

## Minutes

<b>Meeting name</b>	Frequency Response Working Group
<b>Meeting number</b>	18
<b>Date of meeting</b>	13 <sup>th</sup> January 2012
<b>Time</b>	10:00 - 14:00
<b>Location</b>	National Grid House, Warwick, CV34 6DA

## Attendees

<b>Name</b>	<b>Initials</b>	<b>Company</b>
Ian Pashley	IP	Chair
Louise McGoldrick	LM	Technical Secretary
Stephen Curtis	SC	National Grid
Thomas Derry	TD	National Grid
Ian Nicholas	IN	National Grid
Graham Stein	GS	National Grid
Chris Hastings	CH	SSE
Guy Phillips	GP	EON
Chris Proudfoot	CP	Centrica
Raoul Thulin	RT	RWE

## Apologies

<b>Name</b>	<b>Initials</b>	<b>Company</b>
Mike Chowns	MC	RWE
John Costa	JC	EDF Energy

## 1 Introductions and Apologies for Absence

1. Apologies were received from John Costa (EDF Energy) and Mike Chowns (RWE).

## 2 Minutes from previous meeting

2. The draft minutes of the Grid Code/BSSG Frequency Response Working Group meeting held on 12th September 2011 were approved and will be made available on the National Grid Code Website.

## 3 Background

3. TD gave a summary of work completed to date by the Frequency Response Working Group:

### 22 October 2008:

- Commercial and technical review of frequency response requirements
- A number of scenarios determined and studies carried out
- Development of a potential synthetic requirement for asynchronous generation
- Development of several commercial frameworks:
  - Option 1 Grid Code obligation with ability to trade capacity
  - Option 1A Grid Code obligation with ability to have alternative on site technologies to meet shortfall
  - Option 2 Day Ahead Auction
  - Option 3 Bilateral Tender

### October 2010:

- Working Group agreed terms of reference for a technical sub-group to economically demonstrate how frequency response requirements may develop given change to longer infeed loss and changes to generation background with associated reduction in system inertia.

### December 2011:

- Technical sub-group report published with recommendations

## 4 Frequency Response Technical Sub-Group Report

4. IP requested feedback on the Frequency Response Technical Sub-Group Report and asked whether the Working Group accepted the findings.
5. Clarifications were sought for paragraphs 1.5, 4.6.3 and 4.11.7:

Paragraph 1.5: Whether 20GW demand level was low enough for the studies. It was confirmed that 20GW is already quite low and seemed appropriate in the context of recently observed trends. In addition, clarity was sought on the 1800MW largest loss and whether that could be exceeded with 50MW station load for example. It was confirmed that 1800MW is the largest loss limit and included any station load loss.

Paragraph 4.6.3 - Whether the additional 20% to account for erosion risk is sufficient as we would not want frequency to drop out of statutory limits as a result of an 1800MW trip. GS confirmed that the erosion may not be linear and that the effect was likely to vary with the generation mix and demand levels. GS confirmed that the availability of 200MW of low

frequency triggered demand reduction had been adopted as baseline line assumption in line with general historic trends.

Paragraph 4.11.7: the Working Group questioned the benefit of £13m per year in balancing costs. It was confirmed that this did not take account of the de-loading and redistribution costs or the carbon benefit.

6. It was noted by the Working Group that the report discussed how asynchronous plant could deliver synthetic inertia and that the analysis focussed on utilising wind turbines. GS confirmed that the conclusions drawn were equally applicable to HVDC and that there were discussions with a number HVDC manufacturers. It was agreed to add an appendix to the Frequency Response Technical Sub Group report listing the manufacturers involved.

**Action: National Grid (GS)**

7. GP mentioned that timescales were not captured in the report, a timeline is needed to ensure that the requirements are established for frequency response to ensure enough generation is captured in the coming years in order for the service to be financially viable. Although a timeline is currently not available it was agreed that a timeline would be captured in the Frequency Response Working Group Report.

**Action: National Grid (GS & TD)**

8. As the future frequency response requirements have been evaluated using the Gone Green Scenario the Working Group considered whether any further analysis was needed. In conclusion it was felt that the number of scenarios that could potentially be developed is "endless" and that the technical analysis within the report is sufficient to start developing cost benefit analysis against the various options. Consideration was given to whether the assumptions needed to be tested against a worse case scenario and GS agreed to tabulate the assumptions made in the analysis so that individuals can decide whether they are optimistic or pessimistic.

**Action: National Grid (GS)**

9. Various generation scenarios were discussed e.g. de-loading V response, utilising the information contained within Appendix B. RT asked for clarification on whether the risk the Working Group is seeking to address is credible. GS confirmed that the least onerous situation assessed where rate of frequency fall is problematic was the 20GW demand scenario with 'average' wind of (equivalent to 8GW of output) but there is a dependency on what is happening in Europe and Ireland because of the effect of changes in interconnector position.

## **5 Discuss recommendations of Technical Sub-Group Report**

10. IP outlined the recommendations within the Technical Sub-Group Report and requested feedback.
11. GS mentioned that the report had considered the development of a synthetic inertia requirement in detail and that "inertia" should be quantified to avoid misinterpretation by new generators.
12. In response to the need to clarify current Primary Response requirements, CP stated separate definitions may need to be developed for synchronous generation and asynchronous generation such as wind turbines and interconnectors. Any different application of the requirement for the different generation sources would have to be justified.
13. CH mentioned the challenging technical issues that the wind turbines face to achieve the reports recommendations on fast frequency response, in particular problems associated with calculations delivering a change in power output within 2 seconds, as the integrating system could be connected 25 miles away. CH suggested that incentives for wind turbines would be required to drive the research and development to overcome the technical issues and the need for a market place.

14. GS highlighted the comparatively higher costs and long development periods associated with the synthetic inertia solution, and also that synthetic inertia may not meet the frequency response requirements. The Working Group noted that any proposed solution should not preclude future innovation of frequency response solutions.
15. The Working Group considered that the industry was already used to the concept of frequency response but users would be required to deliver the requirement faster. It was also considered that the faster response was feasible for wind turbines to deliver but this may potentially exclude some manufacturers.
16. RT concluded that the frequency response problem is well defined within the report but that the next step is to include a cost benefit analysis and this will need addressing during the Grid Code process.
17. The Working Group agreed that the best way forward would be to proceed with fast frequency response compared to synthetic inertia but the Grid Code obligation should permit the User to have the flexibility to discharge the obligation via synchronous generation or synthetic inertia. GS raised processing issues when using synthetic inertia (frequency trigger, wind recovery period, delays and curtailment issues) and that wind turbine manufacturers had suggested that frequency response could not be assumed to be available for use on the same plant as was delivering synthetic inertia. The Working Group agreed that a cost benefit analysis was still required for synthetic inertia and therefore any further analysis may need to consider the percentage split on the system between synthetic inertia and fast frequency response. GS responded that the cost benefit analysis for synthetic inertia was not meaningful as synthetic inertia did not deliver a viable solution to the future frequency control problem if it could not be assumed that conventional frequency response was available concurrently.

## 6 Next Steps

18. Following the Working Group review of the Frequency Response Technical Sub-Group Report, IP asked whether the Working Group accepted the reports findings and confirmed the Working Groups recommendations for the next GCRP meeting on the 18<sup>th</sup> January.
19. The reports conclusions were accepted, with some caveats, in particular that any proposed solution did not preclude future innovation of Frequency Response solutions.
20. The Working Group agreed that an industry consultation was required and should summarise previous discussions, findings, options and analysis developed by the group and in particular request feedback on the market mechanisms. The industry consultation document should be reviewed at the next Working Group meeting in February 2012 and be submitted to GCRP in March 2012. GP emphasised the importance of a timeline, to ensure enough generation is captured in the coming years in order for the frequency response service to be financially viable. It was also agreed to update the Working Groups terms of reference to reflect the new timescales.

**Action: National Grid (TD)**

21. The Working Group mentioned that the members of the group had changed over the 18 meetings and that membership should be reconfirmed.

**Action: National Grid (TD)**

22. The Working Group considered that the following cost benefit analysis could be completed in parallel with the industry consultation taking account of the market options discussed to date for the following scenarios:

- The status quo
- Frequency response for asynchronous plant against baseline
- Synthetic inertia
- And a combination of the above.

23. RT mentioned the cost benefit analysis should also consider the split between the “sunk costs” for the installation of the equipment and the higher costs for running the system which may be mitigated by the implementation of a new commercial regime.