

DRAFT - Summary of Meeting and Actions

Meeting Name	Frequency Response Technical Sub Group
Meeting No.	5
Date of Meeting	Friday, 5 th August 2011
Time	10:00am – 13:00 pm
Venue	National Grid House, Warwick

This note outlines the key action points from the fifth meeting of the Frequency Response Technical Sub Group.

1) Introductions, Minutes and Apologies

The Chair introduced the meeting and reiterated apologies from Peter Thomas, Alastair Frew, Martyn Cunningham, Ken Lennon, Simon Lord, Tony Lakin, Mick Chowns, Steve Curtis and Alan Mason.

Francois Luciani and Peter Wibæk Christensen had not been able to attend in person and therefore joined by teleconference call.

The previous meeting's (meeting 4) were reviewed for accuracy and the Technical Sub Group agreed for the minutes to be uploaded onto the TSG webpage.

2) Previous meeting's actions

Minutes for meeting 3 were also agreed to be uploaded onto the website.

Action: TI

The Sub Group agreed that the following action could be closed and if a further requirement arises for additional data, then National Grid could discuss this with KL directly:

“KL commented that it would be possible to collect more operational data and agreed to discuss requirements with National Grid”

Except the actions specified above, all previous actions had been completed.

3) Technical Sub Group Status Update

The TSG briefly discussed other industry working groups which were currently underway looking at areas such as Rate of Change of Frequency (RoCoF) protection and Engineering Recommendation G83. It was concluded that the recommendations from the Technical Subgroup group would have to be considered by such other groups. GS summarised the recent tranche of simulation work that National Grid has undertaken:

A full set of simulations have been performed for different levels of demand against high, medium and low wind conditions. These studies have been conducted against the Gone Green generation scenario for 2020. GS summarised the broad assumptions behind the latest modelling.

- Demand 2% / Hz for 12% of Demand
- Generation H=4 or 6 as appropriate
- 1800MW loss
- Response characteristics:
 - 1 second delay
 - Linear ramp to max volume
 - “Fast Response” used under some scenarios

In discussion over the interaction between inertia and load controllers on synchronous machines, CH confirmed that load control typically takes about 10 sec but he believes that RWE have developed a unit that operates faster, within 4 or 5 seconds. MC may be able to confirm details at a further meeting.

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The graphs show four parameters under each scenario: frequency responsive generator output, wind generation output, non responsive generator output and system frequency.

Low Wind Scenarios: GS explained that when the total demand is at the 35 GW level, or above, following the maximum infeed loss (1800MW) the system frequency drops slowly enough that responsive generators can ramp up their full primary response capability in time. Under the 30GW and 25GW scenarios the frequency drops far more quickly and the minimum is reached before the full frequency response has been supplied to the System, which has the effect of increasing the response requirement.

Medium Wind Scenarios: The elbow point is reached (where the minimum occurs before 10 seconds) at higher demand levels, i.e. about 35GW. Therefore where demand is around 30GW, on the steep part of the curve and more response has to be held to keep frequency above 49.2Hz.

High Wind Scenarios: The elbow point is reached at around 35 GW under a high wind situation. At a demand levels below this it is not possible to keep the system frequency above 49.2Hz for the 1,800MW infeed loss using conventional primary response alone..

The next set of simulations modelled asynchronous generation that could provide a faster response which in which the full primary response requirement would be delivered in 5 seconds.

DMcC stated that a five second response obligation is quite ambiguous and was concerned it may just delay the issue as it is not sustainable for the wind turbine. CH also commented that the simulation was 12.5% in 5 sec, which National Grid confirmed to be based on the known capability of current installations.

The Sub Group agreed that the timescales for implementation of such an obligation was key. It was suggested that the recent project at Whitlee was an example of the best response characteristics currently available.

Proportional governors preferred over df/dt .

GS explained that simulations need to be performed to examine a 1,320MW infeed loss This could drive response requirements as this loss needed to be contain to tighter criteria (0.5Hz vs 0.8Hz).

A 1400MW demand loss is the anticipated maximum for the future and this was also modelled. GS explained that this study shows that faster high frequency response will be needed. CH questioned whether in attempting to solve the low frequency situation, there is insufficient margin for high frequency events. GS responded that further consideration of the high frequency containment criteria is required.

Response erosion: GS explained that National Grid's set's it operational limits at 49.8Hz and 50.2Hz, and that procedures used to ensure these limits are adhered to mean that system frequency normally stays between 49.9Hz and 50.1Hz. Concerted control actions are taken outside this range. The normal operating range this needs to be taken into account when considering high and low frequency response as variations in starting frequency impact on the amount of frequency response required. National Grid needs to do some further investigation here to confirm that the draft proposals are robust.

To summarise, areas left for NGET to fully consider:

- 1320MW loss
- Demand loss
- Response erosion

Action: National Grid

TI was requested to post the slide pack on the web.

Action: TI

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The Sub Group discussed that generation plant, available in the medium/ near term, must be able to feasibly achieve any obligations that may be proposed. Consequently it was suggested that National Grid compose and send a questionnaire to wind turbine and HVDC suppliers to determine whether their plant can meet the proposals. It was suggested that responses should be treated as anonymous.

SS commented that the commercial implications from the proposals must also be considered, as inherently the turbines would have to run constrained in order to provide such levels of fast response. The group concluded that even with today's obligations, machines have to be constrained and that the Frequency Response Working Group would have to conclude on this area. It was re-emphasised that the subgroup needed to focus on the technical element of the work. CH added that it would be useful to understand which way the market debate was going forward and DMcC added that decision had to be made in the near future as suppliers are in the process of making critical design decisions.

National Grid to draft and send out questionnaire to turbine and HVDC suppliers.

Action: TI

4) Draft Technical Sub Group Report

GS introduced the first draft of the Technical Sub Group Report, which National Grid has worked up an initial draft for. It was explained that Sub Group members views need to be incorporated throughout the report.

Ultimately the report will be circulated around both the DCRP and GCRP for information although it will need to be officially presented to the Frequency Response Working Group.

The Sub Group agreed that the report should lay out its findings on a chronological basis to show the evaluation of the solution and to illustrate why other options were considered and subsequently discounted.

Endeavours need to be made to include a cost benefit analysis for any proposals where it is feasible to do so.

A Sub Group member commented that it would be useful if the report contained a quantitative assessment on how much more response would be required if there was a delay in the implementation of the proposals.

5) Next steps and timescales

- European Network Codes: Action: TI speak to someone in drafting team. It was agreed it was desirable to dismiss the concept of SI or df/dt trigger so careful wording may be wise.
- National Grid to complete a further iteration of the Report to include latest modelling and comments from the Sub Group. To be circulated at least a week before the next meeting.

Action: NGET

- Next meeting to be held prior to the next Frequency Response WG meeting (11am on 12th September. TI to ask TSG members which of the following dates works best:
- 8th, 9th or prior to meeting on 12th. The meeting may take the form of a face to face or teleconference as appropriate.

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Appendix 1 – Working Group Attendance

Members Present:

Tom Ireland	TI	Working Group Chair
Graham Stein	GS	National Grid
Bjorn Andresen	BA	Siemens Wind Power
Stewart Whyte	SW	National Grid
Damien McCool	DM	EDP Renewables
Chris Hastings	CH	SSE
Sohnke Schierloh	SS	Enercon
Antony Johnson	AJ	National Grid

Members joining by teleconference call:

Peter Wibæk Christensen	PWC	Vestas
Francois Luciani	FL	EDF Energy

Apologies:

Peter Thomas	PT	Nordex
Alastair Frew	AF	Scottish Power
Martyn Cunningham	MCu	Scottish Power
Jytte Kaad Jenson	JKD	Vestas
Tony Lakin	TL	Turbopowersystems
Simon Lord	SL	First Hydro
Ken Lennon	KL	SP Power Systems
Joe Duddy	JD	Renewable Energy Systems
Mick Chowns	MCh	RWE Innogy
Steve Curtis	SC	National Grid
Alan Mason	AM	REpower