Summary of Meeting and Actions

Meeting Name	Frequency Response Working Group
Meeting No.	14
Date of Meeting	Thursday, 14th October2010
Time	11:00am – 3:30pm
Venue	National Grid, 1 - 3 The Strand, London

This note outlines the key action points from the fourteenth meeting of the Frequency Response Working Group.

1) Introductions, Minutes and Apologies

Apologies were received from Francois Luciani (EDF Energy), John Welsh (Scottish Power Systems), Chris Hastings (SSE), Tom Derry (National Grid), William Hung (National Grid) and John Morris (EDF Energy).

TI explained that a wind turbine manufacturer had been invited (following discussions which had taken place at the last GCRP Meeting held on 23 September 2010) who had offered to provide some initial feedback on the draft synthetic inertia obligations, which had been previously produced and discussed by the Working Group. It was highlighted that a broader invitation would be issued to all relevant manufacturers for subsequent technical meetings.

2) Actions from Meeting 13

The draft minutes of the Grid Code/BSSG Frequency Response Working Group meeting 13 held on 10th September 2010 were approved and will be accessible from the National Grid Codes Website.

Action: National Grid

The Working Group noted that all actions have been completed save one:

The outstanding action from a previous meeting was to consider how a payment mechanism for system inertia could be enforced. The Working Group concluded that it was not feasible to consider such commercial mechanisms until the technical system requirements or obligations for system inertia are further developed. Consequently this action will be kept open until such time.

Action: All

3) Grid Code Review Panel (GCRP) feedback

TI provided a summary of recent discussions at the September GRCP meeting concerning Frequency Response. At the Panel meeting, National Grid had presented a paper on the Future of Frequency Response including an assessment on whether the existing Frequency Response arrangements in the Grid Code, if applied to the expected generation background, would secure against the largest loss. The paper concluded that this could be difficult under certain specific scenarios such as minimum demand conditions. A new Working Group to consider the development of an appropriate obligation was initially discussed, however, the Panel felt that the current Frequency Response Working Group (FRWG) was still an appropriate place for this issue and therefore would like this issue to be addressed and therefore would like this issue to be discussed at the FRWG . The Panel had also requested the WG to consider adding any additional Terms of Reference, if needed. In addition, it was proposed that the working group should be opened up to new members. At the GCRP the Ofgem rep stated that in light of this paper, a 'roadmap' should be communicated to Ofgem showing how this issue is to be resolved. This would will help Ofgem to make a decision on the 1800MW largest loss proposal.

GP, who also attended the GCRP, added his own summary, categorised into three areas:

- Ofgem stressed that they would need to see a way forward on the technical elements of the work before a decision could be made on the SQSS Largest Loss.
- Further work was required on developing the proposed Synthetic Inertia obligations which would require additional technical expertise and manufacturer involvement.
- The case for a mandatory Grid Code Synthetic Inertia obligation for those machines that do not inherently provide it has not yet been fully proven.

The Working Group discussed the establishment of a technical sub group that would report to the FRWG. It was agreed that a technical sub group should be established to determine what the total response and inertial requirement should be and that their output would feed into the Working Group who could then develop the commercial products and markets.

The FRWG felt that inherently it is difficult to optimise a commercial mechanism for response without knowing what the product looks like and what the agreed system demand should be.

The group discussed the Terms of Reference for the technical sub-group. In order to determine the overall response requirement, certain high level assumptions need to be agreed. The starting assumptions were agreed, namely that response was mandatory and equal across all types of generation. It was also agreed that once conclusions had been produced, these assumptions would be assessed as to the most efficient solution overall. Requiring all generation to install the full response capability is likely to lead in the capability of the most marginally expensive plant never being utilised and therefore costs not recovered.

An alternative to an equal, minimum inertial capability obligation across all generators was to look at what capability each generation technology could provide without additional cost, examine the marginal cost for additional capability and then find the most efficient combination to meet the total requirement.

In order for the technical sub group to convert the entire system requirements (i.e. volume) into generator obligations, several approaches were discussed. One approach is to determine the response per power station or per generating unit. Alternatively the requirement could be determined on a per MW basis. Such ideas would need further discussion and definition within the Technical Sub-Group.

CP said that a potential response market would be equally attractive to a generator owner as the active power market, and given the right signal, his company would be happy to invest in additional response capability. Another member said that the group still had to prove the working assumption that the provision of Synthetic Inertia is truly low cost.

The group was reminded that a large volume of wind generation capacity is currently being designed and constructed without any inertia and if conclusions are not reached quickly, an opportunity will be missed whilst also noting the concern over system security issues. Retrospective application was considered and it was agreed there was some historic precedent of retrospection obligations, such as Fault Ride Through for Synchronous Plant, although this was not the ideal situation.

<u>Technical subgroup Terms of Reference:</u>

The group concluded the following draft scope for the technical sub group:

i) To determine the total Transmission System Frequency Response and Synthetic Inertial requirements
ii) Consider a largest secured loss of both 1320MW and 1800MW for the scenarios described in i) above
iii) The initial assumption is that obligations are mandatory and equal. To be expressed on a per MW basis

iii) Final proposals will be for the end of February 2011 (this will allow the Working Group to report to either the May or September 2011 meeting)
iv) Three meetings are anticipated
v) Membership will be invited from relevant manufacturers, National Grid, Generators and a representative will be requested from the DCRP
vi) A technical report will be delivered with the findings and a summary of discussions.

A high level consideration of the technical arrangements for an obligation was suggested by MC. For example, whether an obligation was best placed at a power station or generating unit basis. The Working Group concluded that the short timescales for delivery may limit a conclusion on such topics but any relevant discussions should be included in the concluding report.

4) System Inertia

Following an action from the previous meeting of the BSSG, AJ informed the group that Rate of Change of Frequency (RoCoF) relays are not used on the gas transmission system. He advised that at each connection point to the Gas Transmission System the only restriction as far as he is aware was a rate limit of 50MW/Min.

At the last meeting, AJ advised that he would re-run the system studies to establish if the results for and 1800MW loss could be improved based on those presented at the last BSSG meeting held on 10 September 2010. AJ advised further additional studies have been completed which took additional factors into account:

- Demand tripping
- Reduced governor delay
- Greater Plant Deload and increased Primary Response Volumes

AJ advised that the results had to be considered against the background of those presented at the previous BSSG Meeting held on 10 September. He advised that significant improvement could be made if contracted demand tripping was introduced, the governor delay was reduced or the volumes of Primary Response where increased so there was a greater proportion of de-loaded plant (in the study run approximately 4 GW of pulled back plant). This latter factor was discussed in some detail, but it was advised that the preliminary studies showed that if sufficient plant was deloaded the system could be secured although the volume of primary response required would be higher than the largest loss, operating costs would be much higher, greater constraint issues such as plant availability, SEL/MEL levels and transient rises in system frequency above 50Hz.

AJ advised that the studies had been run in a spread sheet and more detailed analysis would be required using Digsilent Power Factory. This additional analysis would be performed under the Technical Sub-Groups TOR..

Action: AJ

5) Manufacturer Initial feedback

<u>RePower Presentation</u>

MB presented a slide pack on analysis performed by Repower on the Working Group's initial Synthetic Inertia proposals. A summary of the key points are:

- Inital proposals required an inertial response after 200ms although it was thought that a realistic minimum response time closer to 800ms was more realistic .
- It was proposed that frequency threshold detection may be more robust than the proposed df/dt detection
- Pre programmed response will give more stable results
- A longer response (e.g. slower decay) could increase frequency stability

MB highlighted that whilst the Synthetic Inertia is provided by software changes, it is also essential that the hardware for turbines is specified to enable delivery of the capability.

Consequently manufacturers will need as much notice as possible to ensure that all future plant can meet any obligations and therefore retrospective application is likely to be far more problematic.

6) Frequency Response Option Development

a. Option I – Capability and delivery trading

This option was not discussed in any detail. Some clarification was sort on how the traded capability would be required to be delivered. Initial thoughts were that the traded capability would need to be selected to provide response if needed.

b. Option II – Tender/ Bilateral contracts

GP explained that under this model (being similar to that applied for Black Start / Reactive Provision) the requirement for every unit to have full capability for the provision of response and the associated investment cost is eliminated. Such an approach should identify more efficient providers from across generation and demand parties. This would allow new and existing plant to price in capability. The price signal for response provision would be provided by the System Operator.

The Working Group discussed how this contracting strategy may force uneconomic and carbon intensive fuelled plant on, as they are likely to be more flexible for response services than other forms of provider.

MA stated that this option is likely to drive the price of the energy market upwards and could lead to a substantial increase in System Operator costs. RT stated that such a market might not be dynamic enough and the balance would have to be achieved between stranded contracts and the locking out of new entrants. Relatively long term contracts were thought to be required to allow generation investment costs to be recovered with enough confidence.

c. Option III – Day ahead auction

This option would be open to both generation and demand providers and the establishment of demand BMUs was debated

Parties wishing to participate would offer blocks of response for the following day (possibly by EFA block). It is anticipated that there would not need to be obligations in the GC but it is not precluded and it was thought that this option could work in conjunction with a GC obligation.

There would need to be an on-the-day method of adjusting the volume and providers of response to account for changes in availability and volumes required.

MA questioned how day ahead/ current day changes would be dealt with? In addition, how such a daily auction could attract would need to be outlined i.e. new entrants may require longer term contracts.

Next Steps

All three options are to be combined into a single paper. The Working Group was reminded that Ofgem has stipulated that cost benefit analysis should be provided for each option. In addition, the Working Group agreed that such a paper would need to consider the relative ease, speed and cost of implementing each option.

Action: National Grid

7) AOB

The WG is due to look at the reactive market after completing its review of response. The delay in this conclusion is going to delay the reactive work. This interaction needs to discussed with the GCRP.

8) Date of Next Meetings

The Working Group agreed that due to the parallel running of the technical sub group and the core Working Group that a number of future meetings should be booked to ensure coordination. It was proposed that the next three meetings for both groups should be scheduled.

Action: TI

[Post meeting note]

The date and the location for the next meetings for the Frequency Response Working Group are:

- 24th November - Warwick
- 20th December – Warwick
- 14th February – Solihull

The proposed dates for the Technical for the Sub Group are:

- 15th November - Solihull
- 3rd December - Warwick
- 13th January – Solihull

Appendix 1 – Working Group Attendance

Members Present:

Tom Ireland	TI	Working Group Chair
Antony Johnson	AJ	National Grid
Malcolm Arthur	MA	National Grid
Guy Phillips	GP	E.ON UK
Stephen Curtis	SC	National Grid
Raoul Thulin	RT	RWE
Mick Chowns	MC	RWE
Bob Nicholls	BN	E.ON UK
Chris Proudfoot	CP	Centrica
Alan Mason	AM	Observer - RePower
Matthias Bundt	MB	Observer - RePower
Paul Mott	PM	EdF Energy

Apologies:

Chris Hastings	CH	Scottish-Southern
John Welsh	JW	Scottish Power (DNO Representative)
Chris Harrison	CHn	EdF Energy
Francois Luciani	FL	EdF Energy
Thomas Derry	TD	Technical Secretary
John Morris	JM	EdF Energy
William Hung	WH	National Grid