

GC0102 EU Connection Codes GB Implementation – Mod 3

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **5pm on Thursday 9th November 2017** to grid.code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0102 Consultation Query'

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| Respondent: | <i>Greg Middleton</i> |
| Company Name: | <i>AMPS</i> |
| Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries) | <p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements |

Standard Workgroup Consultation questions

| Q | Question | Response |
|----------|----------------------------|---|
| 1 | Do you believe that GC0102 | We believe the Original Proposal better facilitates |

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| | Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives? | the objectives. |
| 2 | Do you support the proposed implementation approach? | Yes |
| 3 | Do you have any other comments? | No |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | No |

Specific GC0102 Consultation Questions

| Q | Question | Response |
|---|---|--|
| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | We support option 3 |
| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | The drafts included with this consultation are unfinished and as it stands G99 is completely unsuitable for application to synchronous generators as the type testing procedure is copied from that for inverter based micro-generators. Extensive work is underway on these and a proper consultation must be carried out when they are complete. Because of this it is impossible to give an answer to this question. At the least the workgroup report to Code Panel should clearly acknowledge this. Ideally G98 and G99 will be removed from this consultation process until such time as they are fit for purpose. |
| 7 | Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new | Yes |

| | | |
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| | PGMs are installed alongside existing pre-RfG equipment? (see page 11) | |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See <i>Workgroup discussions section</i>) | No, the process should remain as far as possible the same as it is now unless it has to change to be compliant with RfG. Introduction of a PON seem unnecessary for Type B PGMs |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? (see section 4.1.2.2) | Yes, it is appropriate. |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See section 5.2.5) | As stated under question 6 the draft of G99 with this consultation is completely unsuitable for application to synchronous generators as the type testing procedure is copied from that for micro-generators. A proper consultation is needed once the proposed requirements are known, this cannot be that consultation. Because of this it is impossible to give an answer to this question. At the least the workgroup report to Code Panel should clearly acknowledge this. Ideally G98 and G99 will be removed from this consultation process until such time as they are fit for purpose |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | Yes, these are inappropriate terms in any code now that all network codes refer to bands A-D. |
| 12 | Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99? | No comment. |
| 13 | Do you agree that it is appropriate | No comment |

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| | to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99? | |
| 14 | Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W? | They should be included in G98 as they are micro-generation. The inapplicable requirements can easily be noted. |
| 15 | If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See <i>Workgroup discussions section</i>) | No comment |
| 16 | G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful. | As stated under questions 6 and 10 the drafts of G98 and G99 with this consultation are completely unsuitable for application to synchronous generators as the type testing procedure is copied from that for micro-generators. A proper consultation is needed once the proposed requirements are known, this cannot be that consultation. Because of this it is impossible to give an answer to this question. At the least the workgroup report to Code Panel should clearly acknowledge this. Ideally G98 and G99 will be removed from this consultation process until such time as they are fit for purpose |
| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | As stated under questions 6, 10 and 16 the drafts of G98 and G99 with this consultation are completely unsuitable for application to synchronous generators as the type testing procedure is copied from that for micro-generators. A proper consultation is needed once the proposed requirements are known, this cannot be that consultation. Because of this it is impossible to give an answer to this question. At the least the workgroup report to Code Panel should clearly acknowledge this. Ideally G98 and G99 will be removed from this consultation process until such time as they are fit for purpose |
| 18 | The application of new technical requirements to non-type tested generation connecting to distribution | As stated under questions 6,10, 17 and 17 the drafts of G98 and G99 with this consultation are |

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| | networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | completely unsuitable for application to synchronous generators as the type testing procedure is copied from that for micro-generators. A proper consultation is needed once the proposed requirements are known, this cannot be that consultation. Because of this it is impossible to give an answer to this question. At the least the workgroup report to Code Panel should clearly acknowledge this. Ideally G98 and G99 will be removed from this consultation process until such time as they are fit for purpose |
| 19 | Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code? | The relevant parts of DDRC should be incorporated into G99 but care should be exercised that no unnecessary information is captured accidentally or that the documentation requirement are no more onerous than sum of the requirements from G59 and RfG |
| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | Yes. |

Legal drafting questions

| Q | Question | Response |
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| 21 | The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | No comment. |
| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | G98/G99 defines the compliance route and when those are finished we must have a consultation on them, this cannot be that consultation. |
| 23 | Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | No. |
| 24 | Please make any other comments on the legal text drafting for the | We are feeding our detailed comments on |

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| | <p>Distribution Code, G98 and G99 using the appropriate templates issued with this consultation.</p> | <p>G98/G99 back to the ENA as part of the workgroup developing them. It would be impractical and inefficient to duplicate the hundreds of comments on these forms. Again, we must make the point that this cannot be the considered a consultation on G98 and G99 as the drafts attached are unfinished and the latest drafts have changed substantially.</p> <p>The consultation makes the false statement “This GC0102 consultation includes the full legal text of the Distribution Code and G99.”. It clearly does not include the full text of G99.</p> <p>It also states “The nearly complete text of G98 was included in GC0100 and GC0101 consultations. The version of G98 that is included in this consultation has been modified in the light of feedback from those two previous consultations” implying that this has already been consulted on. Neither document was consulted on, they were just included in the document pack for those consultations with no reference to their existence or questions asked about them.</p> <p>Thus to us it follows that this consultation is flawed and should be withdrawn or re-worded to ensure that participants are not misled or are voting for things that are not clear and defined.</p> |
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| Respondent: | <i>Greg Middleton</i> |
| Company Name: | <i>Deep Sea Electronics Plc</i> |
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| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | Yes. |

Legal drafting questions

| Q | Question | Response |
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| 23 | Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | No. |
| 24 | Please make any other comments on the legal text drafting for the | We are feeding our detailed comments on |

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| | <p>Distribution Code, G98 and G99 using the appropriate templates issued with this consultation.</p> | <p>G98/G99 back to the ENA as part of the workgroup developing them. It would be impractical and inefficient to duplicate the hundreds of comments on these forms. Again, we must make the point that this cannot be the considered a consultation on G98 and G99 as the drafts attached are unfinished and the latest drafts have changed substantially.</p> <p>The consultation makes the false statement “This GC0102 consultation includes the full legal text of the Distribution Code and G99.”. It clearly does not include the full text of G99.</p> <p>It also states “The nearly complete text of G98 was included in GC0100 and GC0101 consultations. The version of G98 that is included in this consultation has been modified in the light of feedback from those two previous consultations” implying that this has already been consulted on. Neither document was consulted on, they were just included in the document pack for those consultations with no reference to their existence or questions asked about them.</p> <p>Thus to us it follows that this consultation is flawed and should be withdrawn or re-worded to ensure that participants are not misled or are voting for things that are not clear and defined.</p> |
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| Respondent: | <i>Steve Cox</i> |
| Company Name: | <i>Electricity North West</i> |
| Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries) | <p>We are aware of the considerable work that has gone into GC0102 and the associated GC0100 and GC0101, and we are pleased that we can now see the strands coming together. On this point we do not see any merit in continuing to develop the GB changes to the Grid Code in three separate modifications. They all interlink and cannot be considered in isolation. The legal text also needs to be considered as a whole, complete with all the changes to definitions, for example, worked in throughout the whole of the Grid Code and not just the Connexion Conditions. On this basis we recommend that you suspend work in GC0100 and GC0101 and find a way to move the consideration of these issues into GC0102.</p> <p>We note that the D Code, G99 and G98 are presented in full as part of the joint GC0102 consultation, which is helpful in all the new requirements can be seen across all the affected text.</p> |

Standard Workgroup Consultation questions

| Q | Question | Response |
|---|---|---|
| 1 | Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives? | Given the legal necessity of implementing the RfG we agree that the GC0102 proposals better facilitate both the Grid <u>and Distribution</u> Code objectives. However as per our opening remarks we are not completely convinced that running GC0102 separately from GC0100 and GC0101 is neutral on the efficiency and administration of Grid Code arrangements; we could argue that not |

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| | | combining the three modifications into one is now inefficient. |
| 2 | Do you support the proposed implementation approach? | Yes – although as above it would be more efficient to combine the three modifications. |
| 3 | Do you have any other comments? | Not that are not picked up in the rest of these questions. |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | No |

Specific GC0102 Consultation Questions

| Q | Question | Response |
|---|---|--|
| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | We are aware of the significant discussions on how to best present the GB requirements to GB stakeholders, recognizing the differences in connexion application process for different sizes of generating equipment, the different needs of stakeholders, and the influence of existing and emergent European standards. We believe that the option now alighted on, post recent discussions with stakeholders, is the best compromise. It has the benefit of being the simplest division of documents for new installations compared to existing in that micro generation (ie less than 16A per phase) will refer only to G98 (cf G83 for existing) and all other generation will refer to G99 (cf G59 for existing). |
| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | We note the development of the structure of G99 and note that more interaction with stakeholders is planned to refine the approach. However we believe that the current draft represents a good basis. |
| 7 | Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside | This is a very important practical point and we are pleased to see that some clear examples have been laid out in 6.1.5 of G99. It will be important to ensure that these examples are fully accepted |

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| | existing pre-RfG equipment? (see page 11) | as illustrative of the legal situation that will apply in such cases by all stakeholders, including Ofgem and BEIS. |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See <i>Workgroup discussions section</i>) | In principle yes. We note however that this is being portrayed by some stakeholders as a new (and arguably therefore more stringent) requirement. We do not believe this to be the case and believe that it should be presented as either (or both) a relaxation on the full EON/ION/FON process for smaller generating plant, or as a formalization of something that happens anyway, but not codified. |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? (see section 4.1.2.2) | Yes. Pending any decisions to change the fundamental approach in GB, the status quo should be maintained. |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See section 5.2.5) | As we work through the new requirements placed on smaller embedded generators, it has obviously been sensible to consider using well developed processes that apply to larger transmission connected plant. We expect to continue to work with stakeholders to examine the requirements in more detail over the next couple of months. |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | DNOs believed that National Grid shared the widespread view that it was inappropriate to retain Large, Medium and Small, and the associated regional differences, as the RfG and the other EU Codes are implemented. Discussions along these lines started probably as far back as 2013. It was therefore a surprise when National Grid announced that regional differences would remain in place and that generation stakeholders would need to be classified into Large, Medium or Small and also into Types A to D. Given the imminence of the compliance deadlines, we agree that it is now inappropriate to try to unpick the regional differences. Nevertheless we support the removal of the terms Large and Small from the Distribution Code, noting that it is necessary to retain Medium because the retention of regional differences means that Embedded Medium Power Stations will retain their complex LEEMPS status. |

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| 12 | Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99? | We have contributed to the drafting of this new specification and await stakeholder feedback. |
| 13 | Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99? | We understand how difficult it would be for Ofgem to approve an approach that applied the new GB documentation to storage, given it is explicitly excluded from the RfG. We believe this is a fundamentally incorrect approach, but recognize that we have essentially no choice in law. However G99 has been drafted to include storage in terms of connexion process etc, but to exclude the RfG specific requirements. |
| 14 | Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W? | Yes, GB process apply to all generation, irrespective of its size or ability to also act as demand. Therefore it is appropriate to include these technologies in G99. We note that the drafting specifically excludes the RfG provisions from applying to these technologies. |
| 15 | If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See <i>Workgroup discussions section</i>) | Whilst we recognize that more can always be done to increase harmonization, the development of both the Grid and Distribution Code requirements has been done jointly, with stakeholders, and as far as is practicable the requirements are the same. |
| 16 | G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful. | We believe this is a good question. We believe it is an absolute requirement that generating equipment should meet relevant PQ standards. However we are still exploring with stakeholders what is the best way to seek assurance that manufacturers have paid appropriate heed to the standards and that equipment is compliant. |
| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | We think the efficiencies from manufacturers' type testing, and equipment certificates in the future, are essential and we believe that the requirements in G98 and G99 form a good basis for continuing discussions with manufacturing stakeholders to refine and improve processes. |

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| 18 | The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | We are continuing to work with other DNOs, the ENA and stakeholders to refine and improve the processes and drafting of G99. |
| 19 | Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code? | Again this is an area where all DNOs would welcome feedback from stakeholders. |
| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | We are only too aware what a significant body of documentation this process is producing, as it tries to make plain the existing and new requirements in a coherent form. We certainly see there is a significant education and briefing need that the network licensees need to undertake with stakeholders from this point forward, probably until well after all the EU codes have been implemented and bedded down, ie over years, not months. |

Legal drafting questions

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| 24 | Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation. | |

GC0102 EU Connection Codes GB Implementation – Mod 3

ENA are aware of the considerable work that has gone into GC0102 and the associated GC0100 and GC0101, and we are pleased that we can now see the strands coming together. On this point we do not see any merit in continuing to develop the GB changes to the Grid Code in three separate modifications. They all interlink and cannot be considered in isolation. The legal text also needs to be considered as a whole, complete with all the changes to definitions, for example, worked in throughout the whole of the Grid Code and not just the Connection Conditions. On this basis we recommend that you suspend work in GC0100 and GC0101 and find a way to move the consideration of these issues into GC0102.

We note that the D Code, G99 and G98 are presented in full as part of the joint GC0102 consultation, which is helpful in all the new requirements can be seen across all the affected text.

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| Respondent: | David Spillett david.spillett@energynetworks.org 020 7706 5124 |
| Company Name: | ENA |
| Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries) | <p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements |

Standard Workgroup Consultation questions

| Q | Question | Response |
|---|---|---|
| 1 | Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives? | Given the legal necessity of implementing the RfG we agree that the GC0102 proposals better facilitate both the Grid and Distribution Code objectives. However as per our opening remarks we are not completely convinced that running GC0102 separately from GC0100 and GC0101 is neutral on the efficiency and administration of Grid Code arrangements; we could argue that not combining the three modifications into one is now inefficient. |
| 2 | Do you support the proposed implementation approach? | Yes – although as above it would be more efficient to combine the three modifications. |
| 3 | Do you have any other comments? | None that are not picked up in the rest of these questions. |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | No |

Specific GC0102 Consultation Questions

| Q | Question | Response |
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| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | We are aware of the significant discussions on how to best present the GB requirements to GB stakeholders, recognizing the differences in connection application process for different sizes of generating equipment, the different needs of stakeholders, and the influence of existing and emergent European standards. We believe that the option now alighted on (Option 3), post recent discussions with stakeholders, is the best compromise. It has the benefit of being the simplest division of documents for new installations compared to existing in that micro generation (ie less than 16A per phase) will refer only to G98 (cf G83 for existing) and all other generation will refer to G99 (cf G59 for existing). |

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| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | We note the development of the structure of G99 and note that more interaction with stakeholders is planned to refine the approach. However we believe that the current draft represents a good basis. |
| 7 | Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? (see page 11) | This is a very important practical point and we are pleased to see that some clear examples have been laid out in 6.1.5 of G99. It will be important to ensure that these examples are fully accepted as illustrative of the legal situation that will apply in such cases by all stakeholders, including Ofgem and BEIS. Note that we expect the D Code to be limited in terms of technical content, with reference being made in the main to G98/G99 |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See Workgroup discussions section) | In principle yes. We note however that this is being portrayed by some stakeholders as a new (and arguably therefore more stringent) requirement. We do not believe this to be the case and believe that it should be presented as either (or both) a relaxation on the full EON/ION/FON process for smaller generating plant, or as a formalization of something that happens anyway, but not codified. |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? (see section 4.1.2.2) | Yes. Pending any decisions to change the fundamental approach in GB, the status quo should be maintained. |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See section 5.2.5) | As we work through the new requirements placed on smaller embedded generators, it has obviously been sensible to consider using well developed process that apply to larger transmission connected plant. We expect to continue to work with stakeholders to examine the requirements in more detail over the next couple of months. |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | DNOs believed that National Grid shared the widespread view that it was inappropriate to retain Large, Medium and Small, and the associated regional differences, as the RfG and the other EU Codes are implemented. Discussions along these lines started probably as far back as 2013. It was therefore a surprise when National Grid announced that regional differences would remain in place and that generation stakeholders would need to be classified into Large, Medium or Small and also into Types A to D. Given the imminence |

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| | | of the compliance deadlines, we agree that it's now inappropriate to try to unpick the regional differences. Nevertheless we support the removal of the terms Large and Small from the Distribution Code, noting that it is necessary to retain Medium because the retention of regional differences means that Embedded Medium Power Stations will retain their complex LEEMPS status. |
| 12 | Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99? | We have contributed to the drafting of this new specification and await stakeholder feedback. |
| 13 | Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99? | We understand how difficult it would be for Ofgem to approve an approach that applied the new GB documentation to storage, given it is explicitly excluded from the RfG. We believe this is a fundamentally incorrect approach, but recognize that we have essentially no choice in law. However G99 has been drafted to include storage in terms of connection process etc, but to exclude the RfG specific requirements. |
| 14 | Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W? | Yes, GB processes apply to all generation, irrespective of its size or ability to also act as demand. Therefore it is appropriate to include these technologies in G99. We note that the drafting specifically excludes the RfG provisions from applying to these technologies . |
| 15 | If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See <i>Workgroup discussions section</i>) | Whilst we recognize that more can always be done to increase harmonization, the development of both the Grid and Distribution Code requirements has been done jointly, with stakeholders, and as far as is practicable the requirements are the same. |
| 16 | G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful. | We believe it is an absolute requirement that generating equipment should meet relevant PQ standards. However DNOs are still exploring with stakeholders what is the best way to seek assurance that manufacturers have paid appropriate heed to the standards and that equipment is compliant. |

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| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | We think the efficiencies from manufacturers' type testing, and equipment certificates in the future, are essential and we believe that the requirements in G98 and G99 form a good basis for continuing discussions with manufacturing stakeholders to refine and improve processes. |
| 18 | The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | We are continuing to work with our members and stakeholders to refine and improve the processes and drafting of G99. |
| 19 | Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code? | Again this is an area where all DNOs would welcome feedback from stakeholders. |
| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | We are only too aware what a significant body of documentation this process is producing, as it tries to make plain the existing and new requirements in a coherent form. We certainly see there is a significant education and briefing need that the network licensees need to undertake with stakeholders from this point forward, probably until well after all the EU codes have been implemented and bedded down, ie over years, not months. |

Legal drafting questions

| Q | Question | Response |
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| 21 | The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | |

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| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | |
| 23 | Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | |
| 24 | Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation. | |

GC0102 EU Connection Codes GB Implementation – Mod 3

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **5pm on Thursday 9th November 2017** to grid.code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0102 Consultation Query'

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| Respondent: | <i>Rachel Woodbridge-Stocks - 07976708078</i> |
| Company Name: | <i>National Grid</i> |
| <p>Please express your views regarding the Workgroup Consultation, including rationale.</p> <p>(Please include any issues, suggestions or queries)</p> | <p>This workgroup consultation represents the end of a very long development process. There is very little time left to achieve compliance with the national implementation deadlines for the European Connection Codes (of which the first, RfG, is due on 17 May 2018). This work must now be brought to a timely close and hopefully this consultation will help in gathering any further evidence available and then allowing submission of the proposal(s) to the Panel and Authority without further delay. It is crucial that members of the industry cooperate to achieve this.</p> <p>Noting that legal text for the alternatives is not included in this consultation, we would point out that this is not necessary to allow their progressing to Code Administrator consultation and submission to the Authority. Given that there is very limited time remaining for compliance, the principles behind the alternative proposals are complete and that mapping tables are in the process of being prepared to ensure the GB Code is consistent with the EU Connection Codes, this consultation should be sufficient to gather any further stakeholder views and evidence and allow the work to proceed. In terms of the legal text, the relevant clauses in the code are GR21.5 which states for the Code Administrator consultation that legal text may not be required if the Panel and the Authority agree; and GR 22.1&2 regarding the final report which in GR22.2(g) requires an assessment of the changes only.</p> <p>It should also be noted that if mistakes are found at a later stage with any of the legal text within the Proposal, a modification can be raised to make amendments.</p> |

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| | <p><i>GR.21.5 Where the Grid Code Review Panel is of the view that the proposed text to amend the Grid Code for a Grid Code Modification Proposal or Workgroup Alternative Grid Code Modification(s) is not needed in the Grid Code Modification Report, the Grid Code Review Panel shall consult (giving its reasons as to why it is of this view) with the Authority as to whether the Authority would like the Grid Code Modification Report to include the proposed text to amend the Grid Code. If it does not, no text needs to be included. If it does, and no detailed text has yet been prepared, the Code Administrator shall prepare such text to modify the Grid Code in order to give effect to such Grid Code Modification Proposal or Workgroup Alternative Grid Code Modification(s) and shall seek the conclusions of the relevant Workgroup before consulting those identified in GR.21.2.</i></p> <p><i>GR.22.2(g) The matters to be included in a Grid Code Modification Report shall be the following (in respect of the Grid Code Modification Proposal):</i></p> <p><i>g) an assessment of:</i></p> <p><i>(i) the impact of the Grid Code Modification Proposal and any Workgroup Alternative Grid Code Modification(s) on the Core Industry Documents and the STC;</i></p> <p><i>(ii) the changes which would be required to the Core Industry Documents and the STC in order to give effect to the Grid Code Modification Proposal and any Workgroup Alternative Grid Code Modification(s);</i></p> <p><i>(iii) the mechanism and likely timescale for the making of the changes referred to in (ii);</i></p> |
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Standard Workgroup Consultation questions

| Q | Question | Response |
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| 1 | Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives? | <p>The original proposal for GC0102 better facilitates the Grid Code Objectives.</p> <p>An assessment of the original proposal against the Grid Code objectives is as follows:</p> <p><i>i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity</i></p> <p>Positive. By implementing RfG and HVDC into the Grid Code with Ofgem’s “only make changes where needed” approach (as can be found in their 2014 Decision Letter), the</p> |

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| | | <p>current requirements for operating the system safely have remained whilst incorporating the requirements necessary to harmonise with Europe. This therefore facilitates the development of a coordinated and efficient system.</p> <p><i>ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity)</i></p> <p>Positive. By implementing the necessary changes required by RfG and HVDC, New Generators and HVDC Owners connecting to the transmission network will be treated equally from a technical connections perspective (as required by RfG and HVDC). In doing so, barriers to trade will be removed.</p> <p><i>iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole</i></p> <p>Positive, maintaining a number of existing Grid Code requirements (not mentioned in RfG or HVDC) facilitates the safe and secure operation of the system. If these requirements were removed from the Grid Code (on the basis of not being mentioned in the European Connection Codes) as is suggested in the “more stringent” alternative, there would be implications for system security and efficiency.</p> <p><i>iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and</i></p> <p>Positive. This modification is required to</p> |
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| | | <p>implement elements of the European Connection Codes forming part of the suite of European Network Codes resulting from the EU 3rd Package legislation (EC 714/2009). The most efficient way of discharging these obligations is to adopt Ofgem’s “only make changes where needed” approach.</p> <p>v. <i>To promote efficiency in the implementation and administration of the Grid Code arrangements</i></p> <p>Neutral. No major impacts on the process of administering the Grid Code.</p> <p>So as noted above, the GC0102 original proposal better facilitates objectives (i)-(iv) and is neutral against objective (v).</p> <p>The ‘more stringent’ alternative fulfils none of the objectives as summarised below.</p> <p>Assessment of the ‘more stringent’ alternative against the Grid Code objectives:</p> <p>i. <i>To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity</i></p> <p>Negative. The ‘more stringent’ alternative has not been well defined in terms of what items have been considered to be more stringent with only a very limited number of examples so far provided, nor do we believe it embodies the “only make changes where needed” solution as required by Ofgem for implementation of the European Network Codes and so does not permit efficient development.</p> <p>ii. <i>To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity)</i></p> <p>Negative. The ‘more stringent’ alternative is</p> |
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| | | <p>not achievable in the time available and proposes striking out of national code requirements without which system security will be compromised and new connections will be unable to proceed under safety rules and due to a lack of clarity over equipment specifications. Further, due to the time that solving these issues will take the ability of new entrants to meet their European Connection Code obligations will be compromised as the lead-time that they will have prior to compliance being required will be reduced.</p> <p>If the more stringent alternative is, instead of the principle submitted, a 3 layer approach, then any minor points subsequently identified by stakeholders as potentially being “more stringent” could be amended as they are identified. There is a concern that if, instead, the more stringent alternative continues to change and time is spent developing it further, the process is delayed and industry parties won’t get visibility of the final solution until very close to the implementation date making it more difficult for them to comply with the new standards and essentially creating a short term barrier.</p> <p><i>iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole</i></p> <p>Negative. The ‘more stringent’ alternative reduces secure connection of new entrants, stifles development of efficient solutions and potentially undermines the safe, secure and economic operation of the Transmission System in a reasonable, efficient and proportionate manner. .</p> <p><i>iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and</i></p> |
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| | | <p>Negative. The 'more stringent' alternative does not efficiently discharge the obligations of RfG and HVDC as more work is required compared to only making changes where needed – there is also the question of whether it could be implemented in the timescales required.</p> <p>v. <i>To promote efficiency in the implementation and administration of the Grid Code arrangements</i></p> <p>Neutral.' No material impact on the administration of the Grid Code. The risk to the timescales is a concern if this alternative is pursued though.</p> |
| 2 | Do you support the proposed implementation approach? | <p>For the original proposed solution, yes. For the alternative proposed, no due to the reasons outlined above.</p> <p>The most important factors for Generators in particular at this stage should be lead time for compliance - this has been greatly reduced due to the time spent on requests for evidence and pursuing alternatives to the detriment of new entrants to the market.</p> |
| 3 | Do you have any other comments? | <p>The original proposal satisfies the requirements of RfG and HVDC and, providing there are no delays to the process, can be implemented by the deadlines required.</p> <p>Where the workgroup has identified additional changes in order to improve the efficiency of and competition within, the electricity network, these should be addressed outside of GC0102 as Open Governance allows industry parties to raise modifications to the Grid Code in order to achieve this.</p> <p>The inclusion of additional requirements that are not necessary to ensure compliance with RfG and HVDC should therefore not delay Implementation and hence risk GB to be non-compliant with European Law given that the original proposal stated in GC0102 satisfies the defect of currently being non-compliant.</p> |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | No |

Specific GC0102 Consultation Questions

| Q | Question | Response |
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| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | No comment |
| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | Yes |
| 7 | Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? (see page 11) | No comment |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See <i>Workgroup discussions section</i>) | Yes, it is a tool to aid New Generators using the transmission network. We believe this clarification gives protection to both Generators and Network Operators especially given that equipment certificates might not be fully developed by May 2018. |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? (see section 4.1.2.2) | Yes |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See section 5.2.5) | No comment. |
| 11 | Do you agree it is appropriate to | Removing Large and Small from the Distribution |

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| | <p>drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code?</p> | <p>Code is a relatively simple step with few implications and may therefore be appropriate. However, removing Large, Medium and Small from the Grid Code has wider impacts on other GB codes and there is not sufficient time to review the wider impacts of doing so and make the necessary amendments. More importantly, it is not necessary for compliance with RfG an HVDC – which is what GC0102 seeks to address. So far as the technical requirements are concerned, the Grid Code has been updated to ensure the technical requirements are consistent with the RfG and HVDC Code without making reference to Large, Medium and Small Power Stations.</p> <p>If it sensible to remove Large, Medium and Small from the Grid Code it should be part of a separate modification, not GC0102. Under Open Governance any industry party can raise a modification to address this which can then be progressed along a separate timeline.</p> |
| 12 | <p>Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99?</p> | <p>No comment.</p> |
| 13 | <p>Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99?</p> | <p>If it is necessary for compliance with RfG and HVDC or if it is a tool to allow implementation of RfG and HVDC.</p> |
| 14 | <p>Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W?</p> | <p>If it is necessary for compliance with RfG and HVDC or if it is a tool to allow implementation of RfG and HVDC.</p> |
| 15 | <p>If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See</p> | <p>I consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, however, a possible alternative would be for distribution networks to follow the same System Management and compliance procedures as transmission networks</p> |

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| | <i>Workgroup discussions section)</i> | – this was not proposed though as it could potentially put additional costs on Embedded Generators. |
| 16 | G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful. | No comment. |
| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | No comment. |
| 18 | The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | No comment. |
| 19 | Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code? | No comment. |
| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section)</i> | Yes. This modification incorporates RfG and HVDC into the Grid Code so that New Users only need to refer to one Code. It removes some of the ambiguity from the ENC's to aid Users' understanding and anything that can be included into the Grid Code (as opposed to Bilateral Connection Agreements) has been in a conscious effort to promote transparency. |

Legal drafting questions

| Q | Question | Response |
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| 21 | The Proposed draft Grid Code legal text contains a number of comments | No comment. |

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| | incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | |
| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | No comment. |
| 23 | Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | No comment. |
| 24 | Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation. | No comment. |

GC0102 EU Connection Codes GB Implementation – Mod 3

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **5pm on Thursday 9th November 2017** to grid.code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0102 Consultation Query'

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| Respondent: | <i>Alan Creighton</i> <i>alan.creighton@northernpowrgrid.com</i> |
| Company Name: | <i>Northern Powergrid</i> |
| Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries) | <p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements |

Standard Workgroup Consultation questions

| Q | Question | Response |
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| 1 | Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, | Given the legal necessity of implementing the RfG we agree that the GC0102 proposals better facilitate both the Grid and Distribution Code objectives. However, |

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| | better facilitates the Grid Code Objectives? | running with three separate modifications may not be the best way to proceed given their interaction. For example the modification considering banding could have implications for GC0102. Combining the modifications may also make it easier for users to assess the proposed changes in their totality. There would be merit in reviewing the most efficient way forwards. |
| 2 | Do you support the proposed implementation approach? | Yes |
| 3 | Do you have any other comments? | No |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | No |

Specific GC0102 Consultation Questions

| Q | Question | Response |
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| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | We believe that on balance, Option Three, which emerged from recent stakeholder discussion, is the best solution if only because it relates more closely to the present document structure and should therefore be easier for stakeholders to follow. |
| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | The current structure of G99 does seem to be reasonably logical and clear although it may be possible to provide additional clarity by incorporating some of the structural diagrams from the GC0102 consultation and a diagram showing the relationship between Power Generating Facility, Power Generation Modules etc. Further descriptions of the scenarios where the GCode requirements apply to Medium may help, recognising that a Medium may comprise multiple Type A synchronous generators. |
| 7 | Do you agree with the current view of how the Grid and Distribution Codes | We agree with the interpretation as set out in the draft EREC G99 and that the examples are helpful. We |

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| | (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? (see page 11) | have provided some editorial comments on the table. It will be important to ensure that these examples are fully accepted as illustrative of the legal situation that will apply in such cases by all stakeholders, including Ofgem and BEIS, particularly as there are some situations where increased technical requirements may be applied to plant already connected. |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See <i>Workgroup discussions section</i>) | We can see the benefits of recording formally the fact that a PGM is connected to the transmission system, and although we have yet to see a draft PON, we would not envisage this to be an onerous requirement. |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? (see section 4.1.2.2) | Yes, although we appreciate that there may be a requirement to review this position in the future. We have provided some editorial comment on the legal text e.g. that further clarity of the requirements may be helpful, for example, where there is a Embedded Medium Power Station that comprises multiple Type B PGMs. |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See section 5.2.5) | DNOs, via the ENA ,are working with small generators to develop the compliance processes which will be incorporated in the new EREC G98 and G99 |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | We had understood that the intention was to remove the concept of Large, Medium and Small Power Stations from the Grid Code and Distribution Code, however we appreciate to complexities associated with doing this particularly as Large, Medium and Small are based on power station capacities, whilst Types A-D may based on the capacity of individual generating units. Retaining the concept of Large, Medium and Small for commercial and regulatory purposes whilst basing the technical requirements on Type A-D could be confusing for stakeholders, but given the extent of the potential changes and timescales involved we accept the current proposal |
| 12 | Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99? | We are still reviewing this internally and will provide feedback to the drafting team as soon as possible. |

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| 13 | Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99? | We currently apply the principles of EREC G83 and G59 when designing battery storage connections and believe it is appropriate to clarify that the scope of the new documents includes storage. Recognising that there are currently industry debates on the treatment of storage we think that it is reasonable to exclude the specific RfG requirements from applying to storage as set out in Appendix 5 pending further debate. |
| 14 | Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W? | Yes, the use of a common set of documents simplifies the connection process for stakeholders and the proposals explicitly exclude the RfG requirements from applying to units <800W. |
| 15 | If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See <i>Workgroup discussions section</i>) | Whilst we recognise that more can always be done to increase harmonisation, the development of both the Grid and Distribution Code requirements has been done jointly, with stakeholders, and as far as is practicable the requirements are the same. |
| 16 | G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful. | It is important that PGMs should comply with international power quality standards, but we are open as to the best way for compliance to be demonstrated. |
| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | We agree that the concept of full and particle type testing but note that whilst reliance on compliance evidence information from manufactures is a pragmatic solution, this is not as robust as compliance been certified by independent test houses in the form of equipment certificates. We have provided some comment on the legal text that should improve clarity. |
| 18 | The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | We will continue to work with other DNOs, the ENA and stakeholders to refine and improve the connection processes and drafting of G99 in order to simplify and clarify the process as far as possible. |
| 19 | Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code? | We believe that the DDRC should detail the data that should be available the DNO, and are open to suggestion from stakeholders on the best vehicle for facilitating the data exchange as part of the connection and compliance process. |

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| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | The changes proposed in this and the associated consultation will help to add transparency to the implementation of the RfG. Given the extent of the documentation, it's inevitable that areas will emerge where further clarification or explanation is required once the new documentation is implemented. We therefore envisage the need for regional and national dissemination and that further changes to the Grid Code and Distribution Code. |
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Legal drafting questions

| Q | Question | Response |
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| 21 | The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | <p>ECC General</p> <p>It's unclear whether a Network Operator in respect to an existing Distribution Network connected to an Existing GSP should comply with the ECC requirements or CC requirements or both. The proposed definition of New User implies that it only relates to a 'new network operator'. ECC3.1 (d) suggest that the ECC apply to Network Operators who don't comply with the conditions set out in ECC3.6, yet ECC3.6 doesn't set out any criteria – rather it states the it applies to Network Operators Systems. Furthermore many of the obligations set out in ECC seem to relate to Network Operators rather than Network Operators Systems and do seem to duplicate those in the CC. We had assumed that a Network Operator would only need to comply with the ECC as part of the connection of a new Distribution System. New User is a newly defined term; we have seen a copy of the proposed definition (which isn't included in the consultation pack) but we're not convinced that this definition aligns with ECC3.1</p> <p>ECC6.2.3.6. This new text suggests that NGET and the DNO should agree the protection scheme and settings at the GSP. In accordance with the principles in RES, the details of the protection scheme forming part the busbar protection schemes should be agreed between the DNO and NGET; however the protection scheme for equipment outside the scope of the busbar protection scheme (e.g. on the outgoing feeders) should be established by the DNO alone provided that settings can be applied which properly co-ordinate and discriminate with NGETs protection.</p> |

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| | | <p>ECC6.2.3.7 As above the need to agree changes should not include changes to the protection scheme outside the busbar protection zone.</p> <p>ECC6.2.3.10 Further details are required in relation to the synchronisation obligation. The DNO has no means of 'synchronising' and can only prevent closure of circuit breakers where the parameters either side of an open point are outside pre-defined parameters.</p> <p>ECC6.5.6.1 As drafted NGET require 'visibility of the real time output and status of indications of User's Plant and Apparatus so they can control the operation of the System' which would include DNOs plant and equipment as a 'User'. Is this the intention?</p> <p>ECC6.5.6.3 At the moment DNOs don't provide operating metering signals - metering is provided by NGETs FMS. Is the intention for NGET not to specify any additional requirements in the DNOs BCA?</p> <p>ECC.A5.4.1 The details of the LFDD scheme is an example where clarification is required on whether a DNO should comply with ECC.A5.4.1 or CC.A.5.4.1. Is reconnection only permitted in accordance with the requirements of ECC6.2.3.10 or CC6.2.3.10?</p> <p>EDRC General As per the proposed draft ECC, it's unclear whether a Network Operator in respect to an existing Distribution Network connected to an Existing GSP should comply with the DRC requirements or EDRC requirements or both.</p> |
| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | |
| 23 | Are there any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | This assessment will be easier once the compliance mapping table is available. |
| 24 | Please make any other comments on the legal text drafting for the Distribution | We have provided comments embedded in copies of |

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| | Code, G98 and G99 using the appropriate templates issued with this consultation. | the consultation documents. |
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GC0102 EU Connection Codes GB Implementation – Mod 3

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **5pm on Thursday 9th November 2017** to grid.code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating ‘GC0102 Consultation Query’

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| Respondent: | <i>Sridhar Sahukari</i> |
| Company Name: | <i>Orsted (formerly DONG Energy)</i> |
| Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries) | <p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements |

Standard Workgroup Consultation questions

| Q | Question | Response |
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| 1 | Do you believe that GC0102 | Yes. We agree that GC0102 Original proposal |

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| | Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives? | facilitates the Grid Code Objectives. |
| 2 | Do you support the proposed implementation approach? | Yes. |
| 3 | Do you have any other comments? | Section 4.1.7 mentions that Article 15(4) in RfG is covered by CC.6.3.10 and CC.6.3.15. However, Article 15(4)(c) is not covered. |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | No. |

Specific GC0102 Consultation Questions

| Q | Question | Response |
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| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | |
| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | |
| 7 | Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? (see page 11) | Yes, we agree with the way RfG clauses will co-exist in the Grid Code. |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process | |

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| | for Transmission connected Type B and Type C PGMs? (See <i>Workgroup discussions section</i>) | |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? (see <i>section 4.1.2.2</i>) | |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See <i>section 5.2.5</i>) | We believe there is no requirement for Preliminary Frequency Testing (ECP.A.6.6.4) as per RfG. We believe this is onerous on the developers, as there is high dependency on weather conditions to perform this test. |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | Yes, we agree to drop the designation Large, Medium and Small from the Grid Code with regard to technical requirements. |
| 12 | Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99? | |
| 13 | Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99? | |
| 14 | Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W? | |
| 15 | If you do not consider the proposed | We agree that the requirements are harmonised |

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| | <p>solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See <i>Workgroup discussions section</i>)</p> | <p>as best as possible with the Proposer's solution. We are not in favour of publishing all the Bilateral Connection Agreements in the public domain due to the commercial sensitivity and confidentiality reasons. However, at the same time we propose that the existing templates for BCA, ConsAg and other appendices to be improved to increase the transparency. Similarly, if any generator is required to meet additional requirement than what is mentioned in the template, NGET shall provide all the required evidence for the addition.</p> |
| 16 | <p>G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful.</p> | |
| 17 | <p>Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity.</p> | |
| 18 | <p>The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements</p> | |
| 19 | <p>Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code?</p> | |
| 20 | <p>Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>)</p> | |

Legal drafting questions

| Q | Question | Response |
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| 21 | The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | <p>In the App 3 -> ECP.6.6.1 (pg 15), it is not clear if 24months period starts from issue of ION-A or ION-B especially in the case of Offshore PPMs. As discussed in the workgroup meetings, load rejection drafting needs to be improved to make it clearer on what is expected of the studies.</p> <p>We believe there is no requirement for Preliminary Frequency Testing (ECP.A.6.6.4) as per RfG. We believe this is onerous on the developers to be able to do this due to high dependency on weather conditions.</p> |
| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | |
| 23 | Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | |
| 24 | Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation. | |

GC0102 EU Connection Codes GB Implementation – Mod 3

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **5pm on Thursday 9th November 2017** to grid.code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating ‘GC0102 Consultation Query’

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| Respondent: | <i>Peter Woodcock 07770302131 Peter.woodcock@rwe.com</i> |
| Company Name: | <i>RWE Generation UK</i> |
| Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries) | <p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements |

Standard Workgroup Consultation questions

| Q | Question | Response |
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| 1 | Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives? | This is enabling the development of the transmission system and I can see that the security of the system will improve. However improving efficiencies in terms of competition, Code administration and generation costs has been worsened due to the complexity of the changes to the Code which have been enforced by RfG. However I cannot think of any significant improvement of what has been suggested by the Original Proposal or the Alternative Proposal. |
| 2 | Do you support the proposed implementation approach? | I am in support of this approach as it builds on the existing Code whilst integrating the RfG requirements into it. There are no significant concerns and just finer details which may be improved in future modifications once the Code is used in practice. |
| 3 | Do you have any other comments? | No |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | No, I believe that the one currently under consideration is suitable. |

Specific GC0102 Consultation Questions

| Q | Question | Response |
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| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | I believe that option 3 is the most sensible structure to follow as this provides a concise document for microgenerators and a detailed document for larger projects who should have the technical capability of understanding which requirements are applicable for their situation. |
| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | Yes this seems sensible. |

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| 7 | Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? (see page 11) | 6.1.3.2 and 6.1.4.2 of G99 is clear and easy to understand. Table 6.1 is very useful to align specific projects to get a guide / appreciation of the approach to take, however not all scenarios are possible to cover here. What is the process if a dispute occurs between DNO and generator about the requirements for a project? |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See Workgroup discussions section) | I think this is to the benefit of type B and C generators when considering connection to the transmission system as it gives a structured approach (process) to obtaining a FON. Therefore I do agree that a PON is required. However I would like clarification following the issue of a FON to a type B or C generator and then subsequent discovery of an compliance issue. Would a LON or PON be issued to manage the issue? |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? (see section 4.1.2.2) | This does seem logical and so I agree with the approach. |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See section 5.2.5) | No |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | As we are forced to adopt the Type definitions, it is appropriate to remove the LMS references as much as possible to avoid confusion for new generators. However it is too much work to do this completely and I would suggest that the term medium is kept in the interim for the D Code. For future clarity I would suggest that a working group should be set up to look at this and other Coding areas which utilise LMS and attempt to convert this to the Type definitions. Note that this may be part of the future European Network Code requirements (Electricity |

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| | | <p>Balancing?).</p> <p>For example 6.1.3.1 in G99 still refers to large power stations in the Grid Code.</p> |
| 12 | <p>Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99?</p> | <p>It may be more appropriate to only consider including harmonic recording if there is found to be a specific concern, say following a harmonics study. This would save unnecessary cost of including permanent harmonic monitoring, which may be a significant cost.</p> |
| 13 | <p>Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99?</p> | <p>Yes, it is appropriate. It is entirely likely that distributed battery storage (e.g. bidirectional vehicle chargers) will be controlled by national 'aggregators'. In theory individual installations would/should come under Type A Generators. These Generators are likely to play an increasingly significant role in balancing, frequency response, arbitrage, etc.. and so should be considered alongside other non-storage technologies.</p> |
| 14 | <p>Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W?</p> | <p>Is this in reference to section 2.3 and 6.1.2 of G99? If so this is not an issue as they refer the reader to G98. However it was my understanding that any PGM rated less than 800W does not need a type definition, so this question is a bit confusing.</p> |
| 15 | <p>If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See <i>Workgroup discussions section</i>)</p> | <p>I believe that the proposed solution is adequate enough for generators connected in England, which is my main focus. I do not have enough appreciation / experience for the complexities of network ownership in Scotland.</p> |
| 16 | <p>G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation</p> | <p>In the case of harmonics, G5/4 provides a means for calculating, or at least predicting, harmonic voltages from a manufacturer's supplied figures of harmonics currents. Reference to the G5/4, or equivalent, process should be sufficient without having to reiterate in G98/99. Accepting results of data from other international standards would have to be approached intelligently on a case-by-case basis.</p> |

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| | of your views would be useful. | |
| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | It would be very useful to include the table in section 5.2.5 of the workgroup report in G99 as I found this a very good summary. |
| 18 | The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | Ran out of time to review this in detail! |
| 19 | Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code? | No |
| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | <p>I believe that the debate on transparency and whether putting requirements in the bilateral agreement is acceptable needs to continue. This is a lot of work to identify all the references to bilateral agreements in the Code, however due to time restrictions in the working group meetings, more work does need to be done on this to identify specific examples and come up with a more transparent solution.</p> <p>At this stage, my personal opinion would be to make the additional BCA requirements public, e.g. intertrip, but not the technical details. This would then be published in a matrix with checks for all the applicable requirements. Competitors would then be able to cross reference similar sites and identify which requirements they are operating under the bilateral connection agreement.</p> |

Legal drafting questions

| Q | Question | Response |
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| 21 | The Proposed draft Grid Code legal text contains a number of comments | No further comments as of now. |

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| | incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | |
| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | No |
| 23 | Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | No |
| 24 | Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation. | |

GC0102 EU Connection Codes GB Implementation – Mod 3

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **5pm** on **Thursday 9th November 2017** to grid.code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0102 Consultation Query'

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| Respondent: | Alastair Frew |
| Company Name: | ScottishPower Generation Ltd |
| Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries) | <p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements |

Standard Workgroup Consultation questions

| Q | Question | Response |
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| 1 | Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives? | In principle yes as it implements European Law. |
| 2 | Do you support the proposed implementation approach? | Yes |
| 3 | Do you have any other comments? | As the SOGL Article 54 also deals with compliance it would be better to ensure that this proposal is also compliant with this article to avoid this have to reopened and changed in the near future. |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | <i>If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website, http://www2.nationalgrid.com/uk/industry-information/electricity-codes/grid-code/modifications/forms-and-guidance/ and return to the Grid Code inbox at grid.code@nationalgrid.com</i> |

Specific GC0102 Consultation Questions

| Q | Question | Response |
|---|---|--|
| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | <p>The structural arrangements seem acceptable but there needs to be a more detailed look at the remaining legal text DCRP7 as how it actually discharges compliance requirements to existing generators.</p> <p>Support option 1 as type A splits easily in the two types of generator, however the higher end of Type A does not fit well either in G99 nor the G-code. I would also go further and say the type A requirements should be removed from the G-code and the G-code should just refer to G98.</p> |

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| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | Yes, but the only section which does not fit well into the structure is appendix C as it contains technical requirements whereas all the other technical requirements are in the text, but I suppose this is a result of the strange G-code structure which also does this from which it has been copied . |
| 7 | Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? (see page 11) | Yes |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See Workgroup discussions section) | Agree with principle of issuing written approval but question why a consistent approach cannot be applied to all types, see answer to question 15. |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? (see section 4.1.2.2) | Yes |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See section 5.2.5) | This a major change for embedded generators who had minimal requirements before but this now matches them with G-code connected generators. |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | Yes Note that there are still some references G99 6.1.3.1 large is include G99 13.9.4 Embedded Medium |

| | | |
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| 12 | Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99? | Ignoring the fact this is a very expensive piece of kit to be purchased by a Type C generator. The next obvious question is why are the DNOs changing any settings of equipment which is not theirs. |
| 13 | Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99? | Yes as these requirements appear to be extremely minimal and are more safety related. |
| 14 | Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W? | Should this be G98? On the bases of potential safety issues it is appropriate to have very basic requirements onto anything which is being connected. |

15 If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See Workgroup discussions section)

Proposed overall compliance process for new generators as summarised as table 1

| Summary of Proposed Compliance Procedures for New Generators | | | | | | | | |
|---|--|----------------------------|---------------------|---|---------------------|---|------------------------|---------------------------|
| | Type A | | Type B | | Type C | | Type D | |
| | G-code | D-code | G-code | D-code | G-code | D-code | G-code | D-code |
| Notification period for site energisation | | | | | | | ECP.5.4 28 days | G99 19.2.5 28 days |
| Permission Required for Site energisation requirement | | | | | | | ECP.5.1 EON | G99 19.2.6 EON |
| Notification Period prior to connecting machine | ECP.6.2A 7 days | G99 16.2.1 ASAP | ECP.6.2B 28 days | G99 17.2.2 28 days | ECP.6.2B 28 days | G99 18.2.2 28 days | ECP.6.2 28 days | G99 19.3.1 28 days |
| Permission Required to Connect Machine to network | ECP.6.4(c) NGET letter of acknowledgement | G99 16.2.3 DNO approval | ECP.6.1.B PON | G99 17.3.1 Written confirmation from the DNO | ECP.6.1.B PON | G99 18.3.1 Written confirmation from the DNO | ECP.6.1 ION | G99 19.3.1 ION |
| Notification period prior to testing | no limit specified | G99 16.3.2 16 days | ECP.6.8B 28 days | G99 17.2.5 28 days | ECP.6.8B 28 days | G99 18.2.5 28 days | ECP.6.8 28 days | G99 19.3.11 28 days |
| Submission of commissioning data no later than since connecting | no limit specified | G99 16.2.5 28 days | no limit specified | no limit specified | no limit specified | no limit specified | ECP.6.6.1 24 months | G99 19.3.6.1 24 months |
| Permission required for Final Generator Operation | None | None | ECP.7.1 FON | G99 17.4.3 FON | ECP.7.1 FON | G99 18.4.3 FON | ECP.7.1 FON | G99 19.4.3 FON |

The process for all users appears similar however there are notable differences in documentation. Starting at the beginning of the process only type D appear to need the site energised a to allow this an EON will be issued, the questions is it correct that only Type D need pre-energisation of the site? To connect a Type B, C or D there seems to be agreement that all users need to submit 28 days' notice, however it should be noted this is a third of the duration proposed by ENTSO-E in the Key Organizational Roles, Requirements and Responsibilities (KORRR) consultation of 3 months, although as currently drafted the TSO can select shorted periods. The area which appears to have the biggest differences between requirements for users is permission to connect a machine to the network, however the requirement is basically the same it that written permission is required whether it is an ION, PON or written confirmation, the question is are these standard forms and do they need to be different? There appears to be a standard 28 day period for requesting testing for types B, C & D generators with only type A only needing 16 day. The area with the most significant difference is the time permitted to complete the connection process with only Type A & D with specified limits which then raises the question should Types B & C generators be allowed to remain connected potentially indefinitely with just connection permission?

The main question is for type B, C & D is could they all use the same process and standard forms?

Other process related question G99 19.2.5 requires certain users to following grid code processes who then issues the EON, ION & FON TSO or DNO?

Proposed Compliance Requirements as summarised as table 2

| Summary of Proposed Compliance Requirements | | | | | | | | | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--|
| Grid Code Reference | Type A | | Type B | | Type C | | Type D | | G99 Reference |
| | G-code | D-code | G-code | D-code | G-code | D-code | G-code | D-code | |
| ECP.A.5 Compliance Testing of Synchronous Power Generating Modules | | | | | | | | | B.5 Compliance Testing of Synchronous Power Generating Modules |
| ECP.A.5.2 Excitation System Open Circuit Step Response Tests | | | Yes | Yes | Yes | Yes | Yes | Yes | B.5.2 Excitation System Open Circuit Step Response Tests |
| ECP.A.5.3 Open & Short Circuit Saturation Characteristics | | | Yes | Yes | Yes | Yes | Yes | Yes | B.5.3 Open & Short Circuit Saturation Characteristics |
| ECP.A.5.4 Excitation System On-Load Tests | | | Yes | Yes | Yes | Yes | Yes | Yes | B.5.4 Excitation System On-Load Tests |
| ECP.A.5.5 Under-excitation Limiter Performance Test | | | Yes | Yes | Yes | Yes | Yes | Yes | B.5.4.3 Under-excitation Limiter Performance Test |
| ECP.A.5.6 Over-excitation Limiter Performance Test | | | Yes | Yes | Yes | Yes | Yes | Yes | B.5.4.4 Over-excitation Limiter Performance Test |
| ECP.A.5.7 Reactive Capability | | | Yes | Yes | Yes | Yes | Yes | Yes | B.5.5 Reactive Capability |
| ECP.A.5.8 Governor and Load Controller Response Performance | | | | | | | | | B.5.6 Governor and Load Controller Response Performance |
| ECP.A.5.8.4 Preliminary Governor Frequency Response Testing | | | Yes | No | Yes | No | Yes | No | |
| ECP.A.5.8.7 (i) Frequency response volume tests as per ECP.A.5.8. | | | Yes | No | Yes | No | Yes | No | |
| ECP.A.5.8.7 (ii) System islanding and step response tests ECP.A.5.8. | | | Yes | Yes | Yes | Yes | Yes | Yes | B.5.6.4 (ii) System islanding and step response tests |
| ECP.A.5.8.7 (iii) Frequency response tests in LFSM-O | | | Yes | Yes | Yes | Yes | Yes | Yes | B.5.6.4 (i) Frequency response tests in LFSM-O |
| ECP.A.5.8.7 (iii) Frequency response tests in LFSM-U | | | Yes | No | Yes | Yes | Yes | Yes | B.5.6.4 (i) Frequency response tests in LFSM-U |
| ECP.A.5.9 Compliance with ECC.6.3.3 Functionality Test | | | Yes | Yes | Yes | Yes | Yes | Yes | B.5.7 Compliance with Output power with falling frequency Test |
| ECP.A.6 COMPLIANCE TESTING OF POWER PARK MODULES | | | | | | | | | |
| ECP.A.6.2 Pre 20% (or <50MW) Synchronised Power Park Module Basic Voltage Control Tests | | | Yes | Yes | Yes | Yes | Yes | Yes | B.6.2 Pre 20% Synchronised Power Park Module Basic Voltage Control Tests |
| ECP.A.6.3 Power Park Modules with Maximum Capacity ≥100MW Pre 70% | | | No | No | No | No | Yes | No | |
| ECP.A.6.4 Reactive Capability Test | | | Yes | Yes | Yes | Yes | Yes | Yes | B.6.3 Reactive Capability Test |
| ECP.A.6.5 Voltage Control Tests | | | Yes | Yes | Yes | Yes | Yes | Yes | B.6.4 Voltage Control Tests |
| ECP.A.6.6 Frequency Response Tests | | | | | | | | | B.6.5 Frequency Response Tests |
| ECP.A.6.6.4 Preliminary Governor Frequency Response Testing | | | Yes | No | Yes | No | Yes | No | |
| ECP.A.6.6.7 (i) Frequency response volume tests as per ECP.A.5.8. | | | Yes | No | Yes | No | Yes | No | |
| ECP.A.6.6.7 (ii) System islanding and step response tests as ECP.A.5.8. | | | Yes | Yes | Yes | Yes | Yes | Yes | B.6.5.7 (ii) System islanding & step response tests |
| ECP.A.6.6.7 (iii) Frequency response tests in LFSM-O | | | Yes | Yes | Yes | Yes | Yes | Yes | B.6.5.7 (i) Frequency response tests in LFSM-O |
| ECP.A.6.6.7 (iii) Frequency response tests in LFSM-U | | | Yes | Yes | Yes | Yes | Yes | Yes | B.6.5.7 (i) Frequency response tests in LFSM-U |
| ECP.A.6.7 Fault Ride Through Testing | | | Yes | Yes | Yes | Yes | Yes | Yes | B.6.6 Fault Ride Through Testing |
| ECP.A.6.8 Reactive Power Transfer / Voltage Control Tests for Offshore | | | Yes | No | Yes | No | Yes | No | |
| ECP.A.7 COMPLIANCE TESTING FOR HVDC EQUIPMENT | | | | | | | | | |
| ECP.A.7.2 Reactive Capability Test | | | Yes | No | Yes | No | Yes | No | |
| ECP.A.7.4 Voltage Control Tests | | | Yes | No | Yes | No | Yes | No | |
| ECP.A.7.5 Frequency Response Tests | | | Yes | No | Yes | No | Yes | No | |
| ECP.A.7.5.4 Preliminary Frequency Response Testing | | | Yes | No | Yes | No | Yes | No | |

Boxes highlighted in yellow show differences between G-code & D-code

The above table summarises the differences in application between to the G-code and D-code requirements except for an area in G99 19.2.2 which states “If the Generator is licenced it should follow the procedures in the Grid Code” as it is not clear exactly going forward who this statement applies too. Is it saying if a new embedded power station is being built by an existing Generator who is already licenced which connects to the 132kV system, independent of size, must automatically comply with the G-code?

This table was initially being produced to show the different requirements between G-code and D-code connected generators, however it quickly highlighted that these are a lot more common than expected. This appears to be the result of the G-code is applying all compliance tests to all types of generator, whether they are applicable or not, and the D-code has copied these requirements with minimum

corrections. An example of the is LFSM-U for synchronous generators where the G-code apply the test requirements to Type B and the D-code correctly does not, however this was not continued in the D-code for Power Park Modules. There are a number of areas such as the excitation system and frequency response tests, where the compliance testing appears to be the same for all types of generator but the actual requirements are different between a Type B and the Types C & D.

As most of the existing technical requirements of the G-code have now been copied into the D-code the only area of difference between G-code and D-code connections appears to frequency response volume testing which only applies to all G-code connected sites regardless of size, this still appears to be a significant requirement being applied to smaller operators who happen to be G-code connected..

Proposed procedures for dealing with Compliance Issues Arising in a Generator after it has been commissioned as summarised as table 3

| Summary of Proposed procedures for dealing with Compliance Issues Arising in a Generator after it has been commissioned | | | | | | | | | | | | | | | | |
|---|----------|--------|--------|--------|-----------------------|--------|--------|--------|-----------------------|--------|--------|--------|-----------------------|--------|------------------------|---------------------------|
| | Type A | | | | Type B | | | | Type C | | | | Type D | | | |
| | Existing | | New | | Existing | | New | | Existing | | New | | Existing | | New | |
| | G-code | D-code | G-code | D-code | G-code | D-code | G-code | D-code | G-code | D-code | G-code | D-code | G-code | D-code | G-code | D-code |
| Issue identified | n/a | | | | | | | | | | | | | | | |
| Period of investigation | n/a | non | non | non | CP8.4 56 days | non | non | non | CP8.4 56 days | non | non | non | CP8.4 56 days | non | ECP8.4 56 days | G99 19.5.3 56 days |
| Issue not fixed within investigation period | n/a | non | non | non | CP8 LON issued | non | non | non | CP8 LON issued | non | non | non | CP8 LON issued | non | ECP8 LON issued | G99 19.5 LON issued |
| Maximum duration of LON | n/a | non | non | non | CP.8.5.2 12 months | non | non | non | CP.8.5.2 12 months | non | non | non | CP.8.5.2 12 months | non | ECP.8.5.2 12 months | G99 19.5.4.2 12 months |
| Derogation | n/a | non | non | non | Need to apply | non | non | non | Need to apply | non | non | non | Need to apply | non | Need to apply | Need to apply |

The application of compliance requirements after a Generator has been commissioned has only been reviewed in terms of the RFG, however the electricity transmission system operation (SOGL) also includes references to compliance in Article 54 and more specifically in paragraph 4."Upon request from the TSO or DSO, pursuant to Article 41(2) of Regulation (EU) 2016/631 and Article 35(2) of Regulation (EU) 2016/1388, the SGU shall carry out compliance tests ". Whilst the SOGL may not be included in this work it seem sensible to ensure this work does comply rather than in future having to go back over all this work to implement the SOGL. The key issues is the SOGL allows for the Relevant System Operator to request retesting of SGU when an issue relating to compliance arises and in this occasion a SGU is any new or existing Type B, C & D generator. Looking at the table all existing Grid connected generators are covered along with all new type D generators which all follow the same LON process, the question is should this process just be applied to all the rest?

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| 16 | G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful. | |
| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | G99 4 Terms and Definitions possible clarification as follows “Where Equipment Certificate(s) as defined in EU 2016/631 cover all or part of the relevant compliance points, then the Equipment Certificate(s) shall be accepted as demonstrating compliance without need for further evidence for those aspects within the scope of the Equipment Certificate.” |
| 18 | The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | See answer to question15. |
| 19 | Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code? | No |
| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | Yes |

Legal drafting questions

| Q | Question | Response |
|----|--|---|
| 21 | The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | ECP.1.1 (i) Type A the text “followed by NGET and any User” possible change to “followed by NGET and any Type A Power Generating Module ” ECP.1.1 (ii) Type B or C the text “followed by NGET and any Generator” |

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| | <p>possible change to “followed by NGET and any Type B or B Power Generating Module”</p> <p>ECP.1.1 (iii) Type D the text in each of the first 3 paragraphs “followed by NGET and any User to” possible change to “followed by NGET and any Type D Power Generating Module to”</p> <p>ECP.4.2. proposed text clarification” The provisions contained in CPECP.5 to CPECP.7 detail the process to be followed in order for the User’s Plant and Apparatus (including OTSUA) to become operational. This process includes for energisation an EON, for connection either a PON (types B & C Power Generating Modules) or an ION (Type C Power Generating Modules) and for final certification a FON.</p> <p>ECP.4.3 & 4.3.1 “Medium Power Stations” are still referred to is this correct?</p> <p>ECP.A.5.1.9 states “NGET will permit relaxation from the requirement ECP.A.5.2 to ECP.A.5.9 where an Equipment Certificate for the Synchronous Power Generating Module”, whereas G99 B.5.1.9 states “ The DNO may permit relaxation from the requirement B.5.2 to B.5.9 where Manufacturers Information for the Synchronous Power Generating Module”, why are these different and can they be made consistent. Other minor point G99 only does not go up to B.5.9.</p> <p>ECP.A.5.3.1 has the text “CP.6.4” not “ECP.6.4”.</p> <p>ECP.A.5.4.2 and G99 B.5.4.2. Looking in G99 B.5.4.2 it refers directly to ECP.A.5.4.2 as opposed including the text, however ECP.A.5.4.3 also refers to PSS testing but is not referenced in G99 B.5.4.2, but then when you look in ECP.A.5.4.3 the first 4 tests appear to be applicable to ECP.A.5.4.1 and G99 B.5.4.1.</p> <p>ECP.A.5.5.4 The Under-excitation Limiter will normally be tested at low active power output (minimum stable operating level) and at maximum Active Power output (Maximum Capacity). Why has the “minimum stable operating level”</p> |
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reference been added to the original OC5.A.2.5.4 text? Also G99 B.5.4.3.4 has minimum generation and is still using the term Registered Capacity.

G99 B.5.4.3.5 Still has references to Registered Capacity.

ECP.A.5.7.1 and G99 B.5.5.1 Reactive Power capability this has changed from the OC5.A.2.7.1 simple test operation of “the Generating Unit at 0.85 power factor lagging for 1 hour and 0.95 power factor leading for 1 hour.” Why is there now a requirement for MAXIMUM leading and lagging capacity to be demonstrated as opposed to a compliance test requesting the required capacity to be demonstrated and using the values from ECC.6.3.2.2 of 0.95 lead & 0.95 lag for type B and from ECC.6.3.2.3 of 0.92 lead & 0.92 lag for types C & D? Also why has the maximum and minimum generation requirements been added?

ECP.A.5.7.2 and G99 B.5.5.2 “In the case of an Embedded Synchronous Power Generating Module where distribution network considerations restrict the Synchronous Power Generating Module Reactive Power Output then the maximum leading and lagging capability will be demonstrated without breaching the host network operators limits.” whilst I accept this is the current text in OC5.A.2.7.2 how are generators actually expected to do this? Or this this supposed allow limited testing only up to the network limits and if this is the case should the wording not be more like that in OC5.A.3.4.3” In the case of an Embedded Synchronous Power Generating Module where distribution network considerations restrict the Synchronous Power Generating Module Reactive Power Output **NGET will only require demonstration within the acceptable limits of the Network Operator** ~~then the maximum leading and lagging capability will be demonstrated without breaching the host network operators limits.”~~

ECP.A.5.7.4 and G99 B.5.5.4 “Where the Generator is recording the voltage and Reactive Power at the Synchronous Power Generating Module terminals and the voltage, Active Power and Reactive Power at the HV connection point

shall be included. The results shall be supplied in an electronic spreadsheet format.” The original OC5.A.2.7.4 was a general request for generator information if they had it, now the wording of ECP.A.5.7.4 and G99 B.5.5.4 seems to be written that if a generator happens to be recording generator data they have to also record connection point data, which might not be the case. I think this need to be rewritten such as to be requesting only the available data as follows “Where the Generator is recording **either** the voltage and Reactive Power at the Synchronous Power Generating Module terminals **and or** the voltage, Active Power and Reactive Power at the HV connection point ~~shall be included~~. **All the available** results from **either or both** shall be supplied in an electronic spreadsheet format.”

ECP.A.5.8.4 why have tests H and I been added to the original OC5.A.2.8.4 preliminary tests?

ECP.A.6.1.9 states “NGET **will** permit relaxation from the requirement ECP.A.6.2 to ECP.A.6.8 where an Equipment Certificate for the Synchronous Power Generating Module”, whereas G99 B.6.1.9 states “ The **DNO may** permit relaxation from the requirement B.6.2 to B.6.8 where **Manufacturers Information** for the **Synchronous Power Generating Module**”, why are these different and can they be made consistent.

ECP.A.6.4.3 this section for network restrictions on an Embedded Generator has not been included in G99 B.6.3 it was include for synchronous generators.

ECP.A.6.4.5 and B.6.3.3 have had the minimum operated MW level increased to 60% where it used to be 50% in OC5.A.3.4.5 why? Also most of the test duration times have changed more specifically tests (i) & (ii) durations have been reduced from 60 to 30 minutes, test (iii) has increased from 5 to 30 minutes and tests (iv) & (v) have increased from 5 to 60 minutes again why?

ECP.A.6.6.4 why have tests H and I been added to the original OC5.A.2.8.4 preliminary tests? G99 B.6.5.4 Preliminary Frequency Response Testing

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| | <p>G99 has no text.</p> <p>ECP.A.6.7 and B.6.6 Fault Ride Through Testing whilst accepting this does currently appear in OC5.A.3.7, I would query the safety of carrying these tests on site using temporally installed equipment. Have any of these tests actually taken place or do these requirements not actually start applying until 1 December 2017. This test seem very similar to the sudden short circuit test applied to synchronous generators which in most case carried out in factories under controlled conditions, however for large site built hydro generators this has to be done on site. When this test is carried out on site temporary equipment is installed and then subjected to very high currents which can be problematic.</p> <p>ECP.A.7.2.3 Embedded HVDC System Owners where are these dealt with in distribution code?</p> <p>ECP.A.7.2.5 HVDC reactive power test durations have change so they are all 60minutes from the original OC5.A.4.2.5 values where only tests (i) & (ii) were 60 minutes and all the rest were 5 minutes long, why?</p> <p>ECP.A.7.5.4 why have tests H and I been added to the original OC5.A.4.5.4 preliminary tests?</p> <p>ECP.A.7.5. Figure 1 – Frequency response volume tests why have all the MLP2, MLP3 and MLP5 test been dropped from the original OC5.A.4.5.</p> <p>ECC.6.3.17.1.3 has the phase 6 line down “dynamic stability assessment studies undertaken by NGET in coordination with the Relevant Transmission Licensee to identify the stability limits“ is this correct are these studies not done by the Relevant Transmission Licensee. Also in the last sentence possible clarification “The selection of the control parameter settings shall be agreed with between NGET in coordination with the Relevant Transmission Licensee between the relevant TSO and the HVDC System Owner”.</p> <p>ECC.6.3.17.2.1 last sentence possible change “If adverse interaction is identified, the studies shall</p> |
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| | | <p>identify possible mitigating actions to be implemented to ensure compliance with the requirements of the ECC6.1.9 Grid Code”</p> <p>ECC.6.3.17.2 change text to “Interaction between HVDC Systems or other Users' Plant and Apparatus Plant and equipment”</p> <p>ECC.6.3.17.2.2 proposed text change and question what level of participation is expected from others? “The studies shall be carried out by the connecting HVDC System Owner with the participation of all other Users' parties identified by NGET”</p> <p>ECC.6.3.17.2.3 possible change “All Users' parties identified by NGET as relevant to each the Connection Point, including the Relevant Transmission Licensee’s”</p> <p>ECC.6.3.17.2.6 mitigating actions the wording from connection application prior to agreement in GSR018 Annex 4 I think is better and propose modifying to “User and The Company shall agree any necessary mitigating actions identified by the studies carried out as follows the site specific requirements and the works, including any Transmission Reinforcement Works and/or User Works, required to ensure that all Sub-Synchronous Oscillations are sufficiently damped”</p> <p>ECC.6.3.17.2.7 do not agree with this being included this appears to allow NGET to put other Users' plant at risk, who is taking responsibility if system needs to operate to ECC6.1.9.</p> |
| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | No |
| 23 | Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | No |

| | | |
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| 24 | Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation. | |
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Grid Code Workgroup Consultation Response Proforma

GC0102 EU Connection Codes GB Implementation – Mod 3

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **5pm on Thursday 9th November 2017** to grid.code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating 'GC0102 Consultation Query'

| | |
|--|--|
| Respondent: | <p><i>Isaac Gutierrez</i> <i>Senior Electrical Engineer</i> <i>Telephone number work: 01416143104</i> <i>Mobile: 07761693652</i> <i>Email: igutierrez2@scottishpower.com</i></p> |
| Company Name: | <p><i>Scottishpower Renewable Ltd (UK)</i></p> |
| <p>Please express your views regarding the Workgroup Consultation, including rationale.</p> <p>(Please include any issues, suggestions or queries)</p> | <p><i>For reference, the Grid Code objectives are:</i></p> <ol style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements |

Standard Workgroup Consultation questions

| Q | Question | Response |
|---|---|---|
| 1 | Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives? | Yes |
| 2 | Do you support the proposed implementation approach? | No, timescales for implementation of the modifications are being rushed. |
| 3 | Do you have any other comments? | No |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | No If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website, http://www2.nationalgrid.com/uk/industry-information/electricity-codes/grid-code/modifications/forms-and-guidance/ and return to the Grid Code inbox at grid.code@nationalgrid.com |

Specific GC0102 Consultation Questions

| Q | Question | Response |
|---|---|--|
| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | SPR preferred option is number 2 as both type A and micro generator requirements will be covered in one document |
| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | Yes |
| 7 | Do you agree with the current view | Yes |

| | | |
|----|---|--|
| | of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? (see page 11) | |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See <i>Workgroup discussions section</i>) | Yes |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? (see section 4.1.2.2) | Yes |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See section 5.2.5) | Yes, in particular the Fault ride through testing. Although it appears in the current UK Grid Code there is no evidence that in the UK any developer has carried out such test. SPR suggest removal of this section as the current practice for compliance is for the wind turbine manufacturer to type test generating units at the factory, provide a type test report to NGET and provide FRT simulations that prove compliance with the UK Grid Code. Also LFSM-U shall not be requested for windfarms |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | Yes, although compliance process will need further revision if this categorization is dropped. |
| 12 | Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99? | Section C3.2.1 does not specify the minimum inputs required for the recording device Section C3.4 under what circumstances the DNO has the right to request demonstration of accuracy and functionality. Need to be clearer on this requirement |

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| 13 | Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99? | Yes |
| 14 | Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W? | No, SPR disagree |
| 15 | If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See <i>Workgroup discussions section</i>) | No comment |
| 16 | G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful. | Yes, other standards should be use as well. For example, currently in the UK developers have to meet the planning levels at the PoC in line with the requirements of Engineering recommendations G5/4. The power quality measurement equipment in continental Europe facilitates harmonics measurements in line with IEC standard which is not included in G99. Allowing the use of other standards like IEC will definitely facilitate procurement of equipment for power stations. |
| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | Disagree. It is not clear the scope of what fully type tested or partially type tested should be. There should be a section indicating what makes a power generating unit fully type tested (list of criteria to meet) i.e FRT type testing, VC type testing?. From SPR experience and according to G99 it would be impossible for a wind turbine to be fully type tested as protection interface always is done on site. |
| 18 | The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | |

| | | |
|----|---|-----|
| 19 | Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code? | No |
| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | Yes |

Legal drafting questions

| Q | Question | Response |
|----|--|--|
| 21 | The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | <p>Annex 1 PC.A.5.1.1 Each Generator (including those undertaking OTSDUW), with existing or proposed Power Stations directly connected, or to be directly connected, to the National Electricity Transmission System, shall provide NGET with data relating to that Plant and Apparatus, both current and forecast, as specified in PC.A.5.2, PC.A.5.3, PC.A.5.4 and PC.A.5.7 as applicable. Each DC Converter Station owner or HVDC System Owner, with existing or proposed DC Converter Stations or HVDC Systems (including Generators undertaking OTSDUW which includes an OTSDUW DC Converter) directly connected, or to be directly connected, to the National Electricity Transmission System, shall provide NGET with data relating to that Plant and Apparatus, both current and forecast, as specified in PC.A.5.2 and PC.A.5.4. For Power Generating Modules the data supplied by the Generator should reflect the true and accurate behaviour of each Power Generating Module under both steady state and dynamic conditions.</p> <p>Generators who supply Power Generating Module simulation models (including DC Connected Power Park Modules) and HVDC System Owners who supply HVDC System models shall ensure that the models provided have been verified against the compliance tests and results submitted as specified in ECPXXX and confirmed as a true and accurate reflection of their performance by NGET. Allowance will be made for new forms of Power Generating Modules (including DC Connected Power Park Modules) and HVDC Systems where new technology has been employed and the final model cannot be verified until site tests have been completed. In which case Generators and HVDC System Owners are required to submit preliminary data which in their and NGET's view best represents the performance of their equipment</p> <p>Annex 2 ECC.6.3.6.1.2.1 Type A Power Generating Modules shall be equipped with a logic interface (input port) in order to cease Active Power output within five seconds following an instruction being received at the input port. . NGET</p> |

Comment [IG1]: Should this not be in the CP? What NGET wants voltage control validation?, frequency?,FRT?

Comment [IG2]: who issues the instruction the operator? or is National Grid expecting direct control over this port?

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| | | <p>may specify any additional requirements (including remote operation)</p> <p>ECC.6.3.6.1.2.2 Type B Power Generating Modules shall be equipped with an interface (input port) in order to be able to reduce Active Power output following an instruction at the input port. NGET may specify any additional requirements (including remote operation)</p> <p>ECC.6.3.17.1 Subsynchronous Torsional Interaction Damping Capability</p> <p>ECC.6.3.17.2.1 Notwithstanding the requirements of ECC6.1.9 and ECC.6.1.10, wWhen several HVDC Converter Stations or other plants and User's equipment are within close electrical proximity, NGET the relevant TSO may specify that a study is required, and the scope and extent of that study, to demonstrate that no adverse interaction will occur. If adverse interaction is identified, the studies shall identify possible mitigating actions to be implemented to ensure compliance with the requirements of the Grid Code</p> <p>ECC.6.5.6.2 Type B, Type C and Type D Power Park Modules, HVDC Equipment, Network Operators and Non Embedded Customers are required to be capable of exchanging operational metering data with NGET and Relevant Transmission Licensees (as applicable) with time stamping as specified by NGET.</p> <p>ECC.6.5.6.7 The automatic controller referred to in ECC.6.5.6.5 paragraph 1 shall be capable of receiving the following signal types from NGET the relevant system operator:</p> <p>(a) operational metering signals, receiving at least the following:</p> <ul style="list-style-type: none"> (i) start-up command; (ii) Active Power setpoints; (iii) Frequency Sensitive Mode settings; (iv) Reactive Power, voltage or similar setpoints; (v) Reactive Power control modes; (vi) power oscillation damping control; and (vii) if available synthetic inertia. |
|--|--|--|

Comment [IG3]: who issues the instruction the operator? or is National Grid expecting direct control over this port?

Comment [IG4]: one subject that is not addressed in this section is sub-synchronous interaction due to the installation series capacitance to increase the transmission lines capabilities of transporting active power. If the TO is installing them, then the TO should be responsible for studies and enabling protection for power station in particular for windfarms as a phenomena called sub synchronoe control interaction (SSCI) can occur with catastrophic result for the wind turbines

Comment [IG5]: who should implement the mitigating actions?

Comment [IG6]: what time intervals? seconds ? ms?

Comment [IG7]: Ther should be a market fpor the provision of synthetic inertia

ECC.6.6.2.1 Each Type C and Type D Power Generating Module including DC Connected Power Park Modules shall be fitted with equipment capable of monitoring the real time Active Power output of a Power Generating Module when operating in Frequency Sensitive Mode

Comment [IG8]: Is this not already done with ASMU?

ECC.6.6.2.2 with regard to real-time monitoring of FSM: (i) To monitor the operation of Active Power frequency response as detailed in ECC.6.6.2.1, each Generator shall be equipped with a communication interface capable of to transfertransferring at the least the following Frequency response data signals the Frequency response data in real time and in a secured manner from the Power Station to NGET: the network control centre of the relevant system operator or the relevant TSO. At the request of NGET the relevant system operator or the relevant TSO, the Generator should provide at least the following signals: — status signal of FSM (on/off), — scheduled Active Power output, — actual value of the Active Power output, — actual parameter settings for Active Power Frequency response, — droop and deadband;

Comment [IG9]: this will represent additional cost to the generator. UP to know National Grid control room provides a telephone instruction to operate in FSM mode hecne NGET should know if station is in FSM or LFSM

ECC.6.5.6.4 (a) NGET shall provide system control and data acquisition (SCADA) outstation interface equipment. Subject to the requirements of ECC.6.5.6.5, the User shall provide such voltage, current, Frequency, Active Power and Reactive Power measurement outputs and plant status indications and alarms to the Transmission SCADA outstation interface equipment as required by NGET in accordance with the terms of the Bilateral Agreement. In the case of OTSDUW, the User shall provide such SCADA outstation interface equipment and voltage, current, Frequency, Active Power and Reactive Power measurement outputs and plant status indications and alarms to the SCADA outstation interface equipment as required by NGET in accordance with the terms of the Bilateral Agreement.

(b) For the avoidance of doubt, for Active Power and Reactive Power measurements, circuit breaker and disconnecter status indications from:

(i) CCGT Modules from Type B, Type C and Type D Power Generating Modules at Large Power Stations, the outputs and status indications must each be provided to NGET on an individual CCGT Unit basis. In addition, where identified in the Bilateral Agreement, Active Power and Reactive Power measurements from Unit Transformers and/or Station Transformers must be provided.

(ii) DC Converters at DC Converter Stations and OTSDUW DC Converters, the outputs and status indications

must each be provided to NGET on an individual DC Converter basis. In addition, where identified in the Bilateral Agreement, Active Power and Reactive Power measurements from converter and/or station transformers must be provided.

(iii) Type B, Type C and Type D Power Park Modules at Embedded Large Power Stations and at directly connected Power Stations, the outputs and status indications must each be provided to NGET on an individual Power Park Module

Annex 3

CPECP.6.6.1 The Interim Operational Notification will be time limited, the expiration date being specified at the time of issue. The Interim Operational Notification may be renewed by NGET for up to a maximum of 24 months from the date of the first issue of the Interim Operational Notification. NGET may only issue an extension to an Interim Operational Notification beyond 24 months provided the Generator or HVDC System Owner has applied for a derogation for any remaining Unresolved Issues to the Authority as detailed in ECP.9.

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

- (a) Reactive capability tests to demonstrate that the Power Generating Module, OTSUA (if applicable) or DC ConverterHVDC Equipment can meet the requirements of CC.ECC.6.3.2. These may be witnessed by NGET on site if there is no metering to the NGET Control Centre.
- (b) voltage control system tests to demonstrate that the Power Generating Module, OTSUA (if applicable) or DC ConverterHVDC Equipment can meet the requirements of CC.ECC.6.3.6, CC.ECC.6.3.8 and, in the case of Power Park Module, OTSUA (if applicable) and DC ConverterHVDC Equipment, the requirements of CC.ECC.A.7 and, in the case of Generating UnitSynchronous Power Generating Module and CCGT Module, the requirements of CC.ECC.A.6, and any terms specified in the Bilateral Agreement as applicable. These tests may also be used to validate the Excitation System model (PC.A.5.3) or voltage control system model (PC.A.5.4) as applicable. These tests may be witnessed by NGET.
- (c) governor or frequency control system tests to demonstrate that the Power Generating Module, OTSUA (if applicable) or HVDC Equipment can meet the requirements of CC.ECC.6.3.6, CC.ECC.6.3.7, where applicable

Comment [IG10]: This is contradictory. NGET keep saying that a power park module could consist of a number of type A, Type B , type C or type D power park units. This statement classifies power park module as A, B, C and D. Please clarify. This makes things a bit confusing in regarding to compliance

Comment [IG11]: 24 months is not enough time. Derogations could take a year to be approved so what NGET expect from the plant during the time that the derogations is being reviewed by ofgem

| | | |
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| | | <p>CC.ECC.A.3, and BC.3.7. The results will also validate the Mandatory Service Agreement required by CC.ECC.8.1. These tests may also be used to validate the Governor model (PC.A.5.3) or frequency control system model (PC.A.5.4) as applicable. These tests may be witnessed by NGET.</p> <p>(d) fault ride through tests in respect of a Power Station with a Registered Maximum Capacity of 100MW or greater, comprised of one or more Power Park Modules, to demonstrate compliance with ECC.6.3.15.1 (a), (b) and (c), CC.ECC.6.3.15.2 (a), (b) and (c), CC.ECC.A.4.1, CC.ECC.A.4.2 and CC.ECC.A.4.3. Where test results from a Manufacturers Data & Performance Report as defined in CPECP.10 have been accepted this test will not be required.</p> <p>(e) any further tests reasonably required by NGET and agreed with the User to demonstrate any aspects of compliance with the Grid Code and the CUSC Contracts.</p> <p>ECP.7.5 If a Final Operational Notification can not be issued because the requirements of CPECP.7.2 and CPECP.7.3 have not been successfully met prior to the expiry of an Preliminary Operational Notification or an Interim Operational Notification then the Generator or DC Converter Station owner/HVDC System Owner (where licensed in respect of its activities) and/or NGET shall apply to the Authority for a derogation. The provisions of CPECP.9 shall then apply.</p> <p>ECP.10.4A Generator referencing a Manufacturer's Data & Performance Report should insert the relevant Manufacturer's Data & Performance Report reference in the appropriate place in the DRC data submission and / or in the User Data File Structure. NGET will consider the suitability of a Manufacturer's Data & Performance Report:</p> <p>(a) in place of DRC data submissions a mathematical model suitable for representation of the entire Power Park Module as per CPECP.A.3.4.4. For the avoidance of doubt only the relevant sections as specified in PC.A.2.5.5.7 apply. Site specific parameters will still need to be submitted by the Generator.</p> <p>(b) in place of Fault simulation studies as follows; NGET will not require Fault Ride Through simulation studies to be conducted as per CPECP.A.3.5.1 and qualified in CPECP.A.3.5.2 provided that;</p> <p>(i) Adequate and relevant Power Park Unit data is included in respect of Fault Ride Through testing covered in CPECP.A.614.7.1 in the relevant Manufacturer's Data & Performance Report , and</p> |
|--|--|---|

Comment [IG12]: as there is no evidence that the FRT test are carried out for windfarm onsite .could this requirement be removed from the process of obtaining FRT type test by the manufacturer and then verify results using FRT simulations studies as it has been done up until now.

Comment [IG13]: during the derogation approval time, how the plant should operate, limited?

(ii) For each type and duration of fault as detailed in CPECP.A.3.5.1, the expected minimum retained voltage is greater than the corresponding minimum voltage achieved and successfully ridden through in the fault ride through tests covered by the Manufacturer's Data & Performance Report.

(c) to reduce the scope of compliance site tests as follows;

(i) Where there is a Manufacturer's Data & Performance Report in respect of a Power Park Unit which covers Fault Ride Through, NGET may agree that no Fault Ride Through testing is required.

ECP.A.3.6.23 The simulation study should comprise of a Generating Unit Synchronous Power Generating Module, DC Converter or Power Park Module Power Generating Module or HVDC Equipment connected to the total System with a local load shown as "X" in figure CPECP.A.3.6.1. The load "X" is in addition to any auxiliary load of the Power Station connected directly to the Generating Unit Synchronous Power Generating Module, DC Converter or Power Park Module Power Generating Module or HVDC Equipment and represents a small portion of the System to which the Generating Unit Synchronous Power Generating Module, DC Converter or Power Park Module Power Generating Module or HVDC Equipment is attached.

ECP.A.3.6.66 To allow validation of the model used to simulate load rejection in accordance with CCECC.6.3.7(c)(i) as described a further simulation study is required to represent the largest positive Frequency injection step or fast ramp (BC1 and BC3 of Figure 2) that will be applied as a test as described in OC5.A.2ECP.A.5.8 and OC5.A.3ECP.A.6.6.

ECP.A.3.7.2 To demonstrate the LFSM-U low Frequency control when operating in Limited Frequency Sensitive Mode the Generator or HVDC System Owner shall submit a simulation study representing the response of the Power Generating Module or HVDC Equipment operating at 80% of Maximum Capacity. The simulation study event shall be

Comment [IG14]: FRT testing should be removed and only (b)(i) and (b) (ii) in the above the process outlined above should be used as this process have been working for windfarms for a very long time

Comment [IG15]: what is the maximum acceptable load "x" size

Comment [IG16]: what is the minimum down rate acceptable by NGET

equivalent to:

- (i) a sufficiently large reduction in the measured System Frequency ramped over 10 seconds to cause an increase in Active Power output to the Maximum Capacity followed by
- (ii) 60 seconds of steady state with the measured System Frequency depressed to the same level as in ECP.A.3.6.8.1 (i) as illustrated in Figure ECP.A.3.6.1 below.
- (iii) then increase of the measured System Frequency ramped over 10 seconds to cause a reduction in Active Power output back to the original Active Power level followed by at least 60

ECP.A.4.3.2 NGET accept that the signals specified in ECP.A.4.3.1(c) may have lower effective sample rates than those required in ECC.6.6.2 although any signals supplied for connection to NGET's recording equipment which do not meet at least the sample rates detailed in ECC.6.6.2 should have the actual sample rates indicated to NGET before testing commences.

ECP.A.6.3 Power Park Modules with Maximum Capacity $\geq 100\text{MW}$ Pre 70% Power Park Module Tests

ECP.A.6.6.4 Prior to conducting the full set of tests as per ECP.A.6.6.6, Generators are required to conduct the preliminary set of tests below to confirm the frequency injection method is correct and the plant control performance is within expectation. The test numbers refer to Figure 1 below. The test should be conducted when sufficient MW resource is forecasted in order to generate at least 65% of Maximum Capacity of the Power Park Module. The following frequency injections shall be applied when operating at module load point 4.

| Test No (Figure1) | Frequency Injection | Notes |
|-------------------|---|-------|
| 8 | <ul style="list-style-type: none"> • Inject -0.5Hz frequency fall over 10 sec • Hold for a further 20 sec • At 30 sec from the start of the test, Inject a +0.3Hz frequency rise over 30 sec. • Hold until conditions stabilise • Remove the injected signal | |
| 13 | <ul style="list-style-type: none"> • Inject - 0.5Hz frequency fall over 10 sec • Hold until conditions stabilise | |

Comment [IG17]: Please clarify is this requirement is applicable to wnd turbines. Power park modules shall be exempt of this simulation as the only way to produce this response is curtailing the windfarm. As highlighted in numerous occasions this will be similar to operate in FSM. According to the text in the **ECC.6.3.7.2.1** if the generating unit can't provide LFSM U the windfarm does not require to do it so the same should apply with simulations studies for LFSM-U . This is not possible with windfarms unless they operate curtailed.

Comment [IG18]: What would be acceptable maximum sampling rates?

Comment [IG19]: There is no FSM teest required? Please confirm

Comment [IG20]: For what size of power park module is this applicable? ECP.A.6.3 is quite clear on the size of PPM but this clause is not PPM greater or equal to 100MW?

Comment [IG21]: remove injected signal as a ramp? during 10 sec? from experience some turbins manufacturers just remove the signal. This need to be clearer

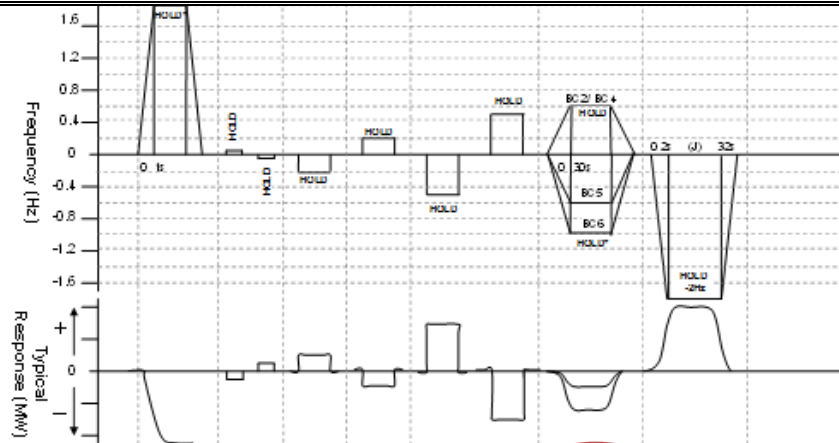
| | | |
|--|--|---|
| | | <ul style="list-style-type: none"> • Remove the injected signal <p>14</p> <ul style="list-style-type: none"> • Inject +0.5Hz frequency rise over 10 sec • Hold until conditions stabilise • Remove the injected signal <p>H</p> <ul style="list-style-type: none"> • Inject - 0.5Hz frequency fall as a stepchange • Hold until conditions stabilise • Remove the injected signal <p>I</p> <ul style="list-style-type: none"> • Inject +0.5Hz frequency rise as a stepchange • Hold until conditions stabilise • Remove the injected signal <p>ECP.A.6.6.7 The tests are divided into the following two types;</p> <p>(i) Frequency response volume tests as per ECP.A.5.8. Figure 1. These tests consist of frequency profile and ramp tests.</p> <p>(ii) System islanding and step response tests as shown by ECP.A.6.6. Figure 2.</p> <p>(iii) Frequency response tests in Limited Frequency Sensitive Mode (LFSM) to demonstrate LFSM-O and LFSM-U capability as shown by ECP.A.6.6 Figure 2.</p> |
|--|--|---|

Comment [IG22]: remove injected signal as a ramp? during 10 sec? from experience some turbiens manufacturers just remove the signal. This need to be clearer

Comment [IG23]: remove injected signal as a ramp? during 10 sec? from experience some turbiens manufacturers just remove the signal. This need to be clearer

Comment [IG24]: remove injected signal as a ramp? during 10 sec? from experience some turbiens manufacturers just remove the signal. This need to be clearer

Comment [IG25]: shal not be applicable to power park modules



| Load Point | +2.0* | +0.02 | -0.2 | +0.2 | -0.5 | +0.5 | +/-0.6 - 1.0 | -2.0 | ±0** |
|------------|-------|-------|------|------|------|------|--------------|------|------|
| MLP6 | BC1 | | | | | O | BC2 | | L |
| MLP6 LFSM | BC3 | | | | | | BC4 | | |
| MLP5 | | | | | A | | | | |
| MLP4 | | D/E | F | G | H | I | | J | M |
| MLP4 LFSM | | | | | | | BC5/6 | | N |
| MLP3 | | | | | | | | | |
| MLP2 | | | | | P | Q | | | |
| MLP1 | | | | | K | | | | |

MLP6 LFSM and MLP4 LFSM -0.6Hz and -0.1Hz shall be removed from windfarm testing

ECP.A.6.6.9 The target frequency adjustment facility should be demonstrated from the normal control point within the range of 49.9Hz to 50.1Hz by step changes to the target frequency setpoint

ECP.A.6.7 Fault Ride Through Testing

Comment [IG26]: Please introduce what National Grid expects to see in this test in graphical form

Comment [IG27]: This section should be removed as in SPR experience it has never been carried out as Data manufacturer data & simulations have been used to demonstrate compliance for windfarms

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| | | Additional comments to Annex 3 an appendix should be included showing the formatting of a generic compliance statement as issued by NGET |
| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | No |
| 23 | Are there any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | Yes, particularly those sections in relation to grid code testing of windfarms for LFSM-U. The testing for windfarm under LFSM-U should be removed as the requirement is not mandatory if you do not have the headroom to provide it which in LFSM is not possible for a windfarm de-loads. FRT testing should also be considered for removal |
| 24 | Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation. | |

GC0102 EU Connection Codes GB Implementation – Mod 3

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **5pm on Thursday 9th November 2017** to grid.code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating ‘GC0102 Consultation Query’

| | |
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| Respondent: | <i>Graeme Vincent, graeme.vincent@spenergynetworks.co.uk</i> |
| Company Name: | <i>SP Energy Networks</i> |
| Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries) | <p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements |

Standard Workgroup Consultation questions

| Q | Question | Response |
|----------|----------------------------|---|
| 1 | Do you believe that GC0102 | Yes, GC0102 better facilitates the Grid Code (and |

| | | |
|---|--|---|
| | Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives? | Distribution Code) objectives as the proposals discharge obligations imposed by the Electricity Regulation and the European Commission. |
| 2 | Do you support the proposed implementation approach? | Yes, although given the interdependencies between the three separate modifications which are now beginning to appear it would be better to consider the three modifications (GC0100, Gc0101 and GC0102) as one going forward. In this way stakeholders will be able to see all the proposed changes and legal text as one document and be able to see how the definitions flow between each of the separate sections of draft legal text. |
| 3 | Do you have any other comments? | No |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | No. |

Specific GC0102 Consultation Questions

| Q | Question | Response |
|---|---|---|
| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | We are aware of the significant stakeholder interactions which the developers of the proposed text have undertaken and support the preferred approach (Option 3) as being the most suitable compromise in meeting all stakeholders' requirements. |
| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | We believe that the current format of G99 is a good basis on which to further engage with stakeholders to further refine the document structure. |
| 7 | Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? (see | Yes – it is beneficial for examples to be provided which will allow all stakeholders to understand how these situations will be considered. |

| | | |
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| | <i>page 11)</i> | |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See <i>Workgroup discussions section</i>) | Whilst we recognise that the Preliminary Notification Process is not an explicit requirement within the RfG for Type B and C PGMs and therefore could be considered as a more stringent requirement, we do understand and appreciate that it is a pragmatic solution for a practical requirement in the connection process for Transmission Connected type B & C PGMs. |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? (see <i>section 4.1.2.2</i>) | Yes we agree to retaining the existing approach. |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See <i>section 5.2.5</i>) | No, where there well developed and robust processes exist for Transmission Connected generation then it seems sensible to adopt and adapt these to suit distribution connected generation. |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | We had assumed, that following the introduction of the RfG then the Large, Medium and Small (LMS) designation would be inappropriate and cease to be used as Type A, B C and D would apply across the GB and any regional differences would also disappear. It was therefore a surprise to see the proposed continued use of these terms and believe that it is potentially confusing for connecting parties going forward. However, it is recognised that the imminent deadlines to ensure compliance with RfG will effectively limit the opportunity for these regional differences to be removed across all codes impacted by the use of terms Large, Medium and Small. We support the removal of Large and Small from the Distribution Code, but note that due to NGET decision to retain LMS terminology that Medium will need to be maintained to cater for embedded medium plant (LEEMPS) connecting to the Distribution Network. |
| 12 | Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 | We have contributed to the drafting of these sections and therefore await comments from other stakeholders on the proposed requirements. |

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| | of G99? | |
| 13 | Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99? | We agree with the proposed inclusion noting that storage is specifically excluded from the RfG. However, in order to provide clarity for Users we believe that it is important for connection related processes to be retained together but also noting that the drafting of the document excludes the RfG requirements being applied to this technology. |
| 14 | Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W? | Yes – inclusion within one document we believe offers a certain degree of clarity for all Users as the connection processes apply equally within GB. We further note that the drafting of G99 specifically excludes the RfG provisions from applying to these particular Users. |
| 15 | If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See <i>Workgroup discussions section</i>) | It is noted that the development of the proposals have been undertaken through a joint working group and have harmonised requirements where practicable. |
| 16 | G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful. | As a networks operator we believe that it is appropriate for generators to comply with power quality requirements. However, we are aware of the ongoing engagement with stakeholders in this area. |
| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | Yes we are in agreement though recognise that there is always room for improvement and look forward to receiving feedback from and engaging further with stakeholders to improve clarity. |
| 18 | The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | No particular comment but as DNO involved in the drafting process we would be keen to hear stakeholders views in this area which would allow us to work with the other DNOs and the ENA to improve these processes and the wording within G99. |

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| 19 | Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code? | As above we would be keen to hear stakeholder's views in this area. |
| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | Yes we believe that this modification and the associated documents are a good start in promoting transparency but realise that there is a significant amount of documentation being created by this implementation process. This is likely to require network operators to undertake further briefing and education sessions with stakeholders. |

Legal drafting questions

| Q | Question | Response |
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| 21 | The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | No response |
| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | No response |
| 23 | Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | No response |
| 24 | Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation. | No response |

GC0102 EU Connection Codes GB Implementation – Mod 3

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **5pm on Thursday 9th November 2017** to grid.code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating ‘GC0102 Consultation Query’

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| Respondent: | <i>Garth Graham (garth.graham@sse.com)</i> |
| Company Name: | SSE |
| Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries) | <p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements |

Standard Workgroup Consultation questions

| Q | Question | Response |
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| 1 | Do you believe that GC0102 | ORIGINAL |

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| | <p>Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives?</p> | <p>We do not believe that GC0102 does better facilitate the Grid Code Objectives as it <u>fails to</u> discharge the obligations imposed upon the licensee by its license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency.</p> <p>As the National Grid presentation to EnergyUK on 23rd May 2017 noted, in respect of the three connection codes (RfG, DCC and HVDC), the aim of these Network Codes is to “<i>Set consistent technical requirements across EU for new connections of user equipment (e.g. generation / interconnectors)</i>”. This accords with the recitals of the RfG, DCC and HVDC Network Codes.</p> <p>However, as both the Proposer’s explanations to the Workgroup and the legal text makes clear there is not even to be a set of consistent technical requirements across GB (let alone with the EU) for new connections as a result of GC0102 as, for example, apparently many of these multiple technical requirements are, instead, to be determined by the TSO alone, in a non-open / non-transparent way, and applied differently to each new connection. This non-harmonised approach is inconsistent with the EU Network Codes.</p> <p>Furthermore, the imposition of additional costs (such as the requirement for Type B and C generators in terms of a ‘PON’ stage and associated administrative costs to manage) will affect cross border trade between Member States as well as within the Member State (between GB and Northern Ireland) and as such will not be in compliance with Article 8(7) of Regulation 714/2009.</p> <p>In addition to not being better in terms of Objective (iv) the GC0102 Original does not better facilitate the Grid Code Objectives (ii), (iii) and (v) as it:</p> <p>fails to facilitate competition in the generation and supply of electricity (by not complying with EU law – see above – and imposing additional costs on</p> |
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| | <p>GB generation);</p> <p>fails to promote security and efficiency in electricity generation (by not complying with EU law – see above); and</p> <p>fails to promote efficiency in the implementation and administration of the Grid Code arrangements (by not complying with EU law – see above).</p> <p>POTENTIAL ALTERNATIVE</p> <p>We do believe that the potential alternative (as described on pages 39-47 of the Workgroup consultation) does better facilitate the Grid Code Objectives as it ensures the discharging of the obligations imposed upon the licensee by its license as well as complying with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency.</p> <p>As the National Grid presentation to EnergyUK on 23rd May 2017 noted, in respect of the three connection codes (RfG, DCC and HVDC), the aim of these Network Codes is to “<i>Set consistent technical requirements across EU for new connections of user equipment (e.g. generation / interconnectors)</i>”. This accords with the recitals of the RfG, DCC and HVDC Network Codes.</p> <p>It is clear that this potential alternative seeks to ensure that <i>only</i> those obligations applicable to newly connecting parties that fall within the scope of the EU Network Codes will be implemented into the GB national network codes (such as, but not limited to, the Grid Code and Distribution Code) as required by those EU Network Codes.</p> <p>As detailed on pages 39-47 of the Workgroup consultation document there are clear reasons as to why this is required.</p> <p>In addition to being better in terms of Objective (iv) the potential alternative (b) also better facilitates the Grid Code Objectives (ii), (iii) and (v):</p> <p>as by complying with EU law – see above – and</p> |
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| | | <p>not imposing additional costs (over and above those required by law) on GB generation it facilitates competition in the generation and supply of electricity;</p> <p>as by complying with EU law – see above – and not imposing additional costs (over and above those required by law) on GB generation it promotes security and efficiency in electricity generation; and</p> <p>as by complying with EU law – see above – and not imposing additional costs (over and above those required by law) on GB generation it promotes efficiency in the implementation and administration of the Grid Code arrangements.</p> |
| 2 | Do you support the proposed implementation approach? | We note the proposed implementation approach set out in Section 10 of the Workgroup document and support that approach. |
| 3 | Do you have any other comments? | |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | No. |

Specific GC0102 Consultation Questions

| Q | Question | Response |
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| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | <p>We note that the proposed relationship between the D Code, G59 and G83, and G98 and G99 as set out in (a) the 19th October version of the Workgroup consultation document; and (b) the 3rd November version of the Workgroup consultation document.</p> <p>Given the presentation provided to the G98 and G99 workshop on Tuesday 7th November – which sets out a different proposed relationship between the D Code, G59 and G83, and G98 and G99 to that shown in either the 19th October or 3rd</p> |

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| | | November versions of the Workgroup consultation document – we are unable to comment on, or indicate our support for, either the 19 th October or 3 rd November versions of the proposed relationship between the D Code, G59 and G83, and G98 and G99. |
| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | See our answer to Q5. |
| 7 | Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? (see page 11) | See our answer to Q5. |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See <i>Workgroup discussions section</i>) | <p>Firstly, we do <u>not</u> agree with the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs.</p> <p>Secondly, we believe that the proposed requirement to oblige Type B and Type C generators (i) not to submit a <i>power-generating module document</i> and (ii) to, instead, submit a <i>Preliminary Operation Notification</i> is illegal.</p> <p>Had the Member States and the Commission intended that Type B and Type C generators were to submit an 'ION' (which is effectively what the 'Preliminary Operation Notification' is, in all but name) they would simply have amended Article 33 accordingly.</p> <p>They did not do so – rather, they determined that a <i>power-generating module document</i> and <u>not</u> an 'ION' (or 'PON' as it has not to subtly been renamed!) was all that Type B and Type C generators need to submit.</p> |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be | It is not clear to us that the current GB arrangements for the automatic connection and reconnection after an incidental disconnection caused by a network disturbance are sufficient to discharge the RfG requirements in Articles 13(7) |

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| | proposed? (see section 4.1.2.2) | and 14(4). Therefore we cannot agree to the retaining of those current arrangements un-amended. |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See section 5.2.5) | Yes, we do consider parts of the proposed compliance, simulation and testing requirements for distribution-connected generators to be more stringent than the requirements as defined in the RfG. |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | We see no evidence, in 3.3 of the Workgroup consultation document, to dropping the designations in terms of Large / Medium / Small that this question states. Rather it's the complete opposite, with the reference to: <i>"As these issues are outside the scope of the EU Connection Code implementation work it is proposed that the concepts of Large, Medium and Small Power Stations are retained..."</i> [3.3] Furthermore, we are concerned that the lack of a harmonised approach to the connection arrangements for new generators in GB would be detrimental. This is because the failure to provide a harmonised approach to the connection of generators in GB will not facilitate Union-wide trade in electricity, will not ensure system security, will not facilitate the integration of renewable electricity sources, will not increase competition and will not allow more efficient use of the network and resources and, therefore, the benefit of consumers will not be achieved. |
| 12 | Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99? | Notwithstanding the confusion about which version of the consultation we are replying to, the proposed requirements for fault recording are far too onerous and go well beyond the minimum requirements of RfG which simply specifies four values (voltage, active power, reactive power, frequency) to be recorded, with the criteria for triggering, sample rates and other 'settings' to be agreed with between the generator, system operator and TSO. There is absolutely no justification for the requirements as set out and these would impose significant cost burdens on to generators. For |

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| | | <p>example: the requirement for time ‘tagging’ (implying sample rate?) of inputs to a 1µs (<i>microsecond!</i>) resolution is technically demanding due to its demands on data storage and the high cost of equipment capable of recording for long durations at this time resolution.</p> <p>Similarly it is left open for the DNO to specify if digital triggering is required but there are no limits on the amount of triggers a DNO could request and hence the impact on the cost of the recorder to accommodate all the triggers.</p> <p>Relatively low cost (< £10k) fault recorders are available which can record samples on a fault trigger at sufficiently high rates (e.g 1024 samples / cycle) for almost all fault investigation work but the requirement as currently proposed precludes the use of such devices despite these being in widespread use in the Republic of Ireland and the fault recorded data from them being accepted by Eirgrid despite it the system being approximately 10x smaller than that of GB.</p> <p>In writing this section, it would be far better if the TSO defined a minimum requirement <i>with an awareness of the cost to implementation</i> by advising in a schedule appended to G99 or the Grid Code, which ‘off the shelf’ fault recording products on the market are likely to be capable of meeting this standard .</p> |
| 13 | Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99? | We have reservations that the proposed application of G98 and G99 to storage will, perhaps inadvertently, apply some RfG obligations on storage which, in our view would be inappropriate. |
| 14 | Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W? | As with our answer to Q13, we have reservations that the proposed application of G98 and G99 to sub 800W generators will, perhaps inadvertently, apply some RfG obligations on sub 800W which, in our view would be inappropriate. |
| 15 | If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the | We do not consider the proposed solution set out in the GC0102 Original proposal to sufficiently harmonise the connection requirements for new parties connecting to the transmission and |

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| | transmission and distribution networks, how would you propose this to be addressed? (See <i>Workgroup discussions section</i>) | <p>distribution networks.</p> <p>We propose that this be addressed, as a matter of the utmost urgency, by the Relevant TSO(s) and relevant System Operator(s) in accordance with their legal obligations under the RfG.</p> |
| 16 | G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful. | <p>Where EU law permits international standards to be used then consideration should be given to this.</p> <p>However, we do not accept that this means that specific requirements can be dropped from the documents – rather, the documents should clearly (where applicable) refer to the exact specific requirement(s) and exactly where (within the detailed part of the international standard) this has been replaced by.</p> <p>European standard EN 50160 relates to Voltage characteristics of electricity supplied by public electricity networks. We would have expected that this is the only standard that would need to apply with respect to Power Quality.</p> |
| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | <p>We note that the draft legal text for G99 has been amended compared to the draft legal text set out in (a) the 19th October version of the Workgroup consultation document; and (b) the 3rd November version of the Workgroup consultation document.</p> <p>Therefore we are unable to answer this question in detail.</p> <p>Nevertheless we would point out that the use of Equipment Certificates should be actively encouraged and supported by the Relevant TSO(s) and relevant System Operator(s). However, we are not certain that this is the case to date.</p> |
| 18 | The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | <p>We expect the use of Equipment Certificates will not give rise to new detailed processes etc., as the use of them will obviate the need for further compliance testing.</p> |
| 19 | Do you have any views on how the data and information required and articulated within G99 can or should | <p>We note that the data requirements are being addressed via GC0106, GLDPM and KORRR. These changes may, in turn, lead to the</p> |

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| | relate to the Distribution Data Registration Code in the Distribution Code? | Distribution Data Registration Code in the Distribution Code needing to be changed accordingly. |
| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | <p>We do not believe that the GC0102 Original modification helps to promote transparency across the Industry.</p> <p>There is, for example, a total lack of visibility to stakeholders of the actual technical parameters that, as a newly connecting party, they have to meet.</p> |

Legal drafting questions

| Q | Question | Response |
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| 21 | The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | We will provide further comments on the Annex 1-5 documents at the forthcoming (16 th -17 th November) two day workshop. |
| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | We will provide further comments on the Annex 1-5 documents at the forthcoming (16 th -17 th November) two day workshop. |
| 23 | Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | <p>We <u>do not</u> agree that the draft legal text contained in Annex 1-5 and 6-9 delivers the intent of the solution outlined in Sections 3-5.</p> <p>This is because the intent of the GC0102 solution is to ensure that all the requisite applicable articles of the EU Network Codes (RfG, DCC and HVDC) are implemented into the national network codes (namely the Grid Code and Distribution Code).</p> <p>However, there is <u>no evidence</u> provided that clearly maps over each of the EU Network Code obligations (that GC0102 is intended to implemented into the national network codes) to the draft legal text in Annex 1-5.</p> <p>It is clear from the draft legal text for GC0102 that multiple gaps and inconsistency existed between the draft legal text and the delivery of the intent of</p> |

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| | | <p>the solution outlined in Sections 3-5 of the Workgroup consultation.</p> <p>Absent a clear mapping of the EU Network Code articles to the draft legal text we cannot see how either (a) the Workgroup; or (b) stakeholders; or (c) the requisite Code Panel(s); or (d) Ofgem can say that the draft legal text in Annex 1-5 does deliver the solution outlined in Section 3-5.</p> <p>Notwithstanding the above, we also note that the draft legal text appears to be in direct contravention of the EU Network Codes.</p> <p>By way of example, the suggested use of the existing national definitions, amended in part by the EU Network Code requirements, has the unintended (or possibly intended?) consequence that it will not be clear to existing connected parties that, in fact, they are not actually bound by the EU Network Code amended definitions within the Grid Code (or Distribution Code) as this would be applying those EU Network Codes definitions (and associated obligations) to existing connected parties without either (1) a CBA being undertaken or (2) those parties having substantially modified their respective connection agreement(s) which would be in direct contravention of the RfG, DCC and HVDC Network Codes.</p> |
| 24 | Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation. | We will provide further comments on the G98 and G99 documents at the forthcoming (23 rd - 24 th November) two day workshop. |

GC0102 EU Connection Codes GB Implementation – Mod 3

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **5pm on Thursday 9th November 2017** to grid.code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating ‘GC0102 Consultation Query’

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| Respondent: | <i>Matt White</i> |
| Company Name: | <i>UK Power Networks</i> |
| Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries) | <p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements |

Standard Workgroup Consultation questions

| Q | Question | Response |
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| 1 | Do you believe that GC0102 Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives? | Given the legal necessity of implementing the RfG we agree that the GC0102 proposals better facilitate both the Grid and Distribution Code objectives. We would suggest however that going forward running GC0102 separately from GC0100 and GC0101 is not the most efficient approach and would suggest combining the three |
| 2 | Do you support the proposed implementation approach? | Yes – although as above we believe it would be more efficient to combine the three modifications now. We acknowledge the amount of work that has gone into GC0102 and the associated GC0100 and GC0101, and are pleased to see these are now progressing. Since these modifications are interlinked and cannot be considered in isolation, we believe there is no merit in continuing with the three separate mods. The legal text also needs to be considered as a whole, complete with all the changes to definitions, (e.g. worked in throughout the whole of the Grid Code and not just the Connection Conditions). On this basis we recommend that you suspend work in GC0100 and GC0101 and find a way to move the consideration of these issues into GC0102. |
| 3 | Do you have any other comments? | We note that work is ongoing in developing both G98 and G99, and there are a number of questions still to be answered. We would look to the ongoing work in this area to provide sufficient clarity on both the requirements for customers and network operators. We acknowledge, agreement in principle with regards to format and layout of the documents |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | No |

Specific GC0102 Consultation Questions

| Q | Question | Response |
|---|--|--|
| 5 | <p>Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why?</p> | <p>We are aware of the significant discussions on how to best present the GB requirements to GB stakeholders, recognizing the differences in connection application process for different sizes of generating equipment, the different needs of stakeholders, and the influence of existing and emergent European Standards. In terms of the D Code, we would expect it to be limited in terms of technical content, with reference being made in the main to G98/G99 (G83/G59).</p> <p>We believe that Option 3, post recent discussions with stakeholders, is the best compromise. It has the benefit of being the simplest division of documents for new installations compared to existing, in that micro generation (i.e. less than 16A per phase) will refer only to G98 (G83 for existing) and all other generation will refer to G99 (G59 for existing).</p> |
| 6 | <p>Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure?</p> | <p>We note the continued development of the structure of G99 and note that more interaction with stakeholders is planned to refine the approach. We believe that the current draft represents a good basis.</p> |
| 7 | <p>Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? (see page 11)</p> | <p>This is a very important practical point and we are pleased to see that some clear examples have been laid out in 6.1.5 of G99. It will be important to ensure that these examples are fully accepted as illustrative of the legal situation that will apply in such cases by all stakeholders, including Ofgem and BEIS.</p> |
| 8 | <p>Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See <i>Workgroup discussions section</i>)</p> | <p>In principle yes, for smaller generators we believe that it should be presented as either (or both) a relaxation on the full EON/ION/FON process or as a formalization of something that happens anyway, but not codified.</p> |
| 9 | <p>Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be</p> | <p>Yes. Pending any decisions to change the fundamental approach in GB, the status quo should be maintained.</p> |

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| | proposed? (see section 4.1.2.2) | |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See section 5.2.5) | We acknowledge the approach in using an already well developed process for transmission connected plant, however further work is required with stakeholders to examine the requirements in more detail. |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | We believed that National Grid would look to remove this categorisation in lieu of the changes proposed by the EU codes, subsequently removing any regional differences. There is concern that this may add unnecessary complexity going forward. Given the imminence of the compliance deadlines, we agree that it's now inappropriate to try and move away from the status quo. Nevertheless we support the removal of the terms Large and Small from the Distribution Code, noting that it is necessary to retain Medium classification to cater for LEEMPS applications. |
| 12 | Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99? | We have contributed to the drafting of this new specification and await stakeholder feedback. |
| 13 | Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99? | We understand how difficult it would be for Ofgem to approve an approach that applied the new GB documentation to storage, given it is explicitly excluded from the RfG. We believe the exclusion of storage is fundamentally wrong, but recognize that we have essentially no choice in law. We agree with the approach to include storage within G98 and G99 in terms of the connection process etc., excluding the RfG specific requirements. |
| 14 | Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not | We would suggest before committing <800W schemes to G99 further work is done to assess the inclusion of <800W schemes in G98 as opposed to G99. Since G98 deals solely with |

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| | applied to PGMs <800W? | micro-generators this may be a more pragmatic approach. We acknowledge that the drafting specifically excludes the RfG provisions from applying to these technologies. |
| 15 | If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See <i>Workgroup discussions section</i>) | Whilst we recognize that more can always be done to increase harmonization, the development of both the Grid and Distribution Code requirements has been done jointly, with stakeholders, and as far as is practicable the requirements are the same. |
| 16 | G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful. | We believe it is an absolute requirement that generating equipment should meet relevant PQ standards. Further work is required to ensure that manufacturers are aware of their obligations and that their equipment is compliant. |
| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | We think there are significant efficiencies to be gained from manufacturers' type testing, and the use of equipment certificates in the future. We believe that the requirements in G98 and G99 form a good basis for continuing discussions with manufacturers to refine and improve processes. We would also want see further clarity around the requirements for witness testing installations. |
| 18 | The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | We are continuing to work with other DNOs, the ENA and stakeholders to refine and improve the processes and drafting of G99. |
| 19 | Do you have any views on how the data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code? | This is an area for further examination and where we would welcome feedback from other stakeholders. |
| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | We are only too aware what a significant body of documentation this process is producing, as it tries to make plain the existing and new requirements in a coherent form. We see the |

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| | | need for significant engagement and education for stakeholders over the coming months/years. We believe there is a place for a set of documents summarising key requirements. These need to be developed over time with key stakeholders. |
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Legal drafting questions

| Q | Question | Response |
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| 21 | The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | No comments at this time |
| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | No comments at this time |
| 23 | Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | No comments at this time |
| 24 | Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation. | No comments at this time |

GC0102 EU Connection Codes GB Implementation – Mod 3

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **5pm on Thursday 9th November 2017** to grid.code@nationalgrid.com. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be forwarded to grid.code@nationalgrid.com with subject clearly stating ‘GC0102 Consultation Query’

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| Respondent: | <i>Nigel Turvey</i> nturvey@westernpower.co.uk |
| Company Name: | <i>Western Power Distribution</i> |
| Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries) | <p><i>For reference, the Grid Code objectives are:</i></p> <ul style="list-style-type: none"> i. To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity ii. To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity) iii. Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole iv. To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and v. To promote efficiency in the implementation and administration of the Grid Code arrangements |

Standard Workgroup Consultation questions

| Q | Question | Response |
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| 1 | Do you believe that GC0102 | Given the legal necessity of implementing the RfG |

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| | Original Proposal, or any potential alternatives for change that you wish to suggest, better facilitates the Grid Code Objectives? | we agree that the GC0102 proposals better facilitate both the Grid and Distribution Code objectives. |
| 2 | Do you support the proposed implementation approach? | Yes – although as above it would be more efficient to combine GC0100, GC0101 and GC0102 |
| 3 | Do you have any other comments? | No |
| 4 | Do you wish to raise a WG Consultation Alternative Request for the Workgroup to consider? | <i>If yes, please complete a WG Consultation Alternative Request form, available on National Grid's website, http://www2.nationalgrid.com/uk/industry-information/electricity-codes/grid-code/modifications/forms-and-guidance/ and return to the Grid Code inbox at grid.code@nationalgrid.com</i> |

Specific GC0102 Consultation Questions

| Q | Question | Response |
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| 5 | Do you have any comments on the structure of the proposed relationship between the D Code, G59 and G83, and G98 and G99? In particular which of the three options in Section 3.2 of this consultation do you support and why? | We believe that the option now alighted on, post recent discussions with stakeholders, is a reasonable compromise. It has the benefit of being the simplest division of documents for new installations compared to existing in that micro generation (ie less than 16A per phase) will refer only to G98 (cf G83 for existing) and all other generation will refer to G99 (cf G59 for existing). |
| 6 | Do you agree with the organization of G99 and how it applies to the different Types of generation? Do you have any alternative suggestions for structure? | The current draft represents a good basis. |
| 7 | Do you agree with the current view of how the Grid and Distribution Codes (and G98 and G99) will be applied to installations where new PGMs are installed alongside existing pre-RfG equipment? (see | This is a very important practical point and we are pleased to see that some clear examples have been laid out in 6.1.5 of G99. It will be important to ensure that these examples are fully accepted as illustrative of the legal situation that will apply in such cases by all stakeholders, including Ofgem |

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| | <i>page 11)</i> | and BEIS. |
| 8 | Do you agree on the introduction of a Preliminary Operation Notification relating to the Compliance process for Transmission connected Type B and Type C PGMs? (See <i>Workgroup discussions section</i>) | In principle yes. We not however that this is being portrayed by some stakeholders as a new (and arguably therefore more stringent) requirement. We do not believe this to be the case and believe that it should be presented as either (or both) a relaxation on the full EON/ION/FON process for smaller generating plant, or as a formalization of something that happens anyway, but not codified. |
| 9 | Do you agree with the retaining of the current GB arrangements for automatic connection and reconnection and the logic for it? If not, what alternative should be proposed? (see section 4.1.2.2) | Yes. Pending any decisions to change the fundamental approach in GB, the status quo should be maintained. |
| 10 | Do you consider any parts of the proposed compliance, simulation or testing requirements for distribution-connected generators to be disproportionately onerous? (See section 5.2.5) | As we work through the new requirements placed on smaller embedded generators, it has obviously been sensible to consider using well developed process that apply to larger transmission connected plant. We expect to continue to work with stakeholders to examine the requirements in more detail over the next couple of months. |
| 11 | Do you agree it is appropriate to drop the designation Large and Small from the Distribution Code as proposed in section 3.3.1 of this consultation? Do you believe it is appropriate to drop the designation Large, Medium and Small from the Grid Code? | DNOs believed that National Grid shared the widespread view that it was inappropriate to retain Large, Medium and Small, and the associated regional differences, as the RfG and the other EU Codes are implemented. Discussions along these lines started probably as far back as 2013. It was therefore a surprise when National Grid announced that regional differences would remain in place and that generation stakeholders would need to be classified into Large, Medium or Small and also into Types A to D. Given the imminence of the compliance deadlines, we agree that it is now inappropriate to try to unpick the regional differences. Nevertheless we support the removal of the terms Large and Small from the Distribution Code, noting that it is necessary to retain Medium because the retention of regional differences means that Embedded Medium Power Stations will retain their complex LEEMPS status. |
| 12 | Do you have any comments on the draft requirements for fault recording equipment for distribution-connected Type C PGMs as drafted in Section 13.11 and Appendix C3 of G99? | No |

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| 13 | Do you agree that it is appropriate to include storage in G98 and G99, noting that as storage is explicitly excluded from the RfG, the technical requirements that arise solely from the RfG are not applied to storage in G09 and G99? | We understand how difficult it would be for Ofgem to approve an approach that applied the new GB documentation to storage, given it is explicitly excluded from the RfG. |
| 14 | Do you agree that it is appropriate to include Type A PGMs <800W in capacity in G99, noting that those technical requirements that emanate from the RfG are not applied to PGMs <800W? | Yes, GB process apply to all generation, irrespective of its size or ability to also act as demand. Therefore it is appropriate to include these technologies in G99. We note that the drafting specifically excludes the RfG provisions from applying to these technologies. |
| 15 | If you do not consider the proposed solution to sufficiently harmonise the connection requirements for new parties connecting to the transmission and distribution networks, how would you propose this to be addressed? (See <i>Workgroup discussions section</i>) | - |
| 16 | G98 and G99 include specific requirements for power quality, harmonic compliance etc. Do you believe it should be possible to use other international standards or requirements to achieve these ends such that these specific requirements can be dropped from these documents? An explanation of your views would be useful. | We believe it is an absolute requirement that generating equipment should meet relevant PQ standards. However we are still exploring with stakeholders what is the best way to seek assurance that manufacturers have paid appropriate heed to the standards and that equipment is compliant. |
| 17 | Do you agree that the explanation of type testing, both full and partial, and the inclusion of equipment certificates, is sufficiently clear and unambiguous in G99 drafting? Please make any suggestions that could add clarity. | We think the efficiencies from manufacturers' type testing, and equipment certificates in the future, are essential and we believe that the requirements in G98 and G99 form a good basis for continuing discussions with manufacturing stakeholders to refine and improve processes. |
| 18 | The application of new technical requirements to non-type tested generation connecting to distribution networks will give rise to new processes etc. Please comment on how comprehensive the coverage of this is in the current drafting of G99 and please suggest any improvements | We are continuing to work with other DNOs, the ENA and stakeholders to refine and improve the processes and drafting of G99. |
| 19 | Do you have any views on how the | This is an area where all DNOs would welcome |

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| | data and information required and articulated within G99 can or should relate to the Distribution Data Registration Code in the Distribution Code? | feedback from stakeholders. |
| 20 | Do you believe that this modification helps to promote transparency across the Industry and if not which areas should be improved? (see <i>Workgroup discussions section</i>) | There is a significant education and briefing need that the network licensees need to undertake with stakeholders from this point forward. |

Legal drafting questions

| Q | Question | Response |
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| 21 | The Proposed draft Grid Code legal text contains a number of comments incorporating both internal and workgroup comments. Please feel free to provide further comment on the documents (Annex 1-5) | |
| 22 | Do you have any views on the structure of the Grid Code drafting for System Management and Compliance? (Annex 1-5) | |
| 23 | Are there are any areas in the Grid Code or Distribution Code drafting which you do not believe reflect the requirements of the RfG or HVDC Codes and, if so, why do you believe they are deficient? (Annex 1-9) | |
| 24 | Please make any other comments on the legal text drafting for the Distribution Code, G98 and G99 using the appropriate templates issued with this consultation. | |