of their compliance with the requirement of the SOGL to ensure that all relevant stakeholders are briefed on any future changes to the RoCoF operating limits adopted for the GB synchronous system. The operating limit is never expected to approach the protection setting of <math>1\text{Hzs}^{-1}</math>; a value of half this is probably a practical limit.</p>

## Distribution Code Consultation Response Proforma

Q4	Do you agree that RoCoF protection should be disabled, in cases where settings cannot be changed, for all non-synchronous plant except for DFIG?	Disagree as power plant might not be able to withstand very large ROCOF i.e. 1Hz/s., Please note that protection of the generating plant shall also be considered	See answer to Q3
Q5	Do you support the proposal that all DFIG machines should use RoCoF protection technique set at 1Hzs-1 with a 500ms time delay as loss of mains?	Disagree. This should be implemented on a case by case basis	See answer to Q3
Q6	Do you agree that all synchronous generation >5MW, should have a RoCoF setting of 1Hzs-1 with a delay of 500ms retrospectively applied?	No. Generators might not be able to withstand RCOF of 1hz/s	See answer to Q3
Q7	Do you agree that the same approach for asynchronous generation <5MW should be applied to that >5MW in that if the existing protection cannot be reset to RoCoF of 1Hzs-1 with a delay of 500ms, then it should just be disconnected/removed?	Disagree as power plant might not be able to withstand very large ROCOF i.e. 1Hz/s. Please note that protection of the generating plant shall also be considered.	See answer to Q3
Q8	Do you agree with the workgroup's proposal that type-tested plant, currently connected to the system, should not be modified?	Agree	Noted. Thanks.
Q9	Do you agree that where practicable on existing relays, the overfrequency setting should be changed to the current requirements (and left as-set if the relay cannot accommodate it)?	Yes although consideration should also be taken to the generator ROCOF withstand capability	Noted. See also response to Q3.
Q10	Do the proposed changes introduce any material risks for distributed generators? What are these risks? And have they been or will they be appropriately mitigated?	As mentioned above power plant might not be able to withstand very large ROCOF i.e. 1Hz/s. Please note that protection of the generating plant should also be considered. Risk include catastrophic failure of mechanical components	See answer to Q3
Q11	Do the proposed changes impose any additional material risks on the system	No	Noted. Thanks.

## Distribution Code Consultation Response Proforma

	operator, eg reduced stability margins, reduced reactive capability margins, or difficulty in managing transmission system voltages? If yes, please highlight these risks.		
Q12	Do the proposed changes impose any additional material risks on distribution network operators, eg stability and security issues safety risks, or any additional investment that might be neither economic nor efficient? If yes, please highlight these risks.	No	Noted. Thanks
Q13	Do the proposed changes adequately protect the interests of all distribution network users? If not, why do they fail to do so?	No as existing old generating power plant can be exposed to failure due to changing ROCOF to 1HZ/s	See answer to Q3
Q14	Are there further technical considerations to be taken into account? If yes, please highlight these technical considerations.	Yes. Withstand capability of existing old generating power plant to ROCOF of 1HZ/s	See answer to Q3
Q15	Is there any evidence that Users will be inappropriately or adversely affected by the changes proposed? If so, please provide details.	This need to be reviewed in a case by case basis as mentioned in the above responses. There are windfarms that are relatively old and in some cases the ROCOCF withstand capability of the wind turbines is unknown	See answer to Q3
Q16	Do the modifications proposed strike an appropriate balance between the needs of generators, DNOs, transmission licensees, and other interested parties? If not, why do they fail to do so?	No. There do not seems to be a proper balance between the needs of the stakeholders as the changes fail to acknowledge the generating plant ROCOF withstand capability. In addition, it seem that all costs associated with these changes should be absorbed by the generating plant owner including changes of protection relays if the existing protection relays cannot be setup to a ROCOF of 1HZ/s. Also, SPR is of the opinion	In addition to the response to Q3, the WG notes that the funding and implementation of the proposed changed is still subject to further development between NG and the DNOs, specifically to address these points.  The WG does not believe that protection setting changes will need to be witnessed. DNOs will decide on a case by case basis if witness testing is required for other more



## Distribution Code Consultation Response Proforma

		that any cost associated with the DNO witnessing the testing of any new G59 settings shall be waived by the DNO. In the consultation paper there is mention of a Phase 2 workgroup activates that should have included "Researching the characteristics (numbers/types etc.) of existing embedded generation of less than 5MW rated capacity including their likely RoCoF withstand capabilities". The paper does not seem to explain much about this research.	intrusive changes, such as a relay change. In any even the funding of this is part of the considerations referred to in the first part of this answer.
Q17	Do you agree with the proposed change implementation approach? If not, please explain why it is not appropriate and what other implementation options should be considered.	Disagree. The timescales for the implementation are too short as owners of existing old generating plant will need to investigate further if these old generators are able to withstand the new RCOCOF setting	See answer to Q3
Q18	Are there any specific additional actions you would recommend to engage small generators in the process to implement the proposed change?	Publish detailed information (if available) of any research regarding RoCoF withstand capabilities of generating plant	See answer t oQ3
Q19	What do you believe are the most important considerations in resourcing implementation of the proposals and in potentially developing new arrangements to do so?	No comment	Noted. Thanks.
Q20	Please provide any other comments you feel are relevant to the proposed change.	In ER G59 clause 10.5.10 there should be additional text saying <i>"The settings in 10.5.7.1 should generally be applied to all non-type-tested Generating Plant. Where these are being applied retrospectively in advance of the 1 October 2021 deadline, and in the cases where it is not possible to apply the compliant RoCoF setting of 1 Hzs-1 and 500 ms time delay to the existing protection equipment, it</i>	The WG believes that this is already catered for in the proposed G59 text.

## Distribution Code Consultation Response Proforma

		<p><i>will be necessary to replace the existing equipment with equipment that does comply unless the Generating plant ROCOF withstand capabilities do not allow for a change in ROCOF settings at all.. However this replacement requirement can be waived for all asynchronous generation apart from double fed induction generation (DFIG) equipment. In other words all synchronous and DFIG generation must be fitted with compliant RoCoF protection (or, for example intertripping), but other asynchronous generation can remove LoM protection if, and only if, its existing protection relays are not capable of being set in accordance with 10.5.7.1. The agreed settings or arrangement should be recorded in the Connection Agreement”.</i></p>	
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## Distribution Code Consultation Response Proforma

### DCRP/18/08/PC: DC0079 Frequency Changes during Large Disturbances and their Impact on the Total System - Phase 4 – All existing Generation

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 17 August 2018** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email 'Consultation Response DCRP/18/08/PC '. Please note that any responses received after the deadline may not receive due consideration by the Working Group.

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<b>Respondent</b>	<i>Damian Jackman</i>
<b>Company Name</b>	SSE Generation Ltd
<b>No. of DCode Stakeholders Represented</b>	1
<b>Stakeholders represented</b>	<i>Damian Jackman – SSE Generation Ltd</i>
<b>Role of Respondent</b>	<i>Generator</i>
<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

## Distribution Code Consultation Response Proforma

	Question	Response	
Q1	Do you believe that DC0079 better facilitates the appropriate Distribution Code objectives? If not, why do they fail to do so?	Yes; the proposals reduce the change of maloperation of Loss of Mains protection and thereby reduce the costs of operating the system – savings that will, in turn, be passed on to consumers.	Noted. Thanks.
Q2	Do you support the proposal to remove vector shift protection technique as loss of main protection for existing distributed generators? If not, please clarify why.	Yes – we support the proposal to remove Vector Shift from all generators.	Noted. Thanks.
Q3	Do you support the proposed change in RoCoF settings to 1Hzs <sup>-1</sup> with a delay of 500ms for all non-type-tested distributed generators below 5MW? If not, please clarify why.	Yes – we support the increase in RoCoF threshold to 1 Hz / s with a delay of 500ms.	Noted. Thanks.
Q4	Do you agree that RoCoF protection should be disabled, in cases where settings cannot be changed, for all non-synchronous plant except for DFIG?	Yes – to be clear, we agree that RoCoF protection should be disabled on non-synchronous generation (e.g. induction generators) provided other forms of Loss of Mains protection (e.g. under/over frequency protection) are provided.	Noted – thanks for the clarification. There are no plans to remove frequency and voltage protection.
Q5	Do you support the proposal that all DFIG machines should use RoCoF protection technique set at 1Hzs <sup>-1</sup> with a 500ms time delay as loss of mains?	Yes. However, it is important to note that a (small) windfarm may require updates to Loss of Mains protection at both its main Loss of Mains relay (configured to trip the main grid connection circuit breaker) <b>and also</b> the individual wind turbines which may each have their own Loss of Main protection function (either RoCoF or under/over frequency). It is critical that <i>all</i> the protection settings on the	Yes, noted. This is definitely an issue for implementation. We are aware of this, but you are right to flag it up as it is likely to be needed as a formal part of any specification for the work undertaken to apply the new settings.

## Distribution Code Consultation Response Proforma

		windfarm are updated (not only the relay controlling the main grid circuit breaker) otherwise it's possible that during a RoCoF event the main grid connection circuit breaker remains closed but the individual wind turbines could trip if have a lower threshold or time delay.	
Q6	Do you agree that all synchronous generation >5MW, should have a RoCoF setting of 1Hzs-1 with a delay of 500ms retrospectively applied?	Yes	Noted. Thanks.
Q7	Do you agree that the same approach for asynchronous generation <5MW should be applied to that >5MW in that if the existing protection cannot be reset to RoCoF of 1Hzs-1 with a delay of 500ms, then it should just be disconnected/removed?	Yes – but provided there is another form of 'backup' loss of mains protection (i.e under/over frequency/voltage) otherwise there is a risk to damage to the plant.	Noted. As per Q4.
Q8	Do you agree with the workgroup's proposal that type-tested plant, currently connected to the system, should not be modified?	Yes – however we are not clear that the risk from existing type-tested solar inverters is minimal; for example the impact from a deep fault on a transmission system (coincident with a generator or interconnector trip), could be widespread if the system fault level is low (as it will be during high solar output periods) and therefore could affect a significant number of inverters. The problem could be compounded by a low system inertia in that some parts of the system (i.e. those with high solar output) could see a significant drop in power being injected potentially leading to a higher risk of system separation.	Thank you for this point. This issue could be further work that National Grid believe to be necessary to investigate further the behaviour of inverters through research etc. It is the WG's belief that the recently formed Grid Code Review Panel Expert Group on Virtual Synchronous Machines will turn its attention to these issues in due course.

## Distribution Code Consultation Response Proforma

Q9	Do you agree that where practicable on existing relays, the overfrequency setting should be changed to the current requirements (and left as-set if the relay cannot accommodate it)?	Yes – this is essential to avoid system instability in the event of a trip of a large out-feed.	Noted. Thanks.
Q10	Do the proposed changes introduce any material risks for distributed generators? What are these risks? And have they been or will they be appropriately mitigated?	We do not believe these changes will impose risks for existing distribution generators.	Noted. Thanks.
Q11	Do the proposed changes impose any additional material risks on the system operator, eg reduced stability margins, reduced reactive capability margins, or difficulty in managing transmission system voltages? If yes, please highlight these risks.	We believe the changes will reduce risk for the ESO. However we believe the risk posed by existing type-tested solar inverters needs further study and potentially mitigating action (for reasons explain above) – possibly in the form of a regional market for synchronous compensators to provide a fault current injection capability to minimise the spread of a deep voltage dip and an improved regional inertial response.	As per Q8
Q12	Do the proposed changes impose any additional material risks on distribution network operators, eg stability and security issues safety risks, or any additional investment that might be neither economic nor efficient? If yes, please highlight these risks.	No	Noted. Thanks.
Q13	Do the proposed changes adequately protect the interests of all distribution network users? If not, why do they fail to do so?	We cannot see how other users will be adversely affected by these changes.	Noted. Thanks.
Q14	Are there further technical considerations to be taken into account? If yes, please highlight these technical considerations.	See note above about need to check for protection settings on individual wind turbine generators (this may also be relevant to	Noted. Thanks.

## Distribution Code Consultation Response Proforma

		inverters on solar farms but that is outside our experience)	
Q15	Is there any evidence that Users will be inappropriately or adversely affected by the changes proposed? If so, please provide details.		
Q16	Do the modifications proposed strike an appropriate balance between the needs of generators, DNOs, transmission licensees, and other interested parties? If not, why do they fail to do so?	Yes – these proposals reduce the cost of operating the system leading to lower costs for the end bill-payer.	Noted. Thanks.
Q17	Do you agree with the proposed change implementation approach? If not, please explain why it is not appropriate and what other implementation options should be considered.	Yes. It is important the most effective action is taken first; ie. if the small embedded wind generators could be targeted first then it will mean that the SO can operate to a higher RocoF limit during the night (typically when the largest infeeds are needing to be constrained)	Thankyou making this point. It should be factored into the detailed delivery and benefit realization plans that need to be developed.
Q18	Are there any specific additional actions you would recommend to engage small generators in the process to implement the proposed change?	<p>The issue could be outlined in a short publication along with the changes that a small generator would need to make and this could be accompanied by presentations at industry events e.g. All Energy.</p> <p>It should be highlighted that the generator owner may need to consider updating settings on each individual generator (if LoM functions are enabled there) in addition to the generator's main grid connection circuit breaker.</p>	Noted – thanks.
Q19	What do you believe are the most important considerations in resourcing implementation	The most important consideration is how the changes are paid for. We believe that	Noted. Currently the DNOs and NG are still developing the approach to funding and to

## Distribution Code Consultation Response Proforma

	of the proposals and in potentially developing new arrangements to do so?	generators should be responsible for the cost in changing their settings - as was the case for all generators > 5 MW. This could be implemented by setting a compliance deadline and by providing advice and support on how generators can comply as outlined in the consultation. As mentioned above, the focus of the implementation should initially be on non-solar generators, as this will enable operating at a higher ROCOF limit during the night.	implementation that they will wish to agree with stakeholders.
Q20	Please provide any other comments you feel are relevant to the proposed change.		



## Distribution Code Consultation Response Proforma

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<b>Respondent</b>	<i>Graeme Vincent</i>
<b>Company Name</b>	SP Energy Networks
<b>No. of DCode Stakeholders Represented</b>	2
<b>Stakeholders represented</b>	<i>SP Distribution and SP Manweb</i>
<b>Role of Respondent</b>	<i>Distribution Network Operator</i>
<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

## Distribution Code Consultation Response Proforma

	Question	Response	
Q1	Do you believe that DC0079 better facilitates the appropriate Distribution Code objectives? If not, why do they fail to do so?	Yes we believe that the DC0079 proposals better facilitate the first DCode objective and will additionally provide additional benefits to the operation of the Total System	Noted - thanks
Q2	Do you support the proposal to remove vector shift protection technique as loss of main protection for existing distributed generators? If not, please clarify why.	Yes, we agree with the proposal to remove vector shift as a LOM protection technique.	Noted – thanks
Q3	Do you support the proposed change in RoCoF settings to 1Hzs <sup>-1</sup> with a delay of 500ms for all non-type-tested distributed generators below 5MW? If not, please clarify why.	Yes, we agree with this proposal.	Noted – thanks
Q4	Do you agree that RoCoF protection should be disabled, in cases where settings cannot be changed, for all non-synchronous plant except for DFIG?	Yes	Noted – thanks
Q5	Do you support the proposal that all DFIG machines should use RoCoF protection technique set at 1Hzs <sup>-1</sup> with a 500ms time delay as loss of mains?	Yes, in order to better manage the risks to the system posed by RoCoF we are supportive of the proposal.	Noted – thanks
Q6	Do you agree that all synchronous generation >5MW, should have a RoCoF setting of 1Hzs <sup>-1</sup> with a delay of 500ms retrospectively applied?	To ensure that the risks of RoCoF are adequately managed and that generators are treated in an equitable manner we agree with this proposal.	Noted – thanks
Q7	Do you agree that the same approach for asynchronous generation <5MW should be applied to that >5MW in that if the existing protection cannot be reset to RoCoF of 1Hzs <sup>-1</sup>	Yes – in order to ensure that generators are treated in a similar manner, we would agree that those generators above and below 5MW should be treated in an equitable manner.	Noted - thanks

## Distribution Code Consultation Response Proforma

	1 with a delay of 500ms, then it should just be disconnected/removed?		
Q8	Do you agree with the workgroup's proposal that type-tested plant, currently connected to the system, should not be modified?	Yes	Noted – thanks
Q9	Do you agree that where practicable on existing relays, the overfrequency setting should be changed to the current requirements (and left as-set if the relay cannot accommodate it)?	Yes – this seems to be a practical approach to the issue of over frequency settings.	Noted - thanks
Q10	Do the proposed changes introduce any material risks for distributed generators? What are these risks? And have they been or will they be appropriately mitigated?	No response	Noted - thanks
Q11	Do the proposed changes impose any additional material risks on the system operator, eg reduced stability margins, reduced reactive capability margins, or difficulty in managing transmission system voltages? If yes, please highlight these risks.	We currently do not foresee any additional material risks for the System Operator arising from these proposals.	Noted - thanks
Q12	Do the proposed changes impose any additional material risks on distribution network operators, eg stability and security issues safety risks, or any additional investment that might be neither economic nor efficient? If yes, please highlight these risks.	We are not aware of any issues at this moment in time.	Noted - thanks
Q13	Do the proposed changes adequately protect the interests of all distribution network users? If not, why do they fail to do so?	We believe that the proposed changes are in the interests of all users of the distribution network.	Noted - thanks
Q14	Are there further technical considerations to be taken into account? If yes, please highlight these technical considerations.	At this moment, we do not believe so.	Noted - thanks

## Distribution Code Consultation Response Proforma

Q15	Is there any evidence that Users will be inappropriately or adversely affected by the changes proposed? If so, please provide details.	We are not aware of any evidence that Users will be inappropriately or adversely affected by these proposals.	Noted - thanks
Q16	Do the modifications proposed strike an appropriate balance between the needs of generators, DNOs, transmission licensees, and other interested parties? If not, why do they fail to do so?	Yes we believe that the proposals contained within this consultation strikes an appropriate balance.	Noted - thanks
Q17	Do you agree with the proposed change implementation approach? If not, please explain why it is not appropriate and what other implementation options should be considered.	We look forward to the views of stakeholders on the appropriateness of the proposed implementation plan and any suggestions for alternative means of achieving these changes.	Noted - thanks
Q18	Are there any specific additional actions you would recommend to engage small generators in the process to implement the proposed change?	No response	Noted - thanks
Q19	What do you believe are the most important considerations in resourcing implementation of the proposals and in potentially developing new arrangements to do so?	No response	Noted - thanks
Q20	Please provide any other comments you feel are relevant to the proposed change.	<p>There are some typographical errors on the proposed legal text;</p> <p><b>DCode legal text:</b> Page 6 should read Sixth Issue (not issues)</p> <p><b>G59 legal text:</b></p> <p>Section 6.1.4: Space required to be added after the words Type Tested.</p>	Noted. We will address these before submission to The Authority

## Distribution Code Consultation Response Proforma

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<b>Respondent</b>	<i>Alan Creighton</i>	
<b>Company Name</b>	Northern Powergrid	
<b>No. of DCode Stakeholders Represented</b>		
<b>Stakeholders represented</b>		
<b>Role of Respondent</b>	<i>Distributor</i>	
<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	
<b>Response</b>	Our only comments relate to a point of technical clarification in the draft G59 and minor editorial points as per the marked up versions off the attached documents.	These are all noted and all accepted and will be included in the final draft that goes to the Authority