



# National Grid

## **GRID CODE CONSULTATION DOCUMENT**

### **Proposed Grid Code Changes to Incorporate New Generation Technologies and DC Inter-connectors (Generic Provisions)**

**The purpose of this document is to consult on the above Grid Code Modification Proposal with authorised electricity operators liable to be materially affected by the proposed changes**

Consultation Ref	D/03
Issue	1.0
Date of Issue	6 June 2003
Prepared by	National Grid

## DOCUMENT LOCATION

National Grid website:

[http://www.nationalgridinfo.co.uk/grid\\_code/mn\\_consultation\\_papers.html](http://www.nationalgridinfo.co.uk/grid_code/mn_consultation_papers.html)

## DISTRIBUTION

Name	Organisation
AEO's	Various
GCRP Members/Alternates	Various
Interested Parties	Various
Wind Turbine Manufacturers	Various
National Grid Industry Information Website	

A. Introduction

1. The National Grid Company plc ("National Grid"), in accordance with its obligations under paragraph 2 of Condition 7 of the Transmission Licence, believes that the time has come to review, in consultation with authorised electricity operators liable to be materially affected thereby, the Grid Code and its implementation in certain respects.
2. This review is concerned with the need to clarify the application of the Grid Code to new technologies including DC Converters and wind farms. The proposed Grid Code changes arising from the review were developed by National Grid in discussion with interested parties sitting on the Grid Code Generic Provisions Working Group. The proposed changes to the Grid Code were discussed at the Grid Code Review Panel meeting held on 22nd May 2003 and National Grid indicated its intention to issue a Consultation Paper.
3. Following receipt of comments from those authorised electricity operators and other interested parties which it has consulted by this Paper, National Grid intends, in accordance with paragraph 2 of Condition 7 of the Transmission Licence, to send to the Authority :-
  - (a) a report on the outcome of its review, including this consultation process;
  - (b) the proposed revisions to the Grid Code which National Grid (having regard to the outcome of such review) reasonably thinks fit for the achievement of the objectives of the Grid Code referred to in subparagraph (b) of paragraph 1 of Condition 7 of the Transmission Licence; and
  - (c) any written representations or objections from authorised electricity operators (including any proposals by such operators for revisions to the Grid Code not accepted by National Grid in the course of the review) arising during the consultation process and subsequently maintained.
4. The revisions to the Grid Code proposed by National Grid and sent to the Authority then require approval by that body and will, if approved, come into force on such date (or dates) of which you will be notified by National Grid, in accordance with the Authority's approval.

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B. DESCRIPTION OF THE PROPOSED AMENDMENTS AND THEIR EFFECTS

5. Background

5.1 With the changes in Government energy strategy to increase the proportion of electricity generated from renewable sources, the number of power stations using generation technology other than “synchronous” machines is expected to increase dramatically. Early discussions between National Grid, potential developers of new generation (mainly wind farms) and wind turbine generator manufacturers, indicated that there was a lack of clarity in the Grid Code on the requirements that new plant employing non-synchronous generation technologies were obliged to meet, and some doubt on the technical capabilities of some of these technologies.

5.2 The proposed Grid Code provisions, which are the subject of this consultation, have been drafted to clearly set out the obligations on the new generation technologies and to include specific provisions for HVDC Interconnectors. The proposals have been discussed at the Generic Provisions Working Group set up under the auspices of the Grid Code Review Panel in September 2002 and include the Grid Code changes recommended by the HVDC Working Group reported to the Grid Code Review Panel in November 2002.

6. Proposed Changes

6.1 Glossary & Definitions

Additional definitions are proposed to cover wind farms and other renewable energy parks (including Non-synchronous Generating Units, Power Park Units and Power Park Modules) and DC Interconnectors (including DC Converter and DC Converter Stations). The general principle of the Power Park Module definition is to allow treatment of all of its generating units and electrical network as a whole with a single point of connection to the public network. The reflection of the new non-synchronous generation technology has also required revision of a number of other definitions to maintain clarity, consistency and application.

6.2 Planning Code

In order to study the performance of the transmission system models are required of the new generation technologies. These models require different data and information from that required from synchronous machines. Additional clauses within the Planning Code are proposed to cover Power Park Modules and DC Converter Stations.

6.3 Connection Conditions

The existing Connection Conditions were drafted in relation to synchronous generation technology and the requirements on synchronous generating units remain unchanged. The proposed changes to the Connection Conditions are intended to clarify the existing requirements by explicitly including references to Power Park Modules and DC Converter stations. Technology specific reactive

range requirements are placed on DC Converters and Power Park Modules in CC.6.3.2. The Connection Conditions for these new technologies are specified functionally at the connection point rather than the terminals of the individual machines. In the case of reactive capability range and frequency response capability, National Grid has proposed that the application of the full requirement on Power Park Modules should be deferred to 1 January 2006. Some additional clauses in CC6.3 are proposed to clearly state the performance obligations on non-synchronous technology that are implicit with synchronous generating units. This includes the ability to remain stable and supply power during transmission faults.

6.4 Operating Codes

The operating codes have been clarified by extending references to Generators/Generating Units to explicitly include Power Park Modules, DC Converters and DC Converter Station owners. In addition, in OC2, the concept of Power Park Planning Matrix has been introduced and generator performance charts are required at the HV connection points for non-synchronous generator technologies. The references to the Connection Conditions in OC5 have also been updated.

6.5 Balancing Codes

The Balancing Codes BC1, BC2 and BC3 have been clarified to explicitly include Power Park Modules, DC Converters and DC Converter Station owners. In addition the requirement for a Power Park Module Matrix has been added in BC2. In line with the Connection Conditions, BC3 does not require Power Park Modules to be frequency sensitive until 1 January 2006.

6.6 Data Registration Code

Additional data sections have been added for Power Park Modules and DC Converters in Schedule 1 consistent with the Planning Code revision. Other schedules have been updated to include DC Converter Stations and Power Park Modules.

7. The Changes

The proposed Grid Code changes are shown in Appendix 1 with proposed changes marked against the current Grid Code, additions being double-underlined and deletions struck-through.

COMMENTS

8. National Grid would be grateful to receive your comments on, or any suggestions you may have in relation to, these proposed amendments to the Grid Code. Comments would be welcomed and should be sent to National Grid by **18<sup>th</sup> July 2003**. The comments will be reviewed and responded to and National Grid will then prepare its report to the Authority.

9. Your formal responses may be:-

Posted to: David Payne  
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Coventry  
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Faxed to: 024 7642 3298

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# Appendix 1

## EXTRACTS FROM THE GRID CODE

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