

Frequency Changes During Large Disturbances

23 October 2012, Warrington

In attendance:

Mike Kay, ENWL
 Joe Duddy, RES
 Martin Lee, SSE
 Joe Helm, NPG
 John Knott, SP (Manweb)
 Graham Stein, NG
 Eleanor Brogden, NG
 Geoff Ray, NG
 William Hung, NG

Absent:

Mick Chowns, RWE
 Paul Newton, EON
 Gareth Evans, Ofgem
 Shijun Yi, Ofgem

1.	Housekeeping
2.	<p>Introductions</p> <p>Working Group members introduced themselves and stated which parties they represented.</p>
3.	<p>Discussion</p> <p>It was noted that the Terms of Reference as currently drafted can be interpreted widely & that this may need to be addressed.</p> <p>In review the ToR, appropriate reference and regard would need to be given to international experience, as it was clear that this was not an issue peculiar to GB.</p> <p>The trigger for the convening of this subgroup, was the work of the Frequency Response Working Group's Technical Sub Group, in which simulations indicated the potential for the rate of change of frequency to be higher than commonly adopted settings for Loss of Mains protection.</p> <p>The group noted the impact of the increased largest infeed loss change to the SQSS from April 2014 to 1,800MW and the implications for frequency response & inertia. Recent experiences were indicative of a potentially more pressing issue. Reported RoCoF triggered losses reported were suspected to understate the volume of generation lost.</p>
	<p>William Hung presented to the group.</p> <p>Points covered:</p> <ol style="list-style-type: none"> 1. Recent losses of the French interconnector had had a more significant effect than anticipated. 2. Reported RoCoF losses from the DNOs for the two incidents (28 & 30 September) was 200MW & 130MW respectively. 3. The current RoCoF setting of 0.125Hz/second is lower than the values seen in some simulated conditions for an 1,800MW loss 4. It was noted that a significant volume of embedded generation with RoCoF is PV generation – question whether this would be pertinent as not generating at times of lowest inertia? 5. Further investigation required to establish the total volume of embedded generation

	<p>that uses RoCoF protection. It was noted that as it not a mandated methodology and there are no detailed records kept.</p> <p>6. Noting that G83 specifies when generation should trip, but not when it should not.</p>
	<p>Comparative concerns in Ireland were discussed.</p> <p>There are 0.5Hz/s ROCOF ride through requirements in the Eirgrid Grid Code (CC.7.3.1.1(d)) and in the ESB Networks Distribution Code (DCC9.9.7.1(i)) but no such requirements in the Northern Ireland codes.</p> <p>Eirgrid and SONI have proposed amended RoCoF settings of 1Hz in the Republic of Ireland and 2Hz in Northern Ireland respectively., After a proposed 400kV intertie has been built between the two it is proposed that the NI setting will revert to 1Hz. Conventional generators have expressed concerns about these proposed settings.</p> <p>Recent enquiries suggested that most wind turbine plant can ride through 2Hz/second and even up to 4Hz/second in some cases.</p>
	<p>ENTSOE are considering the 2Hz/second rating – MK noting that discussions commenced with 6Hz/second, & that ACER FG drafting leaves this detail to be determined nationally .</p>
	<p>Question - do we need LOM protection? Is RoCoF measurement an appropriate technique?</p> <ol style="list-style-type: none"> 1. With the advent of smart grids the network will behave in a radically different way. 2. It was considered whether it was feasible for Domestic PV settings to be changed if this was deemed appropriate. 3. Could MSC certification be changed to take account of RoCoF resilience – ie to link to G59 requirements? 4. If the group were to recommend a change to the RoCoF settings, would this mean that it would not be effective as an anti-islanding protection? 5. What information is available on alternative LoM protections? 6. What would be the consequences of moving to a 2Hz/second setting? 7. It was noted that the group needs to engage with affected parties over the possible need to change settings. 8. Reference also made to the consultation on G83.
7.	Terms of Reference
	<p>It was suggested that the group focus on the protection issues & that the questions of ancillary services to prevent or mitigate RoCoF protection operation could either come afterwards or be considered in another group.</p>

8.	<p>Actions</p> <p>NG to collate available information on the quantities and types of embedded generation in GB. MK to prompt ENA to forward historic information. More recent info to come from Ofgem.</p> <p>Further investigation could be done for recent incidents:</p> <ul style="list-style-type: none"> • WH to inform the group of the exact times of incidents. • DNO representatives to investigate data available on generation losses for the relevant periods. <p>Noting that at present:</p> <p>1. Network owners will not know what protection relay types are</p>	<p>WH MK</p> <p>WH (MK to prompt DNO responses)</p>
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	<p><i>currently installed as there is no requirement for generators to inform;</i></p> <p><i>2. There is no industry standard for the RoCoF algorithms and methodology. RoCoF figures calculated and used in studies are averaged over 500 milliseconds;</i></p> <p><i>3. The measuring periods used in RoCoF protection schemes are to mitigate the effect of a voltage vector shift as the relays are monitoring the waveform. Without the measuring period, the trip could be triggered when there is no actual frequency change;</i></p> <p><i>4. There is expected under reporting of tripped generation, but that the collated data should give us an indication of the ratio of known to unknown tripped generation. This might be capable of being worked into a methodology to assist analysis on future frequency incidents;</i></p> <p><i>5. There is known 3 minute trip & reinstatement time – this needs to be factored into the collated data, as generation may have tripped off, but may have reinstated before the point of data collection. Some' data will be based on 30 minute averages, whereas some will be as details as 5 second averages.</i></p>	
	NGET to review information available from the Feed in Tariff lists.	WH
	Review the group's requirement for additional technical assessment or information	MK/GS
9.	AOB	
	Proposed date for the next meeting, 28 November 2012.	

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