

Summary of Meeting and Actions

Meeting Name	E3C Small Embedded Generation Frequency Obligations Working Group
Meeting No.	8
Date of Meeting	Friday 13th November 2009
Time	10:00am – 3:30pm
Venue	Meeting Room B2-1 National Grid House, Warwick

This note outlines the key issues and actions from the eighth meeting of the E3C Small Embedded Generation Frequency Obligations Working Group.

1) Apologies for Absence

Apologies were received from Bridget Morgan, Andrew Hood and Guy Nicholson

2) Previous Meetings

The minutes for meeting 7 were approved subject to the incorporated comments provided by the Working Group members

3) Actions outstanding

TI informed the Group that the TOR originally submitted to the DCRP and the GCRP were consistent with each other and the only change subsequently made to the TOR was the inclusion of the high frequency events.

TI to send out the original and revised versions of the TORs to the group to make it very explicit how they were developed and if they were amended. **Action: TI**

To help with drafting of the working group minutes the group agreed for the discussions of the working group to be recorded and then deleted once the minutes had written and been approved.

4) Feed back on DNO letter

The group received feedback on the response to date received from the DNO letter. AH sent out 42 letters only receiving 3 responses. 1 generator's response stated they could not change the setting whilst 2 had said it would not be an issue. It was suggested that if the responses received could be identified in terms of size, generation and capacity of plant this could/could not change the frequency settings it would help in developing an overall picture. WH suggested to the DNOs that the data sheets (including sites and their corresponding ratings) they provided for the DCRP high frequency risk investigation could be used for such an assessment.

DR confirmed ENW had contacted 27 generators, 2 had replied they could change the setting and the remaining 25 indicated a positive stance.

KH had contacted 21 generators, 4 had been returned as being undelivered; 3 of which had been re-sent to new addresses. The letters had been sent out had been sent two weeks after those of the rest of the members, therefore responses may be received later.

KH was concerned that the total number of addresses he had obtained (21) seemed low and will investigate to see whether any addresses have been missed off.

AC confirmed they had sent out 44 letters with 7 responses received, 3 of which had indicated that they would be able to adopt the new settings with the 4th indication that they

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didn't have any frequency relays installed. AC suggested the generator with no frequency relays may have been connected under the 1983 Energy Act ie before G59 was introduced. Therefore it could be without interface relays but may have its own protection systems. The three which had responded positively indicated that they would need confirm their position with the equipment manufactures. In terms of MW, AC had written to 930MW of generation with 29MW responding.

AC informed the responses that have been received so far did not really answer all the questions in the letter and some had included a large amount of unnecessary information.

PN highlighted a potential issue in terms of the feedback received. He identified that the feedback to the frequency setting information may only have included the G59 relay settings and not frequency related protection settings on other parts of the plant. WH pointed out that making the G59 protection settings available would be a good start for now.

The group debated whether the letter sent out was too general as the information the group were hoping to obtain was more specific. It was noted that the letter was written in such away that a non technical person could understand it.

TM confirmed his letters had not been circulated yet but he is in the process of doing so. It was debated whether a change in frequency setting was an issue for the contractors/manufacturers. WH informed the Group that manufactures/contractors would not have issue with changing the frequency settings. It was also noted that manufacturing companies who were involved in building a lot of the older plants may no longer exist. A percentage of the working group Identified that the current Generators do not have the incentive or obligation to make any changes to their settings.

AH confirmed he had issues with sending his letters out and that obtaining the latest contact details was not straightforward. He also confirmed a lot the generation plants will have the interface setting as per G59.

All DNO reps are to chase feedback on the letters sent out and report on relevant volumes (MW) affected at the next meeting. **Action: DNO reps**

A majority of the members felt the letters that were sent out did not initially reach the appropriate people and the information collated did not address all the questions posed in the letter.

PN informed the group that a percentage of tripping events experienced on their generation could be under-voltage related. It was highlighted that even though there may be records of settings available the actual setting could be different.

It was agreed that once feedback from the letters was received the settings should be changed as soon as possible, particularly where DNOs had requested that they are informed prior to the change.

Action: DNOs

The issue of whether wind farms should have fault ride through (FRT) capability was raised at the meeting. WH reported that in the earlier days, small wind farms were designed to trip as soon as local network abnormality was detected. However, this practice is no longer acceptable for larger wind farms as the system will not be sustainable for the loss of large volumes of wind farm generation. The Grid Code was therefore changed to include FRT capability after close collaboration with the industry in particular the major wind turbine manufacturers. Since then, major wind farms connected to the GB network are designed to meet the Grid Code FRT requirements.

Some of the members commented that this extra capability will come at a cost. WH agreed but commented that this is unlikely to be significant compared to the overall project cost provided that the FRT requirement was considered at the design stage of the

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project. Without this capability, the plant may have to shut down or spill wind to limit the system generation/infeed loss risk following severe system short-circuit fault conditions (eg lightening faults on overhead lines) to within the scheduled level. The associated loss of opportunity cost could be much more significant.

CM & PN did not agree that fault ride through is analogous to the issue in question, given it relates to voltage collapse rather than frequency deviation.

It was established that there is no standard FRT criteria. PN informed the group he had looked at data on plant across Europe which reflected this. FRT was individually tailored for different countries. A member pointed out when manufactures declare their plant meets the FRT criteria, they could refer to those specified by E-ON/Netz, for example, rather than those specified by the GB Grid Code. The purpose of the GB Grid Code compliance process has been designed to remove this uncertainty although it is the responsibility of the procurer to ensure compliance.

5) Discussion of D- code wording

At the last meeting, proposed D Code legal text change was presented. The change was intended for incorporating in DPC7.4.3.6 which was placed immediately after the clause where the protection settings are specified. However, it was considered to be more appropriate to move this text to DPC.4.1 where Generating plant performance requirements are specified.

In line with the above, WH amended the legal text as agreed and presented it at the meeting for agreement. To better understand the protection setting functions and their relationship with performance requirements, he explained in his presentation that the performance requirements are there to ensure the plant will remain connected to support the Total System unless the system frequency falls outside the specified frequency settings for the associated allowed durations as set out in the proposed D Code and G59/2 document. These protection settings are reproduced in the table below:

Under & Over low frequency Setting	Required Settings
U/F Stage 1	47.5Hz (20s)
U/F Stage 2	47Hz (0.5s)
O/F Stage 1	51.5Hz (90s)
O/F Stage 2	52.Hz (0.5s)

This implies that plant should only be disconnected when the frequency falls below 47.5 Hz for more than 20 seconds or 47 Hz for 0.5 seconds. The same applies if frequency rises above 51.5 Hz for more than 90 seconds or 52Hz for 0.5 seconds. The protection functions as set out in the 2-stage frequency relays are therefore in line with that intended for the plant performance requirements as proposed in DPC.4.1. Hence, the objectives of the DNOs and NGET will be met. It was recognised that this proposal represents a pragmatic solution and relied on the fact that generators are unlikely to reduce their output or disconnect unless protection systems operate.

MP reiterated plants could also trip in exceptional circumstances by other forms of generator related protection where the continuous operation could cause plant damage. Flexibility in the proposed D Code wording has been introduced to cater for exceptional circumstances.

The group were informed that the Grid Code performance requirements apply to Embedded Medium Power Stations.

A member of the group felt that the obligation should be put on the Generators to put these settings on their plant, unless they can justify technically that these settings are inappropriate for their plant. This responsibility should not be just down to the DNOs;

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whilst DNOs would be competent to assess the implications of adopting less onerous settings from a DNO perspective (less onerous settings would tend to cause the generator to trip earlier if an islanding situation occurred and would generally be acceptable to the generator) they would not be competent to assess the impact of less onerous settings on the Total System (premature tripping of plant during a major system incident) and NGET would be best placed to do this although it is not transparent to whom the responsibility lies with..

The requirement or otherwise for retrospective adoption of the proposed G59/2 settings would need to be considered when a clearer picture emerges from the responses to the DNO letters.

A member felt that the proposed wording containing the words 'must – remain connected' should be reworded (eg 'should...', 'expect to...' or 'encouraged to...'). Another member highlighted the proposed wording should be worded similar to the Grid Code to improve clarity.

WH continued his presentation to cover implications of proposed D Code change on existing plant following the recent request from DNOs to Generators operating small power stations $\geq 5\text{MW}$ to change their protection settings to those shown in the above table or at 47.5 and 51.5 Hz where only single stage relays were installed. For discussion he grouped them into the three categories below:

- Existing stations rated at 5MW and above
- Existing stations at below 5MW but above threshold (eg 1MW)
- Existing stations rated below threshold (eg 1MW)

For each category, he explained how the proposed D Code change with appropriate flexibility could manage them without unnecessary derogations.

Following further debate on the wording, PN agreed to draft appropriate wordings for the D Code to introduce a performance requirement as discussed. He still believes that durations at abnormal frequencies should be included. .

Action:PN

The group debated around the cost benefit analysis and it was agreed that there was a nominal cost required to change the frequency settings. National Grid reiterated that the one-off cost of adjusting frequency relay settings on the affected plant would be insignificant compared to the notional costs associated with procuring additional response (ie £160m pa) and energy loss (ie £45k per MWh), as per progress update presentation from meeting 7. National Grid had requested members to identify the one off cost involved in changing frequency settings on affected plant but information has not yet been made available. CM & PN agreed to take on this action and report back at the next meeting.

Action:CM/PN

The option of National Grid procuring additional response to cover these uncertainties has been ruled out in the Report to DECC by the E3C Task Group on the ground of unjustifiable economic case. The intention of the E3C task group was to seek speedy resolution to the problem by the WG. A member of the E3C working group would like to know the current cost incurred by National Grid in managing the high frequency risk. TI agreed to report at the next meeting.

Action:TI

Provision of Operational Information

The group were reminded of the reasoning behind the proposal for increased operational data collection, it was to facilitate better management of the Transmission System in a scenario of increasing embedded generation. The group collectively thought day ahead half hourly reporting was somewhat extreme and that National Grid would not be able to efficiently cope with this volume of data. A member informed the group that there are a

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number of generators obliged to submit this data already connected to the system who do not currently submit this information because NGET is unable to receive and process the volumes of data. As a part of the balancing mechanism the collection of this data was a requirement.

The members of the group asked what National Grid would do differently with day ahead data if it was available. RN stated that the data can form the basis for the trend analysis to help quantify the generation at risk of loss to large frequency excursions. Another member pointed out if settings of the plants are changed to accommodate any further frequency excursions then there is no need to have this data collection as NGET currently carry reserve for unplanned events. The returns from the generators are essential in further assessment of the need for this information.

Another member stated that settlement metering data for all generators over a given size (thought to be 100kW) is available from the settlements system which could help NGET form a view of the historic operational risk and hence predict any future operational risk using trend analysis. There was some uncertainty of who owned such data and whether it was assessable to NGET.

Action:KH

WH reported the early release of the revised settings by the G59 Review WG was to allow the industry to have any early understanding of and preparation for the change. He is aware that some of the industry has already adopted this as their design and operational references including some DNOs. He asked if other DNOs could follow this practice as the continued use of the 50.5 Hz setting on new plant would increase the current risk to system security. CM expressed concern that the proposed settings were being asked for before public consultation had been processed. The group collectively agreed there was some flexibility as the current settings in G59/1 are only recommendations, not obligations. DNOs are requested to review their current practices to minimise the high frequency risk posed to the system and report back at the next meeting.

Action:DNOs

Next Steps

- DNO representatives to send TI a summary of the responses to the letters
- TI to report back to the November GCRP
- PN to draft Distribution Code text
- MP to prepare a note to the DCRP and circulate around to the Working Group
- KH to look into the data from generation whether it can be accessed
- National Grid to provide cost information regarding managing high frequency risk
- CM/PN to provide estimated costs for modifying plant settings
- AC to raise the issue with regards to the early adoption of the proposed G59/2 settings at the ITCG Group
- MP to circulate the draft Working Group Report.

6) Any Other Business

CM updated the group on the 2 stage process developed through the third package. The European Regulators were developing a framework guideline to get Europe more integrated. It was highlighted that piloting had already started with a group looking into, the Grid Connection which CM had attended. The group were informed the discussions at the pilot meeting were very high level and the subject area covered would not impose any restrictions on the E3C working Group. It was mentioned a public workshop is to be undertaken in March 2010 and the time frame for completion of the framework guidelines will include an 18 month process.

CM expressed gratitude for the circulation of early papers.

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It was noted that a new GCRP working group is to be established in the New Year to consider the voltage & frequency requirements in the Grid Code. The group agreed that the time scales of the E3C and new groups were such that the proposal of the E3C group cannot be delayed whilst the new group develops its proposals.

7) Next Meeting

It was agreed that the next meeting of the Working Group would be early January 2010

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Appendix 1 – Working Group Attendance

Members Present:

Mark Perry	MP	Working Group Chairperson
Kabir Ali	KA	Working Group Secretary
William Hung	WH	National Grid
Tom Ireland	TI	National Grid
Alan Creighton	AC	CE Electric UK
Guy Nicholson	GN	Senergy E.Connect
Dan Randles	DR	Electricity North West
Paul Newton	PN	E.ON
Raj Nagarajan	RN	National Grid
Keith Hodson	KH	Central Networks
Andy Hood	AH	Western Power Networks
Claire Maxim	CM	E.ON UK
Hamish Dallachy	HD	Scottish Power
Ham Hamzah	HH	RWE
Apologies:		
Bridget Morgan	BM	Ofgem
Barbara Vest	BV	AEP