

David Payne  
Commercial, Industry Codes  
National Grid Company plc  
NGT House  
Warwick Technology Park  
Gallows Hill  
Warwick  
Warwickshire  
CV34 6DA

Renewable Energy House  
1 Aztec Row, Berners Road  
London, N1 0PW, UK

T 020 7689 1960  
F 020 7689 1969

Wednesday 21 July 2004

Dear David,

**BWEA Reponse: Grid Code Consultation H/04 - Grid Code Changes to Incorporate New Generation Technologies and DC Inter-connectors (Generic Provisions)**

This document is the BWEA response to Grid Code consultation H/04 and has been compiled with support from Econnect who, as you will be aware, have worked with BWEA on previous Grid Code consultations.

BWEA was established in 1978 and is the representative body for companies active in the UK wind energy market. Its membership has grown rapidly in recent years and now consists of 330 companies including all grid-connected wind energy and every company with a lease to develop offshore.

Wind energy is widely recognized as an abundant energy resource indigenous to the UK. Most commentators accept that wind is likely to represent at the very least half of the Government's '10% by 2010' target because of the maturity and low cost of wind powered generation relative to other forms of renewable electricity generation technologies. Continued growth of installed wind energy generation capacity beyond this 10% 2010 baseline is almost guaranteed.

BWEA notes that there has been substantial development of these proposals since they were first published a over a year ago. BWEA welcomes the commitment made by transmission companies to debate these proposals with BWEA and representatives of the wind industry.



## Responses by Clause

Clause CC6.3.2(b) "The steady state tolerance on reactive power transfer to and from the NGC transmission system shall be no greater than 5% of rated power output (MW)", should be rewritten as "The steady state tolerance on reactive power transfer to and from the NGC transmission system shall be no greater than 5% of reactive power capability (MVar) at rated power output (MW)".

Clause CC6.3.2 (c) currently reads, "Point C is equivalent to -5% of rated power output" and "Point D is equivalent to +5% of rated power output". This should be changed to "Point C is equivalent to -5% of MVar range at rated power output", and "Point D is equivalent to +5% of MVar range at rated power output", respectively.

Wind turbines cannot maintain constant active power therefore there is a need to make clear that only section (c) of Clause CC6.3.3 applies.

Clause CC6.3.4 (a) on the availability of Reactive Power output under steady state conditions should also exclude 132kV and 66kV as well as the 33kV, or alternatively all embedded generators, as National Grid Transco (NGT) cannot despatch reactive power on Distributed Network Operator (DNO) networks. Indeed the BWEA would like to refer to our letter of 15th October 2003 on the original Grid Code consultation Ref D/03, where we acknowledged NGT's confirmation that reactive demand tends to be a local issue, and that in the case of embedded plant, provision of reactive power should be agreed between the host DNO and the developer.

BWEA is concerned at the introduction of the term 'using the NGT transmission system' in Clause CC6.3.6(a), as it applies to the Grid Code. This could be interpreted to include any or all embedded generation, and implies commercial contractual arrangements, rather than the technical requirements to which Grid Code Connection Conditions are intended to apply. Therefore this clause should be rewritten with this term removed.

BWEA would also seek clarification of the "change implementation date" which is completely undefined and therefore cannot be commented on.

Clause CC6.3.7(a): There is no applicable standard for Frequency Control devices or Speed Governors on Wind Turbines. Therefore Wind Turbines should be exempt from operating to a given standard.

The islanded frequency control operation required in Clause CC6.3.7 (c)(i) is not practicable in the case of wind turbines, and therefore the requirement on Power Park Modules should be deleted.

Clause CC6.3.7(e)(iii) issue as in point 2.5.

BWEA seeks clarification of boundaries of Power Park module 'allowance' for variation of mechanical power output in frequency sensitive operation in Clause CC6.3.9.

The fault ride through characteristic in Clause CC.6.3.15 (a) requires further clarification, as the voltage duration profile specified in Figure 5 (Figure CC.A.4.1 in Appendix 4) indicates that voltage 'dips' may last up to three minutes, represented by the shaded 'Part 2', and that short circuit faults should be cleared within 140ms, represented by the unshaded 'Part 1'. This is in line with assurances that were given to the BWEA at the recent Grid Code forums, that all faults that resulted in a 0% retained voltage would be cleared and the supergrid voltage recovered to 90% within 140ms. However Figures CC.A.4.2a) and b) in Appendix 4 show the supergrid voltage returning to an unspecified level, 120ms and 140ms after the fault respectively, and the voltage level not returning to 90% until some unspecified 'time' in the future

There is also no mention of what the requirement would be in the scenario described in Figure 1 below where the supergrid voltage has not recovered to 90% within 500ms of the fault occurring.

The characteristic in Figure 1 is within the voltage duration profile specified for which a power park module should remain connected, however considering the situation below at 500ms after the fault, surely it would be better for a power park module to disconnect rather than continue to draw MVAR from the system and further depress system voltage, or alternatively, avoid having to provide significant voltage compensation equipment to remain connected under such a scenario.

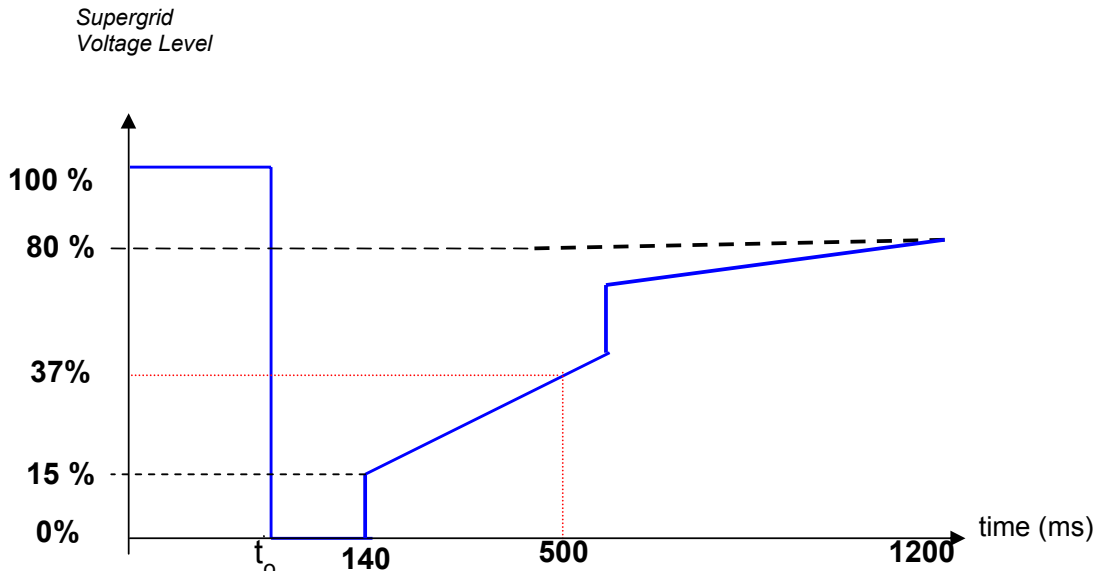


Figure 1: Possible voltage duration profile for which power park module should remain connected under Grid Code proposals.

BWEA maintain that the provisions of Clause CC.6.3.5(a) for fault ride through of both short circuit faults AND voltage dips (represented by Parts 1 and 2 of Figure 5 (CC.A.4.1)), should not apply to Power Park Modules operating at less than 20% of their rated output or with more than 50% of their turbines shut down for whatever reason. At the stated 5% of registered capacity the winds would be very light indeed, such that cessation of output due to falling windspeed is at least as likely as shut down due to a grid fault. The windspeed required for 20% of registered capacity, would mean that the generation capability is considerably more dependable. This point was initially raised in the BWEA's letter of 15th October 2003 on the original Grid Code consultation D/03, and reiterated in the BWEA's response on Fault Ride Through following the Grid Code forum of 30th April 2004.

Clause CC.A.3.1 in Appendix 3 is verbose in the extreme and would be much easier to follow if it were presented in bullet point or tabular form.

The BWEA would ask for a worked example of Clause CC.A.3.2 as applied to a Power Park Module, to be provided to aid understanding.

### Definition Amendments

There is no definition of a 'DC Owner' to match the definition of a 'Generator' as a person who owns such plant. Users in the code are all persons and defined terms. The application of the code to DC owners as a class of persons is therefore unclear and is inconsistent with the drafting and design of the code to date.

The definition of a 'Power Park Module' as a collection of non-synchronous generating units joined together by a system with a single electrical point of connection to the Transmission system, may not include offshore wind farms which potentially may have more than one electrical point of connection to the transmission system.

The defined list of possible entities that could connect at a 'User System Entry Point' should also include the defined term 'Power Station'.

The definition of 'Designed Minimum Operating Level' should also include the term 'Power Park Module' for Clause CC.A.3.2 to apply.

The definition of 'Minimum Generation' should also include the term 'Power Park Module' for Clause CC.A.3.2 to apply.

While 'Droop' may be well known and well defined in text books we nonetheless feel that the term needs to be defined in the Grid Code. A formal definition in the Glossary would greatly help the non-technical reader.

If you have any questions please feel free to contact me at any time.

Yours sincerely,

*Richard Ford*

Richard Ford  
Head of Grid and Technical Affairs  
British Wind Energy Association