Minutes

Meeting name	Frequency changes during large system disturbances workgroup, phase 2 (GC0079)
Meeting number	29
Date	22 April 2015
Time	10.30 – 15.00
Location	Ofgem offices, 9 Millbank, London SW1P 3GE (teleconference option also)

Future meeting dates

Meeting Number	Date
30	21st May 2015
31	24th June 2015

1) Introduction & apologies

GS welcomed the group and was acting chair in the absence of MK.

2) Review of previous minutes & actions from meeting 28

The workgroup acknowledged some minor comments and agreed that the minutes from meeting 28 could be approved.

The group discussed the open actions. Please also see the action log for updates to individual actions. Some more detailed commentary is listed below.

Re action #72, GS has looked at information from Dave Spillett and there are a number of obvious new sites (e.g. new solar sites). For example, in the WPD SW area, 51 out of 84 sites are new solar. Across the whole WPD area this is closer to 100 new solar sites which helps to explain the difference. However it's not possible to definitively determine which other sites are connected before the phase 1 assessment was completed. It would be useful to get a site connection date from each DNO, if feasible, to establish this. ML questioned the benefit of doing this. JW noted that his original question was to get an explanation for the significant difference in the number of generators in the phase 1 category as reported in the Phase 1 report to the Authority as compared to the number subsequently being reported for implementation monitoring. JW added that if these are all found to be new sites then this is fine but if accounting errors then these need to be addressed prior to phase 2 data being produced. ML noted that the data SHEPD provided for phase 1 was from 2010 due to a lack of automated system, which they now have in place, and so there would actually be several years of new connections to consider. JW was concerned by this fact and reiterated his concern that if we cannot accurately gather data for phase 1, which covers hundreds of generators, then the error in phase 2 data will be even greater as it could potentially contain tens or hundreds of thousands of generators and Ofgem will have concerns of the data accuracy in the phase 2 report to Authority. GE

also expressed concern that we don't have this data more readily available, particularly because the impact is assessed against these figures. GS suggested that there is likely to be an element of error in the data but also significant increase in new generation. JW noted the greater monetary impact for phase 2. GS added that KB's dataset will give us a good idea of impacted sites and that we can make different assumptions

GE suggested that it would be worth establishing how each DNO records data on connections to their respective networks. ML explained that for >1MW SHEPD has a very accurate register for where they are and the type of connectivity. However there is no data on the connection dates. ML added that if pre-2010 data, it would be a major task to go through an old paperwork system but that from August 2010 onwards a new data system can do this and provide a connection date. CM suggested it is important to take lessons learned from phase 1 into phase 2.

Action GS and DNO reps: To agree the information required re Phase 1 generator data to better quantify the potential uncertainty in Phase 2 data.

Re action #88, SB noted that the action may not have been captured in sufficient detail. MW advised that he viewed the action as asking the NPG protection engineers if they had a personal preference for the type of loss of mains protection used at sites (i.e. did they prefer RoCoF or did they prefer vector shift over inter-trips and so on). MW spoke to a senior NPG engineer who advised that they are officially silent and would refer customers to G59 or G83 and install what the customer requests. As a personal preference, they prefer RoCoF over vector shift and inter-trip over RoCoF. KB noted that in an interview with DEIF recently, their experience suggests that >90% used vector shift. JR added that at LV, RoCoF is too sensitive and that apparent frequency changes seen on the HV network are far greater. There is much more nuisance tripping on the LV network. In fact, Megacon (a G59 protection relay manufacturer) ran a test and established that there were ~200 false trips in a week, every week. JR added that G59 recommended vector shift protection setting is ~6 degrees and that this would be equivalent to a significant RoCoF value. ML added that it is actually the undervoltage or other voltage effects associated with long clearance times that are the reason for the trips.

Re action #97, KB provided a verbal update. He has datasets for 3 of the 6 DNOs on the workgroup (ENW, NPG & SHEPD). This was considered to be sufficiently representative. Only the ENW dataset allows projects to be clearly related to nodes. The group noted the Week 24 dataset for the >1MW sites and the FiT register for the <1MW sites whilst MW also noted the LTDS data which contains data on what is connected to each DNO at 11kV and is produced annually as a licence obligation. MW also highlighted the data that is provided to the ENA annually. ML noted that different data is held in different forms for different purposes. GS suggested that we draw a line under this and draw general conclusions from the data we have. CM suggested that there is a real need to get this data right. GE echoed this view and highlighted his concern that this data is so difficult to obtain. CM added that it is hard to justify any recommendations made if we do not have accurate data. GS added that KB has been asked to draw together some general conclusions and he's doing that. KB added that he would be reluctant to produce the report if he didn't feel the data was representative.

3) Phase 1 update

GS noted that updated figures would be circulated prior to the next DCRP meeting in May. Our next workgroup meeting is before the next DCRP meeting so we can discuss the latest update then. GS asked if anyone had anything to add regarding the implementation of phase 1 changes. ML advised that he was currently contacting all generators in the SHEPD network area as he had received only limited responses to date. However, this method is getting a greater response and so far 36 generators have agreed to make changes (with 7 already making the changes and 5 not needing to as they had vector shift or inter-trip loss of mains protection). Whilst this approach seems to be returning better results, there are still a lot of generators who have not been contactable.

4) Phase 2 update

4a) Ecofys

In advance of KB's update, GS asked if KB could summarise what Ecofys has left to do and /or anything they need help with.

KB noted that Ecofys was originally aiming for early April for completion of the final report. However, it was felt that it would be valuable to have a direct interaction with protection experts (for which KB has interviews scheduled in the coming two weeks) and the stakeholder workshop was particularly useful for this. Comments on the latest version of the report were received before Easter and these have largely been processed but did raise some additional questions. KB noted that many LV connected projects have separate anti-islanding (i.e. G59) protection and it is only really residential sites that do not. This is an important point although >90% use vector shift protection. AD added that it's useful to see that RoCoF is not used much and thus there may not be a big impact, which will affect our recommendation. GS added that we need to know the total population such that we can determine the number of affected sites (i.e. 10%). CM added that we need to actually find them too. KB advises that he will have a final version of the report by 11 May such that it can be discussed at the next workgroup meeting on the 21 May.

Action KB: Prepare final report and circulate to workgroup by 11 May.

4b) University of Strathclyde (UoS)

AD provided an update on his research since the last meeting. Please see his slides on the workgroup website for reference.

Re WP1, he gave a brief update as the 4 additional inverters have been ordered and are due to arrive within 2 weeks. AD hopes to get new test data for the next meeting. AD added that this will be in addition to the Fronius inverter that is already installed. GM noted that 5 is quite representative.

Re WP2, AD advised that the most popular grouping combinations were: Synchronous; PV; PV & Synchronous; DFIG & Synchronous; PV & Synchronous & DFIG. He confirmed the 4 setting options agreed would be: 0.13 Hzs^{-1} (no time delay); 0.2 Hzs^{-1} (no time delay); 0.5 Hzs^{-1} (0.5s time delay) and 1.0 Hzs^{-1} (0.5s time delay).

AD then discussed each type in turn and the combinations, explaining the stability of each and whether a non-detection zone (NDZ) could be seen. The workgroup discussed the approach of studying the most stable scenario as this was essentially the worst case situation for islanding. The most stable scenario was agreed to be fixed power with voltage control generation mode. JR mentioned the popularity of the PQ mode but it was agreed that this was less stable and so would be covered by the current approach. JD added that we identified this as the worst case for phase 1 and he couldn't see any reason to treat phase 2 differently in that respect. GM suggested that AD could do a spot check for other scenarios to confirm.

AD noted that with groups, he made an interesting observation which was that he saw high RoCoF values but that they were oscillatory and so pass through zero. Therefore the only way RoCoF is detected in these cases is over/under frequency or over/under voltage. JD noted that this work is identifying NDZs and it is the next phase of AD's work that is looking closer at the probability of those NDZs occurring and lasting for an unacceptable duration.

Re WP3, risk assessment calculation, AD noted that his DG register analysis was from data received from WPD, ENW and UKPN only. He asked the workgroup if they were happy that this was representative of GB. AD noted that the dominant groupings appear to be broadly the same for each of the three DNOs. JW questioned this as there is a lack of Scotland DNO data, which may well have different dominant groupings given that it would likely have less PV than southern DNO areas. GS suggested that DNOs could look at AD's data and say whether they believe it is representative.

AD advised that the next steps were to complete hardware testing when the inverters arrived; then complete NDZ assessment. He expects this to be at least 1 month.

Action MW: To establish if he can provide primary substation data for AD (installed capacity for each technology)

Action MW: To provide to JW and GE previous communications to DECC / Ofgem that identify DNO concerns around potential detrimental impact of people connecting but not complying with the G83 notification procedure.

5) Date of next meeting

GS noted that the next meeting (21 May 2015) will have a fairly full agenda and so definitely warrants a face-to-face meeting in Manchester.

6) AOB

CM asked for confirmation that the Workgroup's output was consistent with the industries program for RfG Implementation.

Action GS: To confirm with GC0048 chair that workgroup output is consistent with RfG implementation program

GS noted that National Grid currently manages the system to a RoCoF level of 0.125 Hz/s and takes actions to manage the system to this (curtailing largest loss or synchronising additional generation).

GS added that on Saturday 18 April 2015 the TSO was taking actions over the 3B cardinal point, signalling that operational constraints were no longer confined to overnight periods.

JD informed the workgroup of an IET breakfast event on synthetic inertia in Birmingham on 14 May 2015. MK is the contact for this. The discussion is due to be led by Vandad Hamidi and University of Manchester. More details here https://localevents.theiet.org/714dec

7) Summary of actions / next steps

WG Member	Action No.	Action	Due
GS & DNO reps	106	To agree the information required re Phase 1 generators data to better quantify the potential uncertainty in Phase 2 data	21/5/15
KB	107	Prepare final report and circulate to workgroup by 11 May	11/5/15
MW	108	To establish if he can provide primary substation data for AD (installed capacity for each technology)	21/5/15
MW	109	To provide to JW and GE previous communications to DECC / Ofgem that identify DNO concerns around potential detrimental impact of people connecting but not complying with the G83 notification procedure	21/5/15
GS	110	To confirm with GC0048 chair that workgroup output is consistent with RfG implementation program	21/5/15
IK / ML	111	Provide Scottish DG data to AD on primary substations (installed capacity for each technology) to ensure data used by AD is representative of the whole of GB	24/6/15

Attendees		
Name	**Initials**	**Company**
Graham Stein	GS	National Grid (Alternative chair)
Scott Bannister	SB	National Grid (Technical Secretary)
Adam Dyśko	AD	Uni. Strathclyde
Karsten Burges (T-con)	KB	Ecofys
Gareth Evans	GE	Ofgem
Julian Wayne	JW	Ofgem
Joe Duddy	JD	RES
Mick Walbank	MW	Northern Powergrid
Greg Middleton & John Ruddock	GM / JR	Deep Sea Electronics
Martin Lee	ML	SSEPD
Ioannis Koutsokeras	IK	SP Energy Networks
Jacob Allinson	JA	RWE
Campbell McDonald	CM	SSE Generation
Ken Morton	KM	HSE
Miguel Bernardo	MB	UKPN
Apologies		
Mike Kay	MK	ENW (Chair)
Alastair Martin	AM	Flexitricity
Paul Newton	PN	EON
John Turnbull	JT	EDF Energy
Michael Doering	MD	Ecofys
Lorna Short / Mick Chowns	LS / MC	RWE
Sam Turner	ST	Northern Powergrid
Andy Hood	AH	WPD
Kevin Burt	KEB	UKPN