

## GC0035 & GC0079 Frequency Changes during Large Disturbances and their impact on the Total System.

### TERMS OF REFERENCE

#### Governance

1. The Frequency Changes during Large Disturbances and their impact on the Total System Workgroup was established by Grid Code Review Panel (GCRP) at the May 2012 GCRP meeting.
2. The Workgroup shall formally report to the GCRP and the DCRP.

#### Membership

3. The Workgroup shall comprise a suitable and appropriate cross-section of experience and expertise from across the industry, which shall include:

Name	Role	Representing
Mike Kay	Chair	Electricity North West
Scott Bannister	Technical Secretary	National Grid
Graham Stein	Member	National Grid
Julian Wayne	Authority Representative	Ofgem
Gareth Evans	Authority Representative	Ofgem
Adam Dyško	Technical Expert	University of Strathclyde
Michael Walbank	Member	Northern Power Grid (DNO)
Martin Lee	Member	SSEPD (DNO)
John Knott	Member	SP Energy Networks (DNO)
Andrew Hood	Member	Western Power Distribution (DNO)
Kevin Burt	Member	UK Power Networks (DNO)
Campbell McDonald/Jane McArdle	Member	SSE (Generator)
Joe Duddy	Member	RES (Generator)
Paul Newton	Member	EON (Generator)
John Turnbull	Member	EDF Energy (Generator)
Greg Middleton	Member	Deep Sea Electronics
John Ruddock	Member	Deep Sea Electronics
Alastair Martin	Member	Flexitricity

#### Meeting Administration

4. The frequency of Workgroup meetings shall be defined as necessary by the Workgroup chair to meet the scope and objectives of the work being undertaken at that time.
5. National Grid will provide technical secretary resource to the Workgroup and handle administrative arrangements such as venue, agenda and minutes.
6. The Workgroup will have a dedicated section on the National Grid website to enable information such as minutes, papers and presentations to be available to a wider audience.

7. The Workgroup will, as part of the first stage of work (Phase 1 under GC0035):
- Review the expected behaviour of Total System when subject to frequency changes during large disturbances, with particular focus on the rate of change of frequency. Take into account the output of the Frequency Response Technical Sub-group and also recent experience of disturbances on the Total System.
  - Take account of relevant international practice and the approach taken in European Code development.
  - Research details of the RoCoF based protection settings applied to embedded generators of 5MW and greater rated capacity.
  - Investigate and quantify the risks to DNO networks and Users of desensitising RoCoF protection on embedded generators above 5MW and greater rated capacity. Develop proposals for consultation on any proposed changes drawing out the costs, benefits and risks of such a change to present to the GCRP and to DCRP members in July 2014. The proposed changes were approved by The Authority on 24<sup>th</sup> July 2014.
  - Develop a work plan including timescales and resource requirements for the next stage of work (Phase 2 under GC0079), to include:
    - Development of RoCoF withstand criteria for use in GB (as will be required by the EU Network Code Requirements for all Generators (ref 8.1(b)));
    - Investigating and quantifying the risks to DNO networks and Users of desensitising RoCoF based protection on embedded generators of rated capacity of less than 5MW;
    - Investigating the characteristics of popular/likely inverter technology deployed, particularly in relation to RoCoF withstand capability and island stability;
    - Assessing or modelling the interaction of multiple generators in a DNO power island;
    - Researching the characteristics (numbers/types etc) of embedded generation of less than 5MW rated capacity including likely RoCoF withstand capabilities;
    - Analyse the merit of retrospective application of RoCoF criteria to existing embedded generation of less than 5MW (including comparison with similar programmes in Europe);
    - Consideration of issues relating to the continuing use of Vector Shift techniques; and
    - Develop proposals for consultation on any proposed changes drawing out the costs, benefits and risk of such a change to present to the March 2015 GCRP and DCRP. If applicable, this should include a proposal of where implementation costs should fall and the most appropriate workgroup for this issue to sit with;
    - Engage with the Health and Safety Executive (HSE) and all affected parties considering the different stakeholders that will be impacted by changes to embedded generation with rated capacity of less than 5MW

## Deliverables

8. The Workgroup will provide updates and a Workgroup Report to the Grid Code Review Panel and Distribution Code Review Panel which will:
  - Detail the findings of the Workgroup;
  - Draft, prioritise and recommend changes to the Grid Code, Distribution Code and associated documents in order to implement the findings of the Workgroup; and
  - Highlight any consequential changes which are or may be required,

## Timescales

9. Workgroup timescales are specified in the Scope section of this document.
10. If for any reason the Workgroup is in existence for more than one year, there is a responsibility for the Workgroup to produce a yearly update report, including but not limited to; current progress, reasons for any delays, next steps and likely conclusion dates.