Minutes

Meeting name	GC0048: Joint GCRP/DCRP Workgroup on National Application of RfG
Meeting number	12
Date of meeting	18 August 2015
Time	10.00 – 15:00
Location	**National Grid House, Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA**

Attendees

SD	Steve Davies	DECC
AF	Alastair Frew	Scottish Power
GG	Garth Graham	SSE
MB	Mick Barlow	S&C
PT	Peter Thomas	Nordex
SP	Stephen Perry	Ofgem
CW	Chris Whitworth	AMPS
JAT	Jawad Al Tayie	AMPS
JN	John Norbury	RWE
JD	Joe Duddy	RES
PJ	Philip Jenner	Horizon
CM	Campbell McDonald	SSE
DS	David Spillett	ENA
IP	Ian Pashley	NGET – Chair
MK	Mike Kay	ENA
SC	Sarah Carter	Ricardo AEA
RJW	Richard Woodward	NGET – Tech. Secretary
AJ	Antony Johnson	NGET
BM	Ben Marshall	NGET – Presenter
CR	Celine Reddin	NGET – Presenter

1 Introductions IP

IP welcomed attendees to the workgroup, introducing himself as chair in Rob Wilson's absence. The workgroup were also introduced to SP, who will be replacing Rupika Madhura on GC0048 and will also be attending the DCC workgroup (GC0091).

RJW stated that he would be technical secretary in the absence of SLK. The challenge of being both technical secretary and NGET representative was noted.

IP outlined the objectives for the meeting:

- Accept the updated code-mapping template
- Progress the banding discussion
- Review/accept the proposed project plan and package of implementation mods

2 Stakeholder Representation IP

IP raised the standing agenda item on effective representation, particularly from manufacturers and smaller parties. Absence of Solar PV industry members was noted, and NGET will continue to chase manufacturer contacts which it has been given.

3 Review of Actions & Approval of Minutes RJW

RJW queried whether the workgroup had any changes for the circulated minutes from meeting 11. He gave details of a slight tracked-change error that NGET had spotted on paragraph 18, which will be corrected.

CM raised a query on para 20, which in one version suggested small-medium generators are unable to provide Frequency Response. AJ clarified that the minutes should quote a codified or *mandatory* requirement to provide FR, and who the requirements apply to. He confirmed with RJW that this would be corrected. CM clarified his remarks needed to be addressed broadly speaking, given the market has not historically been supportive of small-medium providers. IP confirmed this would be noted and discussed further in the banding item.

No other corrections were forthcoming, so RJW will update and publish the minutes accordingly.

Actions

AJ gave an update on action 13 regarding alerting those generators with pending contracts about RfG and the criteria for new and existing. He advised that it was planned to raise this issue at the Customer Seminars in October with a follow up letter to all Customers. He agreed this action could be closed once the seminars had taken place. GG queried whether NGET would write out to all generators on RfG, and their status as new/existing. AJ and RJW confirmed this would again be addressed after the seminars. SD said that work was on-going to arrange the stakeholder meeting on future compliance regimes (action 25). More details would follow.

4 Code Mapping Table AJ

AJ recapped the output of the two-day code mapping workshop in July, explaining that the clauses on compliance had been deferred until after the session for NGET to complete. AJ confirmed the mapping of compliance clauses had now been completed and circulated along with the meeting materials for review. RJW confirmed this was also on the GC0048 web page.

GG raised concern regarding the possibility permitted in RfG for third parties to be procured to discharge Relevant System Operator compliance testing, either during commissioning or retesting during operations; noting that there is a risk that they could charge excessive sums for the work and asking how this would be guarded against. AJ and MK shared the view that GB network operators do not employ this method today, and are unlikely to do so in future as this would breach licence obligations on charging. CM queried the resource requirement on behalf of Relevant SOs to discharge testing, particularly if the banding thresholds were lowered and additional generation required more substantial testing. RJW explained this had been discussed internally at NGET, and that this wasn't expected to be a problem, but obviously couldn't comment for DNOs where MK and SC confirmed the majority of compliance testing is type-testing.MK had already provided estimates on this resource requirement in a paper earlier in the year. GG suggested to give assurance to generators that costs would be managed, DECC/Ofgem should provide guidance on this clause. [ACTION - SD and SP agreed to respond on this in September].

JN asked whether it was clear whether compliance would be undertaken by TSO or DNO, given the banding thresholds potentially cut across capacity levels. AJ and MK agreed that your connection to TSO or DNO network would dictate who conducts your compliance testing. AJ thought there may be some ambiguity of Type D embedded however. CM requested a clear split of responsibility on compliance testing, and cost. MK said that the DNOs had produced an estimate of DNO resources a couple of years ago based on RIIO ED1 business plans, and the then assumed GB Banding thresholds. MK said that this could be repeated as part of the overall cost benefit analysis associated with banding. MK also said that the detailed G Code/D Code drafting for Type D would need to resolve any confusion on responsibility for compliance assessment etc., although the default position must always be that it is the responsibility of the network operator to which the generator is connected.

RJW and SC also agreed to update the mapping table sheet for any DECC/Ofgem compliance-related responsibilities, and log clauses subject to D-Code mods 8 and 9. [ACTION – RJW/SC]

5 RfG Banding Thresholds RJW and BM

RJW summarised his latest FES presentation, giving another view of future installed generation capacity under the four scenarios. The data has been formed into capacity by each prospective RfG Type band. IP welcomed BM to the meeting to present System Operability impacts based on the FES data.

RJW focused the workgroup on what it thought were any outstanding data requirements, and that with the code entering into force in Q1 2016, there was now time pressure on this topic which may not have previously been noted.

In relation to a discussion/action from meeting 11, RJW and BM clarified the FES assessment of interconnectors for Frequency Response. Whilst they were considered 'in merit' (or commercially available for Response) at system pinch points such a Summer Minimums, the flow in all interconnectors is considered neutral (i.e. 0MW) - except the Irish interconnectors which are assumed to export from GB to Ireland. During all other times, the flow of the interconnectors would reflect market price differentials. RJW explained that due to the commercial sensitivities around third party data, the FES classification of 'in or out' of merit for all potential providers (including interconnectors) could not be shared external to the NGET FES team.

RJW presented projected capacities of distributed generation (DG) from FES, profiled by RfG banding levels as currently quoted in the code. MK queried the sizeable volume of 'micro generation' as quoted in the presentation (confirmed to be sub-1MW by RJW) and raised concerns that it may be double counting the Type A (800W-1MW) capacity. BM was of the opinion it wasn't double counting, but for clarity RJW removed the 'micro generation' category from the chart whilst he presented the slides. MK suggested that an impending study by Ecofys for the GC0079 ROCOF workgroup may shed more light on levels of existing DG [ACTION – RJW/MK]. RJW and BM highlighted the high proportion of Type A generation, in comparison to other bands of DG, the majority of which is Solar PV. BM would later focus on the operability challenges this causes.

RJW went on to show how the Distributed Generation capacity compared when Transmission-connected generation was factored in ('Type D' Transmission (Tx) gen made up the largest proportion) for the NP and CP FES, noting that around a third of the Tx generation was wind capacity which would be greatly affected by load scaling. Others remarked that this also assumed everything projected is built, which is unlikely given subsidy changes and investment challenges etc. which emerged shortly after FES 2015 was published.

JN suggested that the installed capacity data needed to be put in context, for example wind farm scaling and solar unavailability at peaks or minimums against system demand. IP noted the importance of achieving clarity in the charts; what they show, and clearly setting out caveats and assumptions. RJW noted that tweaks needed to be made to the data, but that workgroup feedback was important to get this right for any banding CBA.CM asked when the workgroup would reach agreement on what data to use to make the case to the Authority, and outline the many assumptions. IP set the challenge to the workgroup to achieve this for today's meeting, but noted that it was likely that September was a more realistic target.

BM then commenced his presentation discussing the operability challenges caused by the rapid proliferation of DG (especially Solar PV), and diminished capacity of thermal synchronous plant. He focused particularly on summer minimums, using the FES data for 'Consumer Power' to explain what generation would be on the system particularly during Summer Minimum periods. The group discussed topics such as inertia, the availability of nuclear plant, and the levels of required Frequency Response by the NETSO from the variety of various potential providers (mandatory or otherwise).

JN and MB raised the point on time horizons, given the presented data stretched to 2035. There was concern again that accurate predictability was more difficult the further out you go. AF and JN commented that a swift and significant political change, such as changes to subsidy support, could immediately derail the accuracy of the FES. MB's view was that a five year period had been agreed, but RJW confirmed that this discussion was still on-going and its progress would be brought up later. JN stated a preference for banding to reflect short-term needs, being revisited every three to five years for example with grandfathering applied to existing generation. BM actually believed that taking a short-term approach could bolster the case for retrospectivity being considered in subsequent banding changes, as the system conditions are likely to deteriorate.

Significant discussion was had on the market for Frequency Response [given its link to Type C band setting]. IP sought to clarify the debate over technical capability versus the market interaction. GG also discussed that even Tx gen (Type D) may not be able to cover the required response requirement, given availability and commercial issues. Given the impact of 'invisible' (to NETSO) embedded solar at summer minimums, there was a good chance larger generators would not have the flexibility to support, and they could be priced out of merit so not even running. Common opinion was that the B/C boundary was critical due to the Type C requirement for generator Frequency Response; AF queried how low should the B/C

boundary go? GG urged caution on potentially introducing onerous banding levels in GB which could make developing and operating plant less competitive here than in the wider EU.

BM continued his operability presentation, trying to explain how RfG could mitigate the challenges expected. He noted that there were some blunt messages and welcomed discussion on them. He noted impacts on loss of infeed tolerance, and noted the impact of reducing inertia on the ability of the system to manage these events. JD queried what was being done to procure inertia from elsewhere, including synthetic inertia; it was generally accepted that more information on this market was needed. CM questioned the current operating limit. BM noted the historic Rate of Change of Frequency (RoCoF) was set to $0.125Hzs^{-1,}$ though this was in the process of being revised under existing industry workgroups CM noted that GC0035 was based on out of date data - MK suggested that the data was up to date at the time of analysis and when submitted to the Authority for decision, but that it was clearly out of date three years on with the very rapid growth of Small Power stations in that time.]

AF asked what levels of generation had been assumed as responsive. BM confirmed TX, DG where contracts exist, Demand Side Response (i.e. aggregation of a portfolio). BM also mentioned the need for de-load, which JN remarked may be difficult given the position of DG. BM confirmed lack of visibility of the DG made this tricky, but he and MB reiterated the part that DSR had to play.

BM moved on to say that enhanced frequency response would be required. JD noted that the table on the slide is based on a 2 second delay in providing response. He noted that RfG allows this delay to be defined by the TSO to be lower than this for non-synchronous power generating modules, which could mitigate the issue somewhat. JD noted that the slide could be seen as 'unduly pessimistic'.

BM presented a slide on solar growth, with significant increases predicted in future, after the already rapid growth in the last few years. BM discussed that estimates for the current year under FES may have been underestimated, reviewing a sensitivity provided by the FES team. JD questioned the data source for Solar. BM stated it was based on DECC data, to which JD noted that DECC data may have a time lag, so the actual capacity might be higher. Some debate ensued regarding individual capacities.

GG noted the PV volume increase in the last two years, highlighting that similar growth could happen within the 'two years after entry into force' of RfG. AJ noted the fundamental market issue of not having access to smaller plant in the Balancing Mechanism, such that larger players (who can provide Ancillary Services) were the first to be curtailed ahead of non-BM participants, noting that the market would require correction to address this issue. AF again queried what the total ‘national’ demand figure was to go alongside this, but BM believed this was almost impossible to do, given the volume of metering data needed; which was subject to BSC reconciliation processes.

CM asked what focus should be on I/Cs, noting the focus was on embedded generators at the moment. He pleaded for a level playing field. BM reiterated the commercial inclination of I/Cs (e.g. power prices), but that other ENCs had a part to play (e.g. HVDC) on codifying their support.

BM went on to talk about the part nuclear generation has to play assisting system operability. However whilst there is a codified (Grid Code) obligation for them to provide support, operational inflexibility and commercial issues preclude their support. GG also mentioned that by the end of the FES period, a lot of the existing fleet may no longer be running.

IP queried the part storage had to play, with GG suggesting that incentives and resulting consumer behaviour will dictate proliferation or otherwise of these technologies. Potentially storage could move the problem to another time of day (from early PM to late PM). A brief discussion was had on Pump Storage operating at convenient times to mitigate the issues of minimum demand peaks and that modern PHES can provide frequency response while pumping through modulation of variable speed pumps. The nature of DSR was discussed, again potentially determined by consumer behaviour. Passive DSR, from white goods, could provide suitable options, and the roll-out of smart meters may also assist, rather than just solving minimum demand challenges by generator de-load. JD noted that de-loading PV generators to facilitate traditional balancing tools may be an unsuitable way to meet the challenges projected for minimum demand under Consumer Power scenario 2035 conditions. BM agreed that new tools would be required. IP queried whether FES considered DSR and storage, as MK and GG reiterated that the time horizon nominated by the workgroup would be a factor in how much of this support was available (i.e. longer time horizon likely to make storage a more viable option).

JD summarised the discussion on response markets by saying that if the market was there, the providers will follow. In particular, the PV data presented shows that domestic consumers react quickly and in large

volume to clear incentives.

BM clarified his three proposed options to mitigating the system operability challenges discussed with the workgroup. Option 1 is bolstering the emergency provisions in the Grid Code to permit the NETSO to compel DNOs to shed DG off the network. JN and IP believed that by presenting this in some kind of commercial context instead, it might actually offer opportunities for DG to be rewarded for participating in energy balancing. In general the workgroup considered the use of emergency instructions to be a little draconian.

Option 2 proposed a drastic lowering of the RfG banding thresholds, with Type B potentially starting lower than Type A. BM said that the proposed thresholds had been calculated by RJW but the methodology or reasoning for these particular levels (500kW – 1MW) was not described. This led to extensive code drafting debate as to whether B/C thresholds <1MW are allowed, and the implications on implementation. The initial workgroup view was this is unlikely to be permitted legally. [ACTION – SD to clarify how far down the banding thresholds could go]. BM however felt this would lead to a greater variety of responsive and competitive options to assist the NETSO.

Again reservations were raised over imposing onerous operational and cost-intensive requirements on Small-Medium scale generators. The LEEMPS debate was brought up again, with CM and JD in particular challenging NGET to explain why the levels of response-capable LEEMPS are not currently instructed (i.e. stranded). Whilst MK believed some had derogations for this requirement, JN believed the risk of stranding would be replicated in RfG if the banding was incorrectly set. [ACTION – RJW to understand levels of potentially available LEEMPS response, and any on-going work to access them].

Option 3 presented a balanced view between options 1 and 2 and evolution of FR markets. BM reiterated that Option 1 is a last resort option, so should not be considered as viable, unless the bandings cause unforeseen consequences in future. CM challenged BM to produce the same options with data from the other FES scenarios (only Consumer Power was illustrated). CM believed that Consumer Power paints the worst possible case, though BM countered that all four scenarios reach the same concerning outcome, just at different rates. [ACTION – BM to reproduce his option slides based on all four FES scenarios].

IP sought to conclude the banding presentation by challenging the workgroup to work collaboratively, rather than put the sole burden of providing supporting data on NGET. This meant being constructive when feeding back on presented information, but also supporting NGET in sourcing alternatives if appropriate.

Banding Data Time Horizon

RJW presented a table of responses from the survey responses received to date. The preference of the workgroup submissions so far was 5 years, but some members had stated as far out as 10 years (including NGET). RJW invited attendees to respond if they hadn't already, including changing their perspectives if the presentations had had an impact, and would close it off at the end of August. He would summarise in a report, including justifications, in September.

6 Project Plan Update CR

CR presented the updated plan on a page, and mod package Gantt chart following the code mapping workshop and post-work by AJ and RJW. Seven mods had been identified (one additional mod for 'System Management'), with two additionally proposed by SC for D-Code changes. Timing estimates had been provided, along with proposed start dates following any necessary pre-work. GG challenged NGET to be able to transpose each RfG clause into respective mod, and RJW suggested this was possible in the current mapping spreadsheet. He suggested producing a view of which RfG clauses went into each mod to assist with setting their scope [ACTION – RJW to extract code mapping exercise into mod-specific reports].

There was some discussion on existing Grid Code mods working on RfG topics. RJW confirmed that GC0062 (Fault Ride Through) had done a lot of work, but would be finishing its ToR without finalising a solution for RfG out of choice. It had however, done a lot of the leg work needed and would provide this to GC0048 to consider. For GC0079 (RoCoF), MK (chair) said their ToR, although currently under review, have had a specific action for some time to develop RoCoF withstand requirements as required by the RfG. MK asked NG to ensure that all relevant WG ToRs were summarised for GC0048 to confirm that all necessary development work is underway. [ACTION Rob Wilson].

MK noted that the overall timescale for GC0048 seems to have been recast this into a two year programme. This is one year longer than it was last month. Other WG members agreed with MK that the WG should try to look to move it back as far as possible to 12 months overall, given Users need for clarity on requirements as far in advance of the implementation deadline as possible.

There was a discussion on the mod dependencies – RJW reiterated that banding was a precursor to the technical parameter setting mods. CM raised a point regarding coherence across existing Grid Code workgroups and RfG. Debate covered the need to ensure that linkages were drawn as appropriate; whilst ensuring rights and obligations were clear across (a) RfG 'new' plant and (b) Grid Code 'from a point in the future' plant.

MK queried when the banding modification was submitted, what would happen in respect of any legal text changes as it was not obvious that it would be appropriate to put just banding text into the current Grid Code. In which case, how would Ofgem cement any judgement or decision on the proposal? MK asked SP to consider if this was a real concern. [ACTION SP]

GG mentioned the opportunity for multiple solutions for banding if Open Governance (GC0086) was implemented in time, though MK probably thought this was acceptable anyway given current interpretation of the ability to generate alternative modification proposals. RJW believed this may cause confusion at workgroups, but IP believed that if there were two *substantiated* banding proposals on the table, that work on the other mods could commence based on those. Legal text changes for banding could be considered at a later date.

CW summarised discussions he'd had with Julian Rudd and SP on banding setting in other EU member states. He supported GG's earlier comment about GB making onerous banding levels in comparison to elsewhere, and the potential impact commercially this would cause to multi-national developers. [ACTION – SP to report back on member state progress setting banding; GG/others to summarise outputs of ENTSO-E implementation meeting on banding topic].

7 Risk Register — RJW

No significant developments since the last meeting. RJW confirmed with SD and SP that names assigned to Ofgem actions should be changed [ACTION – RJW/SD/SP].

8 DECC/Ofgem Steering Group Reporting — All

No meeting in August.

10 AOB / Next Meeting — All

AOB

SC gave an update on the re-drafting of D-Code documents. G98/1 draft would be circulated for review imminently. G/83 was being condensed for RfG and would also be circulated with tables clarifying changes to existing clauses, and anything new. G99 was dependant on the GC0048 sub-mods discussed above. It will be redrafted as they progress.

IP concluded the meeting, confirming actions with RJW, and thanked attendees for their participation.

Next Meeting:

The next RfG Workgroup meeting will take place on **Friday 25 September** at **National Grid House, Warwick**. Please also find attached below all future dates arranged for this workgroup for 2015:

(Calendar invites have been sent out for these dates, please contact Grid.Code@nationalgrid.com if you haven't received them)

- Wednesday 28 October
- Thursday 19 November
- Thursday 17 December