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Monday 21st July 2003

Dear David,

BWEA Response: E&W Grid Code Consultation Ref. D/03. Proposed Grid Code changes to incorporate new generation technologies and DC inter-connectors (Generic Provisions)

BWEA is concerned that the proposed changes would place unnecessary and onerous demands on new wind turbine technologies. Despite the requests that BWEA and others have made over the last few months through the Generic Provisions Working Group, we have yet to see the need for or appropriateness of, the proposals as stated. We are therefore unable to support them in their present form.

Our objections arise out of concerns in the following areas;

Social and environmental obligations. The EU Directive on 'the Promotion of Electricity Produced from Renewable Energy Sources in the Internal Market' of 27 September 2001 states that the "*costs of connecting new producers of electricity from renewable energy sources should be objective, transparent and non-discriminatory and due account should be taken of the benefit embedded generators bring to the Grid*". These sentiments are echoed in the live DTI consultation 'Draft Social and Environmental Guidance to the Gas and Electricity Markets Authority'. Notwithstanding these requirements BWEA feels that the Grid Code proposals in their current format are not objective, transparent or non-discriminatory.

Nature of the Code & Development of Proposals. The Code today is a functional specification of existing, relatively mature, synchronous generation. Notwithstanding this point D/03 endeavours to alter the Code to incorporate wind turbine technology certain aspects of which, while evolving rapidly, are nonetheless not yet fully developed, tried and tested.

As BWEA and others have stated repeatedly through the Generic Provisions Working Group, we remain concerned that changes are being proposed based largely or solely, on private conversations between NGT and various turbine manufacturers. Even when turbine manufacturers have achieved recent technical 'break-throughs' this nonetheless leaves the



developer carrying all the risk of implementing new and relatively untested technology. This has significant implications for project financing.

GB wide review. The renewables industry is already inhibited by the different technical and commercial requirements in Scotland vs. England & Wales. Changes to the E&W Grid Code for wind, which differ significantly to those proposed in Scotland, will further constrain development of wind energy systems. A GB solution should be developed in the first instance and this should be used to inform amendments made to both the E&W and Scottish Codes.

Phasing of requirements. The D/03 consultation envisages introduction of the proposed amendments by certain dates. These dates are either arbitrary or based on forecasts made about the rates of installation of wind energy developments. The introduction of phased technical requirements should be linked to installed wind energy capacity rather than dates. In this way it will be possible to introduce requirements in a manner which gives the technology time to evolve while also being in direct response to the need for stable operation of the network.

Market in ancillary services. BWEA continues to believe, as we have stated throughout the GPWG discussions, that the provision of Frequency and Reactive Power/Voltage, Response would be best addressed by market mechanisms.

There should be no mandatory Grid code requirements on generators, interconnectors, DNOs or demand users to provide these capabilities. Under a market mechanism if there were a shortfall in these services the market would constrain off certain generation without the necessary capabilities, in order to constrain on other generation to meet the requirements. Such action would precipitate provision of the capability by the parties constrained off.

DC Interconnectors. NGT owns part of the channel interconnector and has interests in other DC interconnectors elsewhere in the world. BWEA is concerned that there may be a conflict of interest between NGT's obligation to maintain a fair and equitable Grid Code while also having commercial interests in DC interconnectors.

Without prejudice to our objections as stated; detailed technical comments are also included in the Appendix below.

Please feel free to contact me at any time if you have questions.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'James Glennie', with a stylized flourish at the end.

James Glennie.
Head of Offshore. Chair: BWEA Grid Panel

Appendix. Detailed comments: Extracts from Glossary & Definitions

Power Park Module

The last sentence "The connection to the **NGC Transmission System** (or **User System** if **Embedded**) may include a **DC Converter**." should be deleted, as there is discrimination between synchronous and non-intermittent generators which if connected by a DC converter, would be treated differently.

Registered Capacity

The definition does not refer to an averaging period and clarification is required. In the case of wind turbines the Registered Capacity should be a type test measured in accordance with IEC Standards. It is not clear how this relates to **Rated MW**.

DC Converter and Converter Station Owners

A defined term **DC Owner** is needed for this class of person. All other Users of the system are covered by defined terms. There is a disparity with persons exporting power to the System, as DC owners are not a defined class of person. Also with persons importing power from the System there is a danger of discrimination by absence of this definition.

PCA 5.4

On the 26th February 2003 the Distribution Code Review Panel launched a consultation "Modifications to the Distribution Code to clarify the data interchange requirements between Users and DNOs." It is not clear that NGT has responded to this consultation and there is a danger that a diverging set of requirements is being put in train with the industry consulting on different data requirements for 50 – 100MW embedded generators in Distribution and Grid Codes.

We seek clarification that NGT has considered the outcome of the DCRP consultation and ask that they make a clear case for any proposed changes given the recent wide industry consultation on this matter.

CC 6.3.1

NGT has removed the exemption from section 6.3 for all renewable energy projects. There are four key points.

- 1) Why is it necessary to remove the exemption for all renewable projects? This may preclude an important initial single wave or tidal project over 50MW.
- 2) This clause must be considered in relation to the aim of the Grid Code (discussed in the cover letter above). i.e. whether it is truly prescriptive or is designed to be a set of targets.
- 3) NGT has not commented on the other effects of this change e.g. on G75/1 and the Distribution Code.
- 4) If the changes as proposed by NGT are accepted this clause will still be required and/or exemptions will be needed.

CC 6.3.2

There are a number of issues arising from these proposals

- For embedded plant the reactive requirements are likely to be governed by the connection arrangements and the voltage control on the DNO system. It will therefore not be possible to meet the requirements in (b) in all cases.

- It is not always economical for wind turbines/farms to be designed to supply the full reactive power capability at rated active power (c). It will generally be more economic to reduce the real power in order to supply the reactive requirement.
- This option should be available to generators as there is no requirement to supply at rated real power at any time.
- The requirement "at all times" (b) is unclear in relation to system faults and abnormal conditions. There are two potential reactive requirements, steady state and transient (under fault). These two separate requirements need careful examination and specification.
- There is an assumption that a **Bilateral Agreement** will be in place. This goes against NGT's reasoning for making the changes to the Grid Code.¹

BWEA believes that this modification, if implemented as proposed by NGT, would restrict competition in generation and therefore may result in NGT being in breach of its licence conditions.

CC 6.3.3

In accordance with standard aerodynamic theory most, if not all wind turbines, are unable to comply with (a). However, it is doubtful that the variation of power with frequency could be measured given the minor changes in frequency and the fluctuations in wind energy. It is not known how other tidal and wave power devices would behave as this is dictated by the theory of their prime movers.

We therefore propose that paragraphs (a) & (c) are deleted and that (b) and Figure 1 are modified as below

(b) maintaining its **Active Power** output at a level not less than the line in Figure 1.

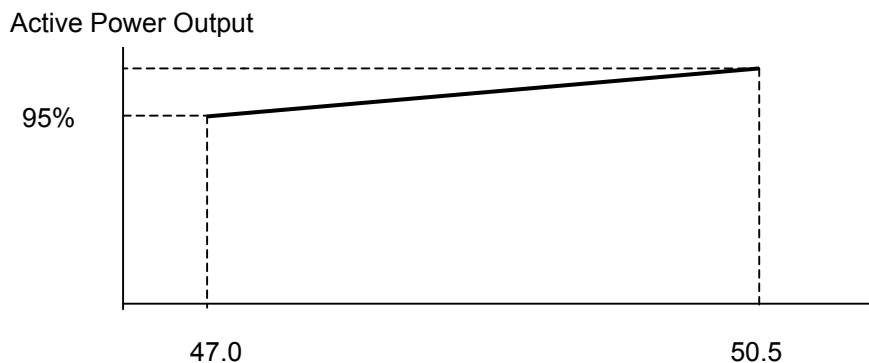


Figure 1.

¹ NGT Information Paper on D/03 Para 10.

CC 6.3.3 (d)

This part of 6.3.3 relates to the Demand action of a DC converter. Any such requirement should therefore be entered in a different section.

This requirement clearly discriminates against Demand Users connected by a DC link compared to those connected by an AC link. It is linked to the setting of low frequency load shedding relays and should be in that section of the Grid Code.

Figure 2 is extremely confusing in relation to Figure 1 and we suggest it is redrawn as below and the text in (d) is modified as per (b) above.

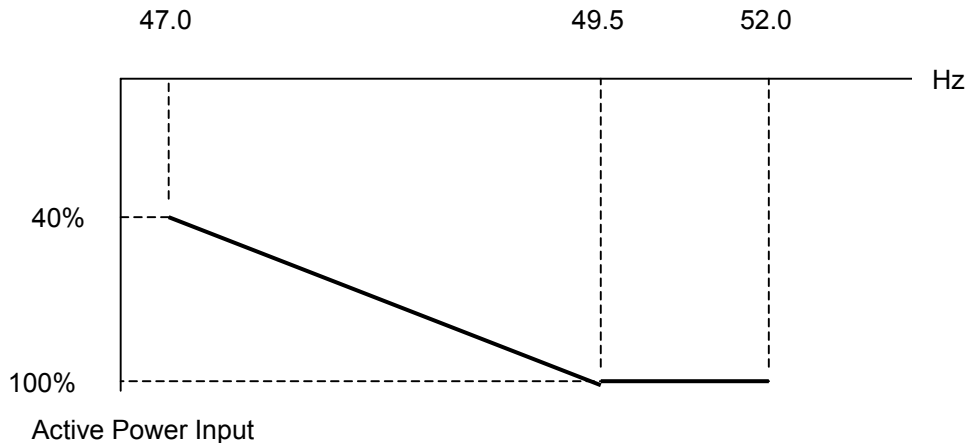


Figure 2

CC 6.3.4

We recommend that the words "and 132kV and lower voltages" are deleted. This Section does not apply to embedded plant and therefore will not be applicable to the vast majority of the 132kV system nor to any lower voltage system.

CC 6.3.6

The use of the word "continuous" is misleading and the opportunity should be taken to clarify. In the case of voltage control those with relevant experience know that this can be achieved by the intermittent operation of a generator transformer tap changer resulting in a step change.

NGT should clarify the requirements.

BWEA believes that if this modification were implemented as proposed by NGT it would restrict competition in generation.

CC 6.3.7

A number of issues arise:

- 1) The word "fitted" (a) implies that there is a piece of hardware associated with this requirement. When some wind turbines have this facility it will be part of the control system software and not a separate visible piece of hardware.
- 2) There is no "standard" (a) for such systems in wind energy.
- 3) (b) If and when frequency response becomes available on some wind turbines it would not operate over the full range of output. If a requirement is eventually put in place we would recommend that for wind energy it should be limited to operation at >50% of rated power

4) (c) (i) This section implies that the control system should be able to operate with an islanded load and is impossible for the majority of wind turbines without sophisticated additional dynamic dump load control

5) (c) (ii) Droop should be a defined term or the requirement explained. e.g. a 5% droop means that a 5% change in frequency will result in a 100% reduction in the currently available power.

6) (c) (ii) The requirement in Scotland is for a deadband of 0.2Hz (+/- 0.1Hz) compared to NGT's 0.03Hz requirement. Can NGT, SP and S&S explain this difference in the light of system requirements?

7) The mixture of requirements and dates in CC. 6.3.6; CC. 6.3.7 and Appendix 3 is extremely confusing and requires clarification and simplification.

8) Meeting these requirements with wind turbines with proven systems is not currently possible.

BWEA believes that if these modifications were implemented as proposed by NGT they would restrict competition in generation.

CC 6.3.8 (b)

The use of the phrase "continuously-acting" is misleading and the opportunity should be taken to clarify. In the case of voltage control those with relevant experience know that this can be achieved by the intermittent operation of a generator transformer tap changer resulting in a step change.

CC 6.3.10

We note:

- Some, if not all, DFIGs are very susceptible to tripping under negative phase sequence voltages. Induction generators are generally more robust.
- Back up clearance times are very long, especially on DNO systems in which projects may be embedded.
- The level of voltages is not specified as it is for symmetrical faults.

BWEA believes that, if implemented as proposed, this proposed modification would restrict competition in generation.

CC 6.3.12

1) It is impossible for some designs of wind turbines to guarantee operation in all conditions (windspeed, voltage, connection parameter) at frequencies above 51Hz.

2) Most doubly fed wind turbines are able to operate up to 52Hz

BWEA believes that, if implemented as proposed, this modification would restrict competition in generation.

CC 6.3.15

1) BWEA recognises that the risk of common mode failure due to a supergrid fault needs careful examination

2) (a) For embedded generators it will be impossible to ensure that this requirement is met and continues to be met, under all conditions of load and generation and under all future scenarios of network changes and generator connections. BWEA therefore proposes that some more standard and generic requirements are put in place

3) (b) We note that for DC converters, although their inputs are much larger, there are no specific requirements and hence note that this is discriminatory.

4) Wind turbines must have the option to shed active and reactive power inputs during a fault.

BWEA believes that if implemented as proposed these modifications would restrict competition in generation.

CC 6.5.6

a) Renumbering required two section (i)s.

b) Reword last 3 lines of (c) to read: "in the case of a wind farm being used by the system operator to provide advanced warning of excess wind speed shutdown" in order to clarify responsibilities.

CC 8.1

There is discrimination between Generators who are "obliged to provide" and DC owners who are "obliged to have the capability to supply".

Balancing Code

BWEA is concerned that there are no windfarms currently operating in the balancing market and therefore there is limited experience in its membership in relation to the issues and potential issues under the proposed changes.

There is concern with regard to the variations in wind energy that occur and how this matter will be dealt with.