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RfG Banding

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Summary of GC0048 banding discussions to date

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- NGET have presented on:
  - ❑ Future generation profiles (e.g. FES, ED1)
  - ❑ The resulting impact of the above on System Operability
  - ❑ The market mechanisms currently in play for delivering commercial services, and future changes to these
  - ❑ How long into the future above data sources are valid for in a CBA

- NGET believe that RfG banding setting provides an opportunity to achieve greater generator support at a proportionate technical level to help mitigate significant system challenges

- The workgroup have continued to seek quantitative evidence on the above, raising concerns over the return on investment for costly new response requirements, whilst also querying the volume of existing providers not utilised by NGET

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A new approach on banding

■ As we've seen from the project plan - **time is now of the essence for banding!**

■ With WG consensus on banding still some way off, NGET propose the following approach:

1. List viable options for what the banding thresholds could be (provisional options shown in later slides)

2. Workgroup members lodge their preference on these via circulation (similar to the recent survey on banding data source duration)

3. One or two preferred options proceed for scoping via CBA, prepared by workgroup members ("owners")

4. Workgroup review, and if acceptable take on to industry consultation (Target = January 2016)

Is this the right way…?

If not this way, how else can we progress banding setting?

■ NGET lodge its preferred position formally via CBA, and the industry has the opportunity to do the same?

■ [Discussion]

Won't this potentially lead to an incorrect banding being set?

■ The approach we're taking only progresses the work for the CBA

■ Multiple banding options can be considered (albeit this increases the workload), and we still need to consult with industry and obtain NRA approval before levels are set

■ If GC0048 believe the associated CBA(s) do not endorse the banding levels preferred, then these will not be taken forward

Is this the right way?

This seems quite a drastic shift in approach, why the sudden urgency?

- **Risk to RfG implementation milestones**, for example start of technical parameter sub-workgroups in 2016

- Discussion at GC0048 meetings has not progressed GB banding for imminent conclusion (albeit understanding on the issues in play has improved)

- The supporting work for banding needs to be owned in a more collaborative manner. To date, NGET has taken the lead on proposing banding levels. Changing our approach now allows other stakeholders to get up to speed before decisions need to be made, particularly on cost data needed for a CBA

Is this the right way?

How is this approach (including the banding options) affected by market facilitation topics discussed at WG?

■ Each of the four options require market facilitation for generator service provision, in one form or another

■ NGET propose this to be managed in a separate dedicated work-stream to GC0048, in conjunction with NGET Commercial Services. This allows GC0048 to focus on agreeing how to implement the technical requirements in the code

■ Thorough assessment of existing LEEMPS response options, as well as resolving access to stranded assets, can also be considered as a reference point for RfG

Any other questions?

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Banding Options

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Background on the options

- The banding options have evolved from Ben Marshall's (NGET) SOF presentation at the August workgroup

- They provide a spectrum of options from high to low; each carry inherent risks for affected parties (or opportunities depending on your state of mind!)

- NGET has provided its position on each of the options proposed; GC0048 stakeholders are now encouraged to do the same

- The workgroup are also welcome to propose alternate options to those presented. Please note the limitations in the code, e.g. the ceiling levels drafted into the code (see next slide…)

Reminder of synchronous area banding levels (as per final version of code)

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Synchronous areas	Lower MW Limit for which a power generating module is Type B	Lower MW Limit from which a power generating module is Type C	Lower MW Limit from which a power generating module is Type D
Continental Europe	1 MW	50 MW	75 MW
Great Britain	1 MW	50 MW	75 MW
Nordic	1.5 MW	10 MW	30 MW
Ireland and Northern Ireland	0.1 MW	5 MW	10 MW
Baltic	0.5 MW	10 MW	15 MW

- Type A universally starts at 800W

- Connection at 110kV or greater defaults a generator to Type D

Option 1 – Bandings as per Continental Europe

	Type A*	Type B	Type C	Type D
Option 1 MW	800W-1MW	1MW-50MW	50MW-75MW	75MW+

- Bandings as per the maximum allowed in the code for GB

Pros: Arguably least contentious position; least onerous RfG requirements on generators (so lower cost)

Cons: System issues pass to System Operators to manage, incurring sizeable operational costs; not future proof against generation profiles

NGET view:

- Cannot be accepted by NGET without enhancements to Grid Code emergency provisions (e.g. generation disconnection) for more routine use to mitigate lack of codified generator response requirement/capability

- Missed opportunity to be right first time? NGET would expect to propose reductions to the bandings after the minimum three year period

- Retrospectivity on certain RfG provisions cannot be ruled out if system conditions dictate

11

Option 2 – Bandings as low as poss.

	Type A*	Type B	Type C	Type D
Option 3 MW	800W-0.1MW	0.1MW-0.5MW	0.5MW-5MW	5MW+

- Set bandings to as low a level as possible to ensure all new generation is capable of providing robust system support.

Pros: Highest possible availability of generator response to assist SOs; lots of competition could lead to lower participation pricing

Cons: Extremely onerous on new generators (high costs); As with previous option, costs/risks moved from one party to another; Improved market facilitation critical for success; industry consensus may be difficult

NGET view:

- NGET capable of providing a supporting CBA (from SO perspective) on these levels, given the significant system management challenges anticipated

Option 3 – Moderate banding levels comparable to existing Grid Code

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	Type A*	Type B	Type C	Type D
Option 4 MW	800W-1MW	1MW-10MW	10MW-30MW	30MW+

- Bandings pitched between Options 1-2, but taking account of existing Scottish TO Grid Code levels

Pros: More equitable split on responsibility for system management between generators and System Operators; provides elements of consistency for Scottish region; additional service providers for SO

Cons: Incrementally more onerous for England and Wales generators than existing Grid Code (higher costs?)

NGET View:

- Above 10MW, generators should have inherent communication capability (e.g. SCADA) which would also help us

- NGET would still need to consider curtailment approach (as discussed in Option 1)

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Option X/Y/Z – Any other suggestions?

- [Discussion]

Option 'I' – Banding as per Ireland

	Type A*	Type B	Type C	Type D
Option 2 MW	800W-0.1MW	0.1MW-5MW	5MW-10MW	10MW+

- Match bandings of Republic of Ireland + Northern Ireland

Pros: SO has a large range of response providers; consistency with existing GB Grid Code levels in north Scotland for 'Large'

Cons: Onerous requirement on generators in comparison to Options 1/3

NGET view:

- Consistent rationale for adopting adjacent synchronous area levels as per Option 1 – CE

- Irish TSO have minimised small-medium power stations through non-synchronous-to-demand limits

What happens next?

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Next steps

1. Do we agree with this approach? If yes…
2. Compile workgroup views on banding options via circulation (SurveyMonkey?)
3. Views compiled into a report for consideration next month, where the final option(s) will be approved
4. Workgroup members take ownership to compile the supporting CBA. (This should not be NGET alone!)
5. CBA is compiled outside the workgroup. Updates provided at November workgroup, with a target completion date of December
6. If approved by GC0048/GCRP/DCRP circulated for consultation Q1 2016

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Next steps – More on the CBA (Point 4)

- A subset of the workgroup prepare a preliminary CBA/report for GC0048 to consider at the next meeting

- The key is for shared ownership amongst GC0048 membership, rather than NGET being the sole proposer

- The subset will incorporate workgroup members keen to contribute, but also needs to ensure good coverage of workgroup/industry stakeholder demographics (i.e. small/medium/large generation; DNOs; TOs; TSO)

- Objective should be to draft a workgroup report for consideration at the December meeting, which will then lead to a consultation

Supporting Slides

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RfG x4 Type requirements

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Introduction to Banding – Type A

- A basic level necessary to ensure capability of generation over operational ranges with limited automated response and minimal system operator control.

- Type A ensure that there is no large-scale loss of generation over system operational ranges, minimising critical events, and include requirements necessary for widespread intervention during system-critical events.

Overview of technical requirements:

- Operation across a range of frequencies
- Limits on active power output over frequency range
- Rate of change of frequency settings applied (likely to be at least 1Hz/sec)
- Low-level communication capability (cease active power in 5 secs)

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Introduction to Banding – Type B

- Type B provides for a wider range of automated dynamic response, with greater resilience to more specific operational events.

- They ensure an automated response to alleviate and maximise dynamic generation response to system events.

Overview of technical requirements

- Type A, plus…

- Ability to automatically reduce power on instruction

- Control schemes, protection and metering

- **Fault Ride Through requirements (prevents faults causing cascade tripping)**

- Ability to reconnect

- Reactive capability

- Reactive current injection

Introduction to Banding – Type C

- Provide for a refined, stable and highly controllable (real-time) dynamic response, aiming to provide principle ancillary services to ensure security of supply

- These requirements cover all operational network states with consequential detailed specification of interactions of requirements, functions, control and information to utilise these capabilities

Overview of technical requirements:

- Type A-B, plus…
- Active power controllability
- **Frequency response**
- **Monitoring**
- Automatic disconnection
- Black start

- Stable operation anywhere in operating range
- Pole slipping protection
- Quick resynchronisation capability
- Instrumentation and monitoring requirements
- Ramp rate limits
- Simulation models

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Introduction to Banding – Type D

- Requirements specific to higher voltage connected generation with an impact on entire system control and operation.

- They ensure stable operation of the interconnected network, allowing the use of ancillary services from generation Europe-wide.

Overview of technical requirements

- Type A-C (latter band parameters take precedence when requirements overlap), plus…

- Wider Voltage ranges / longer minimum operating times

- Synchronisation on instruction

- Fault Ride through