

# Summary of Meeting and Actions

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Meeting Name	Grid Code Power Park Modules and Synchronous Generating Units Working Group
Meeting No.	3
Date of Meeting	Tuesday, 11 <sup>th</sup> July 2006
Time	10:00am – 2:00pm
Venue	National Grid Offices, Coventry Road, Hinckley

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This note outlines the key action points from the third meeting of the Grid Code Power Park Modules and Synchronous Generating Units Working Group

## 1) Apologies for Absence

Apologies for absence were received from Tim Moore.

## 2) Minutes from the Previous Meeting

The minutes of the second Working Group meeting held on 9<sup>th</sup> May 2006, were agreed and approved by members.

## 3) Actions from Previous Meeting

The majority of the outstanding actions refer to legal text which National Grid will circulate to Working Group members once the drafting has been finalised. All other outstanding actions, with the exception of the following, will be discussed under subsequent agenda items:

National Grid is looking to clarify the precise application of the requirement for unity power factor capability in Scotland and will inform relevant parties in due course.

## 4) Point of Voltage Control

The Working Group was informed of two main aspects regarding this point:

- CC.6.3.2 – Location of Reactive Range requirement for directly connected plant in Scotland
  - proposed to be the Connection Point
- CC.6.3.8 (c) – The point of voltage control in Scotland
  - proposed to be the Connection Point.

NT indicated that the proposal will seek to remove ambiguity of interpretation and to clarify that whilst the control point is specified, the measurement point and location of voltage control system elements including any reactive compensation plant will be decided by the User.

NT reiterated National Grid's preference for having the point of **steady state** voltage control at the Connection Point otherwise practical problems would arise if the two points were different.

HD replied that the main concern is that a SCADA system is required to provide the HV monitoring and it is the speed of data transfer over this that is the issue.

NT pointed out that technologies other than SCADA are available which are not as slow as SCADA however there is a difference between steady state, where SCADA is perfectly adequate, and transient voltage control and the two must be separated to help clarify the issues.

DMcC recognised that one manufacturer offers an alternative to SCADA. However from a developer perspective, if the Grid Code offers an option regarding this issue, the most cost effective method will be selected i.e. SCADA system and control at the LV side.

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DMcC queried the need to develop an alternative system when the existing equipment is Grid Code compliant the point being that a local response by the turbines to changes in terminal voltage brought about by changes at the connection point produced an adequate transient response from the windfarm as a whole. This had been the position of SP in their discussions with NGET for some considerable time.

DW indicated that he did not believe that the Grid Code was clear on the necessary requirements regarding this matter.

NT did not believe that it would be beneficial for the Grid Code to contain descriptions of technical engineering solutions as this would be a hindrance to Users. However NT indicated that National Grid would welcome suggestions from Working Group members regarding associated text for this issue.

DG informed the Working Group that recent experiences have highlighted the fact that manufacturers are not prepared to undertake Research & Development activities which would allow their equipment to meet Grid Code requirements.

DG stated that the situation was resulting in developers having to procure third party systems in order to achieve Grid Code compliance. Developers were no longer able to rely on manufactures for compliance issues to be solved at source.

NT informed the group that this was not the viewpoint obtained from manufactures when Generic Provisions was being developed, as the manufactures viewed the UK market as being crucial. NT stated that from a National Grid perspective, the security and stability of the system is paramount and this underpins the basis of any requirements regarding this issue.

DMcC informed the Working Group that developers had built system that they believed to be Grid Code compliant. However after reviewing the conditions within the Bilateral Agreement they could not comply with National Grid's interpretation of compliance as enshrined in the Bilateral Agreements. The Working Group was informed that historically developers have expended time, effort and money to adapting their equipment to meet Grid Code requirements. However this was no longer the case due to the emergence of markets in the USA and China which offer a more attractive commercial environment to manufacturers.

CM noted that it now appeared that National Grid was inserting additional conditions within Bilateral Agreements that removed flexibility provided for in the Grid Code wording. CM indicated that it was important to understand whether the flexibility was no longer allowed by National Grid. NT noted that some of the flexibility being referred to appears to be in connection with the compliance with the requirements.

DMcC indicated the real issue was the lack of transparency/understanding of the true intention of the existing Grid Code provisions. National Grid view of the Grid Code requirements (as stated in the Bilateral Agreement) was just one interpretation which differed somewhat from that of the developers perspective and the Grid Code was not explicit in its requirements this led to disputes.

NT noted that the way in which some Generators appear to have interpreted the transient voltage control requirement is inappropriate as evident in the type of solution being sought e.g. communication via SCADA. NT stated that studies will be presented that show that full flexibility is available already in terms of how to deliver the requirement. Also, NT stated that it would be important and beneficial to bring forward maximum clarity and visibility of the requirements in order to minimise any risk of differing interpretations.

HD noted that in his view there has been a clear change in the requirements for voltage control since the discussions between the three TOs, Ofgem and the manufacturers at the beginning of 2004. HD believes that the discussions centred round fast control at the generator terminals with a slower outer loop providing the control at the Connection Point.

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HD stated that whilst National Grid claim to have advised manufacturers of a 1 second response time, they did not inform the Scottish TOs of this requirement, nor did they advise the participants at the Forum organised by Ofgem, hence avoiding informed discussion at this meeting. HD became aware of the requirement at a meeting with Helge Urdal in Wokingham on 14<sup>th</sup> November 2005.

### Post Meeting Note

In response to the assertions made by HD on page 2 and page 3 of the minutes of the previous meeting, NT presented evidence that confirmed that the three TOs did discuss with WTG manufacturers the requirement for a 1 sec speed of response at the GEP/USEP. The evidence presented was the minutes of meetings held between the three TOs and WTG manufacturers (and Ofgem) in January/February 2004. These meetings were attended by HD and SHETL and the minutes were approved by the three TOs, Ofgem and the manufacturers. The Scottish TOs were thus fully aware of the requirement. The fact that this was not discussed by the three TOs at the Forum organised by Ofgem was because these were not part of the Grid Code Proposals as the thinking at the time was to include the voltage control performance specifications in Bilateral Agreements in line with the custom and practice for synchronous plant.

SC asked whether it was possible to examine the interpretation of the Grid Code requirements.

CM indicated that it would be an issue if National Grid's interpretation effectively rules out the use of generic manufactured wind turbines. Therefore it was important to explore the manufacturers' interpretation and see whether it really is completely unacceptable to National Grid.

NT noted that the Grid Code requirements and site specific requirements are not based on specific turbines and hence are not designed to either rule in or out any specific manufacturers.

DG indicated that the procurement of 3<sup>rd</sup> party equipment to meet Grid Code requirements was adding approximately 20% to the overall cost of projects.

JN mentioned that the associated guidance notes are, in his views, ambiguous and lack clarity. NT pointed out that the guidance note is a live document and is available on the National Grid website and that comments are welcomed. He invited comments on the guidance notes from Working Group members.

HD noted that the requirements for fast response had changed significantly over the past two years, moving away from a slow outer loop. This change in the requirement has been brought through wording in the Bilateral Agreement and not the Grid Code.

NT indicated that this was not the case and that National Grid has been consistent in their approach in terms of the delivery of 1 second speed of transient response..

DMcC stated that meeting the slope requirements specified in Bilateral Agreements adds complexity and expense for developers and questioned if it was really necessary to impose this requirement given that any turbine operating in voltage control mode would deliver a reactive response to any voltage deviation until either it reached its target voltage or delivered/absorbed Qmax. DM indicated that the natural slope characteristic seen at the connection point resulting from the wind farm impedances is not likely to be significantly higher than that for a synchronous generator and its generator transformer. National Grid agreed to consider specifying a maximum slope setting and allowing the wind farm to provide any value up to this.

JG reminded the Working Group that CC.6.3.4 (specifically figure 4) of the Grid Code specified the reactive capability/voltage requirements for PPMs embedded at/below 33kV or connected at/below 33kV in England and Wales. These requirements represent a relaxation from what would be required of PPMs connected at higher voltages, due to

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voltage regulation issues within the wind farm when exporting/importing MVArS. It needs to be recognised that if that point of delivery of reactive range was aligned with the point of voltage control (i.e. at the connection point), as proposed by National Grid, then all PPMs without a generator owned transformer at the connection point would require a similar relaxation.

### 5) Speed of Voltage Control

MP circulated the findings of a National Grid study regarding the 1 second response rate for reactive power which is currently stated in the Bilateral Agreements. MP indicated that the aim of the proposal was to treat all plants equally and to maintain current system performance levels.

The studies aimed to identify the type of contingency that would necessitate a 1 second response rate, whether or not the contingency would be credible, and highlight any implications of an insufficient response.

The studies showed that for a credible fault some distance from the wind farm within a large network, a one second response is necessary to prevent widespread voltage depressions and the loss of the wind farm. The location of the fault was sufficiently far from the wind farm that several wind farms could be affected, resulting in a large loss of generation if the voltage control response is insufficient.

National Grid conducted additional studies based on a 2 second response using fault ride through capability. In this study the all of the MVArS available at the terminals were fully switched in when the terminal voltage reached 0.6. This did not prevent voltage collapse. This study indicated that for system security it is not sufficient to meet the Grid Code requirement by providing a step response at one second. Further studies indicated that for this network and event a 600 ms switching time would be needed for a step response to maintain security. This time will vary according to the wind farm and network and hence is site specific. Any specification in the Grid Code of the performance requirements necessary for a step response will need to be generic and therefore reflect the most onerous requirement. National Grid believes that specifying that the response should be progressive is more suitable.

DMcC, JN and PB suggested that a range should be included in the Grid Code for values that may be placed into the Bilateral Agreement.

DW noted that similar regime is in the Grid Code for fault clearance times.

NT agreed that National Grid would investigate the matter further.

**Action: National Grid**

NT noted that the study also demonstrated that if a transient voltage control system monitors and respond to the LV terminals of the generators, then this provided a similar transient response to that which responded to the connection point. Both maintained system stability and hence a 1 sec at the terminals is sufficient. HD pointed out that this study demonstrated the satisfactory nature of voltage control at the terminals of the generators, hence the additional complexity of providing voltage control at the connection point was not justified. National Grid will draft new words on transient voltage control requirement to ensure maximum clarity of requirement.

**Action: National Grid**

NT stated that the control of the Connection Point voltage under steady state timescale to a droop can be met by slow acting action e.g. through the farm's SCADA system.

### 6) Provision of Reactive Capability by Embedded Generators

The Working Group reviewed a paper which outlined DNO's latest position regarding Reactive Capability.

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MK indicated that DNO's favoured solution remains the status quo i.e. generators continuing to meet Grid Code requirements.

The Working Group discussed the possibility of modifying the Grid Code to allow tripartite discussions between National Grid, DNO and Generator on the actual required Power Factor range for an embedded medium power station which would form part of the Bilateral Agreement between the DNO and the User. It was acknowledged that this discussion might be quadripartite in Scotland, to take account of the Scottish Transmission Owners. The Working Group acknowledged that the existing Derogation route would remain for embedded Large Power Stations.

The issue of stranded assets was discussed by the Working Group. NT and NS informed the Working Group that the steady state reactive capability required on distribution connected generators cannot be classified as stranded assets as the reactive capability would be fully utilised under transient conditions to assist in distribution network voltage control.

NT informed the Working Group that the transient requirements are not mentioned specifically within the Grid Code as the steady state requirements are delivered in transient timescales hence the transient requirements are implied via steady state provision for reactive power.

NT confirmed that it is NGET's view that the inability of a generator to supply reactive power within the DNO network due to network limitations would not impact the Generators' compliance with the Grid Code regarding their reactive power capability. It was further confirmed that there was no obligation on the DNO to upgrade their network to facilitate delivery of such Grid Code capability.

National Grid to provide draft legal text that assumed the status quo but would allow the tripartite discussion referred to above to vary the requirement on a case by case basis.

**Action: National Grid**

### 7) Next Steps

Date of the next meeting to be confirmed, it has been provisionally booked for 7<sup>th</sup> September 2006.

National Grid will circulate draft legal text to Working Group members by the end of August 2006.

It is the intention that the Working Group Report will be submitted to November's GCRP.

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## Appendix 1 – Working Group Attendance

### Members Present:

Mark Duffield	MD	Chairman
Lilian Macleod	LM	Secretary
William Hung	WH	National Grid
Mark Perry	MP	National Grid
Brian Taylor	BT	National Grid
Nasser Tleis	NT	National Grid
Neil Sandison (via teleconference)	NS	SSE
David Gardner (via teleconference)	DG	SSE
Hamish Dallachy	HD	Scottish Power
Damien McCool	DMcC	Scottish Power
Mike Kay	MK	United Utilities
Philip Belben	PB	E.ON
Claire Maxim	CM	E.ON
John Gaffney	JG	RWE
John Norbury	JN	RWE
Simon Cowdroy	SC	Econnect
David Ward	DW	Magnox
Bridget Morgan	BM	Ofgem