



GRID CODE CONSULTATION DOCUMENT

Grid Code Requirements for Current Sourced DC Links

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 and forms the basis of the subsequent Report to the Authority

Consultation Ref	F/07
Issue	1.0
Date of Issue	14 th December 2007
Responses required by	18th January 2008
Prepared by	National Grid

DOCUMENT LOCATION

National Grid website:

<http://www.nationalgrid.com/uk/Electricity/Codes/gridcode/consultationpapers/>

DISTRIBUTION

Name	Organisation
AEO's	Various
GCRP Members/Alternates	Various
Interested Parties	Various
National Grid Website	

A. INTRODUCTION

1. Paragraph 2 of Condition C14 of the Transmission Licence granted to the National Grid Electricity Transmission plc ("National Grid") provides that National Grid shall, in consultation with Authorised Electricity Operators liable to be materially affected thereby, periodically review the Grid Code and its implementation. That paragraph also requires National Grid, following such review, to send to the Authority:-
 - (a) a report on the outcome of such review;
 - (b) any proposed revisions to the Grid Code as National Grid (having regard to the outcome of such review) reasonably thinks fit for the achievement of the objectives set out in sub-paragraph (b) of Condition C14 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.
2. This review examines an inconsistency between the requirements of the Grid Code Connection Conditions and the recommendation of two Grid Code Review Panel (GCRP) Working Groups. The inconsistency relates to the requirements for current sourced DC Links to maintain a reactive power transfer within a range.
3. The proposed changes to the Grid Code were discussed with the GCRP on 15th November 2007. Panel Members agreed that National Grid should issue a Consultation Paper regarding the proposed changes.
4. Comments upon the proposed changes within this consultation should be sent to National Grid by **18th January 2008** as detailed in section C. The comments will be reviewed and responded to.
5. Following this consultation, National Grid will prepare a Report to the Authority detailing National Grid's recommended changes to the Grid Code and all comments/responses received from Authorised Electricity Operators through this consultation. Once sent to the Authority this report will be made available on National Grid's website.
6. Where Authorised Electricity Operators' responses have been marked as confidential they will not be published within the version of the Report to the Authority placed on the National Grid website.
7. The revisions to the Grid Code proposed by National Grid and sent to the Authority, 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.

B. DESCRIPTION OF THE PROPOSED AMENDMENTS AND THEIR EFFECTS

8. DC Links

- 8.1 The Grid Code HV DC Interconnector Working Group, established to consider the requirements for DC links, reported back its findings and recommendations to the November 2002 GCRP meeting¹. The recommendations of the Working Group on the reactive power transfer, for current sourced DC links, was for it to remain within a reactive range specified within the Bilateral Agreement rather than in the Grid Code.
- 8.2 At the November 2002 GCRP meeting, the panel membership noted that the Grid Code Generic Provision Working Group had been initiated and recommended that the work undertaken by the HV DC Interconnectors Working Group be transferred and taken forward by the newly established Working Group².
- 8.3 The Grid Code Generic Provisions Working Group³ reported back its findings and recommendations to the May 2003 GCRP meeting and recommended that the Grid Code requirements applicable to current sourced DC Converters should reflect the original recommendations of the HV DC Interconnector Working Group. This Working Group recommendation was reflected in the subsequent D/03 Report to the Authority (Generic Provisions) submitted for determination on 31st October 2003⁴. In these proposals it was recommended that the tolerance on reactive power transfer was specified in the Bilateral Agreement for Non-Synchronous Generators and Power Park Modules as well as for DC Converters.
- 8.4 In response to the D/03 report, the Authority requested further Generic Provisions work on Power Park Modules which included discussions relating to wind turbine generators with manufacturers and developers. It was agreed that the proposals relating to reactive power transfer tolerance for Non-Synchronous Generators and Power Park Modules should be modified and explicitly stated in the Grid Code.
- 8.5 The wording currently in Grid Code CC.6.3.2 (b) was introduced as a result of this subsequent Generic Provisions work on Power Park Modules and included in the H/04 Report to the Authority dated 20th September 2004⁵. It requires current sourced DC links, as well as Power Park Modules, to have a tolerance on reactive power that is stated in the Grid Code rather than in the Bilateral Agreement.
- 8.6 Unfortunately it appears that the Grid Code wording included in the H/04 Report

¹ HV DC Interconnectors Working Group Report is available on National Grid's Industry Information Website: https://www.nationalgrid.com/NR/ronlyres/956D1788-5CFC-4ECB-ADAE-F6097258F162/2142/pp02_31.pdf

² Section 5.3 of GCRP Minutes (November 2002) – minutes are available on National Grid's Industry Information Website: <https://www.nationalgrid.com/NR/ronlyres/041E9A5B-DC4F-498F-AAED-F49D30F171C5/2758/021121pm.pdf>

³ Generic Provisions Working Group Report is available on National Grid's Industry Information Website: https://www.nationalgrid.com/NR/ronlyres/7AEFB0B4-3AB5-4342-B7E4-29C5FDB88589/1986/GPWG_pp03_11.pdf

⁴ Report to the Authority D/03 (Generic Provisions) is available on National Grid's Industry Information Website: https://www.nationalgrid.com/NR/ronlyres/E38D11B6-5019-44A9-BA9D-508E494F019B/7045/ReporttotheAuthorityD_03.pdf

⁵ Report to Authority H/04 (Generic Provisions) and legal text is available on National Grid Industry Information Website: <https://www.nationalgrid.com/NR/ronlyres/1AD6F0AB-F786-4256-ADD7-DD030F7209AE/6800/Authrepv11report.pdf>
<https://www.nationalgrid.com/NR/ronlyres/18017111-E0B6-404E-B464-E57B2470ED03/6801/Authrepv11legaltxt.pdf>

to the Authority was incorrectly updated so that it applied the reactive transfer tolerance requirement for Power Park Modules to current sourced DC links. This was inconsistent with the recommendations made for DC links by both the Generic Provisions and HV DC Interconnector Working Groups that are reflected in the D/03 Report to the Authority.

9. Proposed Grid Code Changes

- 9.1 It is proposed to amend the Grid Code such that the reactive power transfer, for current sourced DC links, remains within the reactive range specified within the Bilateral Agreement rather than the Grid Code.
- 9.2 The amendment is reflective of the recommendations from the HV DC Interconnector and Generic Provision Working Groups and reflected in the D/03 Report to the Authority and which remain valid.
- 9.3 The proposed amendments will not have any adverse impact on the existing or future current sourced DC links.
- 9.4 The proposed amendments to CC.6.3.2(b) are shown in Appendix A.

10. Impact on Industry Documents

10.1 *Impact on Core Industry Documents*

10.1.1 None.

10.2 *Impact on other Industry Documents*

10.2.1 None.

C. RESPONSES

11. This section will contain a summary of responses received during the Consultation and will be completed as part of the Report to the Authority.

12. Your formal responses may be:-

Posted to: Lilian Macleod
 Electricity Codes
 Regulatory Frameworks
 National Grid Electricity Transmission plc
 National Grid House
 Warwick Technology Park
 Gallows Hill
 Warwick
 CV34 6DA

Emailed to: lilian.macleod@uk.ngrid.com

Appendix A: Proposed Grid Code Changes

Connection Conditions Changes

CONNECTION CONDITIONS CODE

- CC.6.3.2 (b) Subject to paragraph (c) below, all **Non-Synchronous Generating Units, DC Converters and Power Park Modules** must be capable of maintaining zero transfer of **Reactive Power** at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**) at all **Active Power** output levels under steady state voltage conditions. **For Non-Synchronous Generating Units and Power Park Modules** the steady state tolerance on **Reactive Power** transfer to and from the **GB Transmission System** expressed in MVar shall be no greater than 5% of the **Rated MW**. **For DC Converters** the steady state tolerance on **Reactive Power** transfer to and from the **GB Transmission System** shall be specified in the **Bilateral Agreement**.