



Commission for Energy Regulation

An Coimisiún um Rialáil Fuinnimh

HVDC Interconnector Grid Code modifications

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Abstract:

EirGrid has recently submitted proposed Grid Code modifications relating to HVDC Interconnectors to the Commission for approval. The Grid Code applies to the electricity grid in the Republic of Ireland. Once approved by the Commission the Grid Code sections and clauses relating to HVDC Interconnectors will apply to all future HVDC Interconnectors.

This consultation paper requests comments on the proposed modifications.

Target Audience:

This decision paper is for the attention of the energy industry, generators, electricity network users, energy customers and all interested parties. It will be of particular interest to members of the energy sector that have an interest in the connection of HVDC Interconnectors to the Irish electricity transmission network.

Related Documents:

The current Grid Code as applies to the electricity grid in the republic of Ireland is published on EirGrid's website on the following web pages:

For general Grid Code and GCRP publications please access the following link:

<http://www.eirgrid.com/operations/gridcode/>

Some recent minutes/publications, relevant to HVDC Interconnector (from the above website) include:

Grid Code Review Panel (GCRP Documents)	Effective Date
GCRP 23 Minutes Final Version	29-10-09
GCRP 22 Minutes Final Version	29-05-09
HVDC Post Workshop Modifications Paper GCRP 23	24-09-09
HVDC Proposed Modifications Paper GCRP 22	29-04-09
HVDC Actual Proposed Modifications GCRP 22	29-04-09
HVDC Interconnector Addendum GCRP 22	29-04-09

Executive Summary

EirGrid has recently submitted for approval to the Commission Grid Code¹ modifications associated with HVDC Interconnectors. These modifications, which comprise of significant updates and the addition of substantial clauses to the existing Grid Code, have been developed by the Grid Code Review Panel (GCRP). The GCRP was happy to recommend the proposed modifications to the Commission for approval except for one outstanding requirement relating to reactive power (CC.7.5.10). This exception is also published for comment in the Appendix.

This consultation paper requests comments on the proposed modifications which are published in conjunction with this consultation paper.

Following this consultation, and taking account of both public comments and the Commission's own technical review, the Commission will decide whether to approve the proposed modifications or to revert to the GCRP with any issues that need further consideration.

¹ The Grid Code in question applies to the electricity grid in the Republic of Ireland.

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1.0 Introduction

1.1 The Commission for Energy Regulation

The Commission for Energy Regulation ('the Commission') is the independent body responsible for overseeing the regulation of Ireland's electricity and gas sector's. The Commission was initially established and granted regulatory powers over the electricity market under the Electricity Regulation Act, 1999. The enactment of the Gas (Interim) (Regulation) Act, 2002 expanded the Commission's jurisdiction to include regulation of the natural gas market, while the Energy (Miscellaneous Provisions) Act 2006 granted the Commission additional powers in relation to gas and electricity safety. The Electricity Regulation Amendment (SEM) Act 2007 outlined the Commission's functions in relation to the Single Electricity Market (SEM) for the island of Ireland. This market is regulated by the Commission and the Northern Ireland Authority for Utility Regulation (NIAUR). The Commission is working to ensure that consumers benefit from regulation and the introduction of competition in the energy sector.

1.2 Purpose of this paper

The purpose of this paper is to seek the views of industry and stakeholders with regard to the proposed Republic of Ireland Grid Code modifications relating to High Voltage Direct Current (HVDC) Interconnectors, as recently submitted by EirGrid to the Commission for approval. In order to make an informed and impartial decision on this topic the Commission wishes to obtain comments from the energy industry, generators, electricity network users, energy customers and parties with an interest in the connection of HVDC Interconnectors to the Irish electricity transmission network. The Commission commits to considering all views equally and affording each respondent the opportunity to clarify any issue raised in this paper.

1.3 Background to the Electricity Grid Code

The electricity Grid Code is a technical document which establishes the rules governing the operation, maintenance and development of the Irish transmission system and sets out the technical parameters against which users of the transmission system (including generators and demand users) should comply. This document helps to ensure the security, stability and the safety of the electricity transmission grid and that all users of the grid are treated in a transparent and equitable manner.

EirGrid is responsible for the development and maintenance of the Grid Code through the Grid Code Review Panel (GCRP). The GCRP is a standing body, attended by representative groups such as generator and demand users, as well

as the Commission. The GCRP is mandated to review and discuss the Grid Code and offer suggestions for amendments to it.

The Grid Code and all modifications, updates and derogation requests to the Grid Code are subject to approval by the Commission pursuant to Section 33 of the Electricity Regulation Act, 1999. This is done taking account of the safety, stability, security and operational efficiency of the system.

1.4 Proposed HVDC Interconnector Modifications

There are a number of parties who are currently developing or planning to develop HVDC Interconnectors between Ireland and other jurisdictions. To cater for these potential developments the Grid Code needs to be updated. This will require a significant update and additional clauses in the Grid Code with respect to sections including the General Conditions, Planning Code, Connection Conditions and Operational Code.

Attached are the proposed modifications to the electricity Grid Code² to account for future HVDC Interconnectors connecting to the transmission system.

The proposed modifications relate primarily to connection obligations and standards. They do not cover System Support Services, Scheduling and Dispatch Codes and the data for PC.A4.14, all of which will be developed at a later stage.

The proposed modifications were discussed at recent GCRP meetings. The GCRP was happy to recommend the proposed modifications to the Commission for approval except for one outstanding requirement relating to reactive power (CC.7.5.10). This exception is also published for comment in the Appendix.

Given the importance of this issue, the Commission is now publically consulting on the proposed changes as published with this consultation document and invites comments from interested parties.

The Commission is also concurrently seeking technical advice from its own consultants on these proposed modifications, as is typically the case for significant modifications or additions to the Grid Code.

The proposed HVDC Interconnector modifications are published in conjunction with this consultation paper as follows:

- a) The HVDC Interconnector modifications as proposed by the GCRP and submitted for approval by EirGrid; and,

• ² Republic of Ireland Grid Code version 3.3: available on EirGrid's website: <http://www.eirgrid.com/media/Grid%20Code%20v3.3.pdf>

- b) The consolidated Grid Code with the HVDC modifications marked as track-changes.

1.5 Responding to this paper

Responses should be received by close of business on 14th January 2010 and should be sent to:

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Unless marked confidential, all responses will be published by placing them on the Commission's website at the following address: www.cer.ie. Respondents may request that their response is kept confidential. The Commission shall respect this request, subject to any obligations to disclose information. Respondents who wish to have their responses remain confidential should clearly mark the document/s to that effect and include the reasons for confidentiality.

2.0 Next steps

The deadline for receipt of comments on this paper is close of business on 14th January 2010. Please refer to Section 1.5 for details.

Following this consultation, and taking account of both public comments and the Commission's own technical review, the Commission will decide whether to approve the proposed modifications or to revert to the GCRP with any issues that need further consideration.

The proposed modifications relate primarily to connection obligations and standards for interconnectors. They do not cover System Support Services, Scheduling and Dispatch Codes and the data for PC.A4.14, all of which will be developed at a later stage.

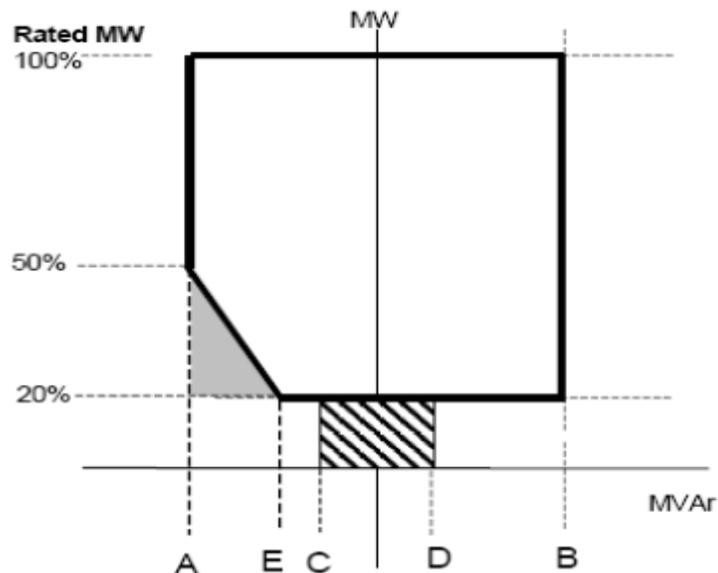
Appendix A.1: ABB Reactive Power Capability - 350MW Converter

Apart from one exception all of the proposed modifications as published in conjunction with this consultation paper have been recommended by the GCRP and EirGrid to the Commission for approval.

The following are the details of this one exception which relates to the reactive power capability of ABB's 350MW HVDC Interconnector technology.

The diagrams in Appendix A.2 and A.3 represent the reactive power capability of the ABB 350MW HVDC Interconnector technology which is planned to be used for the Templeraíney Interconnector connecting to Arklow 220kV substation.

The current proposed requirement as it appears in the HVDC Interconnector Grid Code Modifications states that the HVDC Interconnector should be capable of operating in the region indicated below:

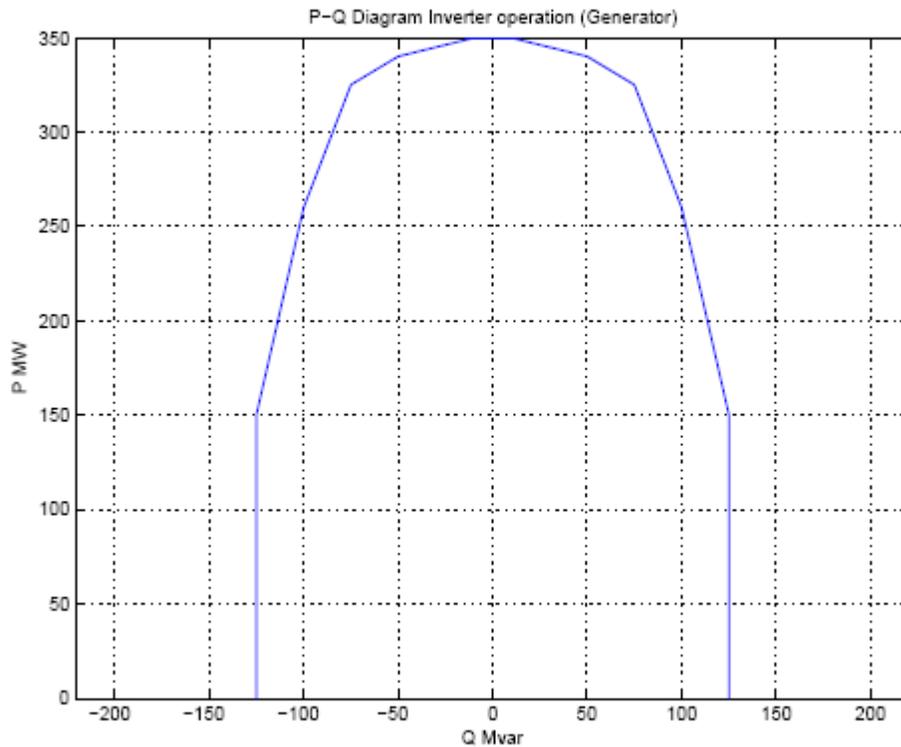


- Point A is equivalent (in MVar) to: 0.95 leading **Power Factor** at **Rated MW** output
- Point B is equivalent (in MVar) to: 0.95 lagging **Power Factor** at **Rated MW** output
- Point C is equivalent (in MVar) to: -5% of **Rated MW** output
- Point D is equivalent (in MVar) to: +5% of **Rated MW** output
- Point E is equivalent (in MVar) to: -12% of **Rated MW** output

Without additional reactive compensation, the ABB 350MW HVDC Interconnector will not be able to meet the proposed grid code requirement. ABB have informed the GCRP that the following reactive power requirements would be more suitable to the capabilities of their converter:

- 0.95 lead and 0.95 lag at 90% of the active power
- 99% lead and 99% lag at rated active power

Appendix A.2: ABB 350MW HVDC Interconnector Reactive Power Capability Diagram (Generator)



Appendix A.3: ABB 350MW HVDC Interconnector Reactive Power Capability Diagram (Load)

