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25 March 2008

Dear Duncan

**REVIEW OF THE GRID CODE : DECISION AND NOTICE IN RELATION TO  
CONSULTATION G/06 (Power Park Modules and Synchronous Generating Units)**

The Gas and Electricity Markets Authority (the "Authority")<sup>1</sup> has carefully considered the changes that NGET<sup>2</sup> has proposed to its Grid Code as set out in the report to the Authority arising from consultation G/06 (Power Park Modules and Synchronous Generating Units)<sup>3</sup> that has been submitted to it for approval.

The Authority has decided to approve the majority of the proposed changes to the Licensee's Grid Code (the "Grid Code") as set out in the Appendix B of the report to the Authority arising out of Consultation G/06. The Authority has decided to reject the proposed change to the Grid Code relating to the harmonisation of the point of voltage control and point of reactive capability requirement. In conjunction the Authority has decided to direct the amendments to the Grid Code<sup>4</sup> as set out in Appendix 1 of this letter.

This document explains the background to the proposals and sets out the Authority's reasons for its decision to approve these changes to the Grid Code. This letter constitutes notice by the Authority under Section 49A of the Electricity Act 1989 in relation to this decision.

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<sup>1</sup> Ofgem is the office of the Authority. The terms "we", "Ofgem" and "the Authority" are used interchangeably in this letter.

<sup>2</sup> National Grid Electricity Transmission plc

<sup>3</sup> Report from NGET – Consultation Reference G/06, Issue 1, Date of Issue - 21 Dec 2007.  
[http://www.nationalgrid.com/NR/rdonlyres/D478E2DC-DDBE-4E92-9332-EA9ED330977E/22321/ReporttotheAuthorityG06PPM\\_issued.pdf](http://www.nationalgrid.com/NR/rdonlyres/D478E2DC-DDBE-4E92-9332-EA9ED330977E/22321/ReporttotheAuthorityG06PPM_issued.pdf).

<sup>4</sup> As permitted in C14.4

## Background to the proposed changes to NGET's Grid Code

NGET has proposed changes to the Grid Code requirements that relate to Power Park Modules and synchronous generating plant. NGET's G/06 consultation was issued by NGET which described the Grid Code change proposal that had been developed with the assistance of a Grid Code Review Panel working group. NGET advised that the proposed Grid Code changes are intended to:

- Improve Grid Code requirements relating to new generation technologies that were implemented in 2005 in light of practical experience.
- Improve the clarity of Grid Code obligations that are relevant to Power Park Modules.
- Improve the visibility of the technical requirements for synchronous plant that are currently defined in site specific bilateral agreements.

NGET has presented the proposed Grid Code changes in 14 discrete sections which are set out in Appendix B of the report to the Authority arising from consultation G/06. The following table provides a description of each section of the G/06 Grid Code change proposal.

Section Number	Section Name	Description of Change Proposal
B1	Fault Ride Through Power Recovery	A relaxation to the current fault ride through requirement to allow a conditional power swing in active power recovery.
B2	Additional Power Park Unit Data	An increase to the volume of Power Park Unit parameters that a generator would need to provide to NGET.
B3	Power Park Module Single Line Diagram	Amendment of existing data provision obligation to specify options for presenting information available to the generator.
B4	Short Circuit Contribution to the GB Transmission System	<p>An increase to the volume of fault infeed data that generators are required to provide in respect of Power Park Modules.</p> <p>Subsequent to consultation G/06, NGET has proposed to include an option for reduced data requirements during connection application timescales if data is not available to the generator.</p>
B5	Voltage Control and Reactive Range below 20% Power Output	A change to current capability requirements to permit generators to provide voltage control when operating below 20% of Rated MW.
B6	Manned Control Rooms	A change to clarify the requirements for manned Control Points in Scotland.
B8	Generic Performance Specifications for Synchronous Generating Units and Power Park Modules	Changes to incorporate technical requirements currently defined in bilateral agreements between NGET and generators, in the Grid Code.
B9	Harmonisation of Point of Voltage Control and Point of Reactive Capability Requirement	Amend the current obligations in Scotland to align with arrangements that apply in England and Wales.

B10	Definition of Power Park Module	Amend the current definition to include synchronous generating plant that is powered by intermittent power sources.
B11	Frequency Response	Clarification of frequency response requirements that are applicable to Power Park Modules.
B12	Amendment of Schedule 5 Data Requirements (protection settings)	A change that would require generators to provide setting information for rotor overspeed and underspeed protection for Power Park Modules.
B13	Negative Phase Sequence Withstand Capability for Power Park Modules	A change to clarify the requirement applies only to Power Park Modules with a completion date of 1 Jan 2006 or later.  Proposed change would correct an error with the drafting for the previous Generic Provisions Grid Code changes (H/04).
B14	Reactive Power Output with Voltage Variation	Extension of the current relaxation which applies in England and Wales, to Scotland.
B15	Cross Referencing for LEEMPS Provisions	Update reference lists of Grid Code clauses relevant to Licence Exempt Embedded Medium Power Stations to reflect, relevant Grid Code changes proposed in consultation G/06.

NGET received 12 responses to Consultation G/06 from authorised electricity operators and four responses from other interested parties (wind turbine manufacturers). NGET advised that it responded to all comments raised and received further comments from five authorised electricity operators.

Ofgem notes that respondents made the following points:

- Respondents generally supported the proposed changes to the Grid Code set out in B1, B5, B6, B8, B10 and B15.
- Respondents did not raise any objections in respect of the proposed changes to the Grid Code set out in B3, B12, B13 and B14.
- Respondents considered that the proposed changes to the Grid Code set out in B11 were benign.
- Respondents considered that the increased data provision requirements that would arise from the proposed changes to the Grid Code set out in B2 and B4 were not justified. Respondents also noted that the required information would not normally be available in connection application timescales.
- One respondent was concerned about the impact on transmission system investment requirements of the proposed changes to the Grid Code set out in B9.

NGET noted in its report to the Authority that it had amended the drafting of the proposed Grid Code changes to take account of many of the comments received from respondents, but that it was not able to resolve all of the objections raised.

## **NGET's recommendation**

In its report<sup>5</sup> to the Authority on Consultation G/06 NGET set out the drafting for proposed changes to the Grid Code. It recommended that the Authority approved the proposed changes.

## **Ofgem's view**

Approval of these changes by the Authority is required by standard condition C14(3). Having carefully considered the NGET's report on the proposed changes, we consider that, having had regard to the licensee's obligations<sup>6</sup> set out in condition C14(1)(b) of the Transmission Licence ("the obligations") and our wider statutory duties<sup>7</sup>, we have made a decision in respect of each section of NGET's G/06 Grid Code change proposal separately. Each decision and our reasons for reaching that decision are outlined below.

### **B1 - Fault Ride Through Power Recovery**

We note that the proposed change would relax the current Grid Code requirement to better reflect the performance of generating plant during active power recovery. We also note that NGET has confirmed that this proposed Grid Code change will not adversely affect its ability to operate the GB transmission system.

We consider that this section of the G/06 Grid Code change proposal will improve the definition of minimum requirements for generating plant in light of practical experience, which will better facilitate competition in generation. We have therefore decided to approve the B1 section of the G/06 Grid Code change proposal.

### **B2 - Additional Power Park Unit Data**

We note that the proposed change would increase the scope of Power Park Unit parameters that the generator would need to provide to NGET at the connection application stage and in some circumstances on an ongoing basis. We note that many respondents to NGET's G/06 consultation raised concerns about the introduction of more onerous data requirements for Power Park Modules. We also note respondents' concerns that the requested data would not be available at the connection application stage.

We sought further information from NGET about the proposed data requirement. NGET advised that:

- It needs the data to be able to carry out accurate analysis work needed for economic, co-ordinated and efficient design and operation of the GB transmission system.
- The Grid Code already allows for a generator to submit estimated data as part of a connection application should actual data not be available and that this would apply to this proposed data requirement.

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<sup>5</sup> As required by C14.2.a

<sup>6</sup> The licensee's transmission licence defines the Grid Code objectives as follows:

- (i) to permit the development, maintenance and operation of an efficient, co-ordinated and economical system for the transmission of electricity;
- (ii) to facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the GB transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity); and
- (iii) subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in Great Britain taken as a whole.

<sup>7</sup> Ofgem's statutory duties are wider than the matters that the NGET has to take into consideration and include amongst other things a duty to have regard to social and environmental guidance provided to Ofgem by the government.

We consider that this section of the G/06 Grid Code change proposal will enhance the scope of information available to NGET which will better facilitate the design and operation of the GB transmission system. We have therefore decided to approve the B2 section of the G/06 Grid Code change proposal.

#### B3 - Power Park Module Single Line Diagram

We note that the proposed change would specify the options available to the generator to meet the existing data provision obligation.

We consider that this section of the G/06 Grid Code change proposal will improve the definition of minimum technical requirements for generating plant. We consider that improved definition of technical requirements reduces the risk of misinterpretation of compliance requirements and therefore, will better facilitate competition in generation. We have therefore decided to approve the B3 section of the G/06 Grid Code change proposal.

#### B4 - Short Circuit Contribution to the GB Transmission System

We note that the proposed change would increase the volume of fault infeed data that the generator would need to provide to NGET at the connection application stage and on an ongoing basis. We note that many respondents to NGET's G/06 consultation raised concerns about the introduction of more onerous data requirements for Power Park Modules. We also note respondents' concerns that the requested data would not be available at the connection application stage.

We acknowledge that following respondents' comments, NGET proposed further changes to the Grid Code to include an option to reduce the data requirement in connection application timescales if actual data about the proposed generating plant is not available to the generator. We note NGET's expectation that the generator would provide a full data submission when the generator has made its decisions in respect of generating plant supplier and the design of the Power Park Module, and actual data is available.

We consider that this section of the G/06 Grid Code change proposal will enhance the scope of information available to NGET which will better facilitate the design and operation of the GB transmission system. We have therefore decided to approve the B4 section of the G/06 Grid Code change proposal.

#### B5 - Voltage Control and Reactive Range below 20% Power Output

We note that the proposed change would better reflect the capability of generating plant when operating at low power output levels and would allow use of facilities that are beneficial to NGET when operating the GB transmission system.

We consider that this section of the G/06 Grid Code change proposal will better facilitate the operation of an efficient and economic transmission system. We have therefore decided to approve the B5 section of the G/06 Grid Code change proposal.

#### B6 - Manned Control Rooms

We note that the proposed changes would clarify the requirements for a generator to have a manned control room.

We consider that this section of the G/06 Grid Code change proposal will improve the definition of minimum requirements for generator control facilities which will better facilitate competition in generation. We have therefore decided to approve the B6 section of the G/06 Grid Code change proposal.

#### B8 - Generic Performance Specifications for Synchronous Generating Units and Power Park Modules

We note the general support for the proposal to define requirements that NGET has been including in site specific bilateral agreements in the Grid Code. We acknowledge that NGET specifies specific performance requirements in each bilateral agreement with a generator in respect of each generating station. We observe that these proposed Grid Code change will define an indicative range for such performance requirements which would normally apply in respect of most generator connections. However we also note that the proposed change to the Grid Code allows for NGET to specify in a bilateral agreement parameters that are outside of the indicative ranges defined in the Grid Code.

We agree that this will improve the visibility of the obligations that NGET will require a generator and therefore will better facilitate competition in generation. We have therefore decided to approve the B8 section of the G/06 Grid Code change proposal.

We acknowledge a request from NGET for us to direct further changes to CC.A.6.8.2 to provide clarification about the testing requirements for any Over-Excitation Limiters installed by the generator. This request was made after NGET had submitted the G/06 report to the Authority to us for decision.

We consider that the additional proposed change will improve transparency and therefore better facilitate competition in generation. We therefore have decided to direct further changes to CC.A.6.8.2 of the Grid Code.

We were concerned by the proposal to apply these requirements to generating plant with a completion date of 1 January 2008 which was only shortly after NGET's submission of the G/06 report to the Authority. We sought information from NGET to establish if there were any current generation projects that are expected to complete in 2008. NGET advised of a number of projects in this category and noted that there were differences between the performance requirements defined in the site specific bilateral agreement and the B8 proposed Grid Code requirements in respect of some of these generation projects. We note that implementation of the B8 section of changes may require generators and/or NGET to request derogation from the Grid Code.

We have decided that it would be more appropriate to allow time for generators and NGET to assess the Grid Code compliance implications that may be associated with these proposed Grid Code requirements and investigate possible remedial actions before the changes become effective. We therefore direct that the B8 section of the G/06 Grid Code change proposal should apply in respect of generating projects with a completion date after 1 January 2009.

The further changes that we have decided to implement are included in Appendix 1 of this letter and are change marked against the current baseline Grid Code text following the B8 changes.

#### B9 - Harmonisation of Point of Voltage Control and Point of Reactive Capability Requirement

We note the concerns raised by one respondent to NGET's G/06 consultation that the proposed changes in this section of the G/06 proposal would have on transmission system reinforcement requirements. We have sought further information about the possible impact on transmission system reinforcement requirements and note that the impact could be significant. We observe that this impact was not identified until the consultation stage and was not fully investigated as part of the G/06 Grid Code review.

We do not consider that sufficient justification has been provided for the B9 section of the G/06 change proposal. We have therefore decided to reject the B9 section of the G/06 Grid Code change proposal.

We consider that there is a need to clarify CC.A.7.2.2.1 and CC.A.7.2.2.4 of the Grid Code<sup>8</sup> to reflect our decision to reject the proposed harmonisation of the point of voltage control and point of reactive capability requirement. Therefore, we have decided to direct changes to CC.A.7.2.2.1 and CC.A.7.2.2.4 of the Grid Code to align with the existing regional difference in CC.6.3.2(c). The further changes that we have decided to implement are included in Appendix 1 of this letter and are change marked against the current baseline Grid Code text following the B8 changes.

#### B10 - Definition of Power Park Module

We note that this proposed change would also allow a generator to register groups of synchronous generating plant that is powered by intermittent power sources as a Power Park Module.

We consider that it is appropriate for similar collections of generating units to be treated consistently, as this will better facilitate competition in generation. We have therefore decided to approve the B10 section of the G/06 Grid Code change proposal.

#### B11 - Frequency Response

We observe that this proposed change was intended to clarify existing Grid Code obligations in respect of frequency response obligations that are applicable to Power Park Modules.

We generally consider that obligations should be clearly defined as transparent definition of requirements better facilitates competition in generation. We have therefore decided to approve the B11 section of the G/06 Grid Code change proposal.

We note that the proposed change would provide additional text in Grid Code CC.6.3.7(a) in respect of control devices whereas the current requirement is in respect of a "control device". We consider that it would be clearer for references to "control device(s)" to be on a consistent basis within CC.6.3.7 and recommend that this is considered as part of a future Grid Code review.

#### B12 - Amendment of Schedule 5 Data Requirements (protection settings)

We note that the proposed change will improve the information available to NGET about protection settings that the generator has applied to equipment within a Power Park Module.

We consider that this section of the G/06 Grid Code change proposal will better facilitate the development of an efficient and economic transmission system and will promote the security of the overall electricity system. We have therefore decided to approve the B12 section of the G/06 Grid Code change proposal.

#### B13 - Negative Phase Sequence Withstand Capability for Power Park Modules

We note that this proposed change will correct an unintended drafting error in a previous Grid Code change proposal.

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<sup>8</sup> CC.A.7.2.2.1 and CC.A.7.2.2.4 of the Grid Code will be introduced by our decision in respect of the B8 section of the G/06 Grid Code change proposal.

We consider that this section of the G/06 Grid Code change proposal will better reflect the minimum requirement applicable to Power Park Modules, which will better facilitate competition in generation. We have therefore decided to approve the B13 section of the G/06 Grid Code change proposal.

#### B14 - Reactive Power Output with Voltage Variation

We note that NGET has advised that this proposal to apply the current relaxation that applies in England and Wales across GB, will not adversely affect its ability to operate the GB transmission system.

We consider that this section of the G/06 Grid Code change proposal will remove a current regional difference in the Grid Code requirements that apply to generators, which will better facilitate competition in generation. We have therefore decided to approve the B14 section of the G/06 Grid Code change proposal.

#### B15 - Cross Referencing for LEEMPS Provisions

We note that this proposed change would apply new obligations introduced by other parts of the G/06 Grid Code change proposal to licence exempt medium power stations (via the relevant distribution licensee).

We consider that it is appropriate to require distribution connected generating plant to comply with relevant technical obligations as this will promote the security of the electricity system as a whole and enhance the efficiency of transmission system operation. We have therefore decided to approve the B15 section of the G/06 Grid Code change proposal.

#### Other

We note that some of the change marked text in Appendix B of the report to the Authority arising from consultation G/06 does not match the text presented in Appendix A of that report. In particular we note differences in the numbering of Planning Code Appendix B, PC.A.2.5.6, CC.A.7.2.3.1 and BC2.A.2.5. NGET has explained that the numbering of the draft legal text presented in Appendix B of the report to the Authority arising from consultation G/06 had been corrupted.

We appreciate that this corruption was not intended and acknowledge that this error will not be reflected in the changes made to the Grid Code as a result of our decision in respect of the G/06 Grid Code change proposal.

### **The Authority's decision**

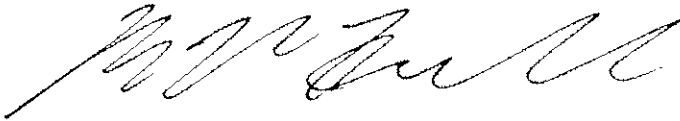
Based on the reasons set out above the Authority has therefore decided to approve the Grid Code changes set out in sections B1, B2, B3, B4, B5, B6, B8, B10, B11, B12, B13, B14 and B15 of Appendix B of the report submitted to the Authority arising from consultation G/06 (Power Park Modules and Synchronous Generating Units). In conjunction it has decided to direct the amendments set out in Appendix 1 that reflect further changes that it considers are required to clarify parts of the G/06 change proposal and to allow time for generators and NGET to remain compliant with the Grid Code.

The Authority has decided to reject the Grid Code changes set out in section B9 of Appendix B of the report submitted to the Authority arising from consultation G/06 (Power Park Modules and Synchronous Generating Units).

The implementation date for these Grid Code changes is 1 April 2008.

Please do not hesitate to contact me on the above number if you have any queries in relation to the issues raised in this letter or alternatively contact Bridget Morgan on 020 7901 7080.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Robert Hull', written in a cursive style.

**Robert Hull**

**Director - Transmission**

Signed on behalf of the Authority and authorised for that purpose by the Authority

cc: Richard Dunn, GCRP Secretary

Appendix 1 – Amendment to Changes Proposed in the Report to the Authority Arising from Consultation G/06 (Power Park Modules and Synchronous Generating Units)

CC.6.3.8(b)

In respect of **Synchronous Generating Units** with a **Completion Date** before 1 January ~~2008~~2009, the requirements for excitation control facilities, including **Power System Stabilisers**, where in **NGET's** view these are necessary for system reasons, will be specified in the **Bilateral Agreement**. If any **Modification** to the excitation control facilities of such **Synchronous Generating Units** is made on or after 1<sup>st</sup> January ~~2008~~ 2009 the requirements that shall apply may be specified in the **Bilateral Agreement** as varied. To the extent that the **Bilateral Agreement** does not specify, the requirements given or referred to in CC.A.6 shall apply. The performance requirements for a continuously acting automatic excitation control system that shall be complied with by the **User** in respect of **Synchronous Generating Units** with a **Completion Date** on or after 1 January ~~2008-2009~~ are given or referred to in CC.A.6. Reference is made to on-load commissioning witnessed by **NGET** in BC2.11.2.

CC.6.3.8(c)

In the case of a **Non-synchronous Generating Unit, DC Converter or Power Park Module** a continuously-acting automatic control system is required to provide control of the voltage (or zero transfer of **Reactive Power** as applicable to CC.6.3.2) at the **Grid Entry Point** or **User System Entry Point** without instability over the entire operating range of the **Non-Synchronous Generating Unit, DC Converter or Power Park Module**. Any **Plant** or **Apparatus** used in the provision of such voltage control within a **Power Park Module** may be located at the **Power Park Unit** terminals, an appropriate intermediate busbar or the **Connection Point**. In the case of a **Power Park Module** in Scotland with a **Completion Date** before 1 January ~~2008~~2009, voltage control may be at the **Power Park Unit** terminals, an appropriate intermediate busbar or the **Connection Point** as specified in the **Bilateral Agreement**. When operating below 20% **Rated MW** the automatic control system may continue to provide voltage control utilising any available reactive capability. If voltage control is not being provided, the automatic control system shall be designed to ensure a smooth transition between the shaded area bound by CD and the non shaded area bound by AB in Figure 1 of CC6.3.2 (c).

CC.6.3.8(d)

The performance requirements for a continuously acting automatic voltage control system in respect of **Power Park Modules, Non-Synchronous Generating Units and DC Converters** with a **Completion Date** before 1 January ~~2008-2009~~ will be specified in the **Bilateral Agreement**. If any **Modification** to the continuously acting automatic voltage control system of such **Power Park Modules, Non-Synchronous Generating Units and DC Converters** is made on or after 1<sup>st</sup> January ~~2008-2009~~ the requirements that shall apply may be specified in the **Bilateral Agreement** as varied. To the extent that the **Bilateral Agreement** does not specify, the requirements given or referred to in CC.A.7 shall apply. The performance requirements for a continuously acting automatic voltage control system that shall be complied with by the **User** in respect of **Power Park Modules, Non-Synchronous Generating Units and DC Converters** with a **Completion Date** on or after 1 January ~~2008-2009~~ are given or referred to in CC.A.7.

#### CC.A.6.2.2

In respect of **Synchronous Generating Units** with a **Completion Date** on or after 1 January ~~2008~~2009, and **Synchronous Generating Units** with a **Completion Date** before 1 January ~~2008-2009~~ subject to a **Modification** to the excitation control facilities where the **Bilateral Agreement** does not specify otherwise, the continuously acting automatic excitation control system shall include a **Power System Stabiliser (PSS)** as a means of supplementary control. The functional specification of the **Power System Stabiliser** is included in CC.A.6.2.5.

#### CC.A.6.2.8.2

The performance of the **Over-Excitation Limiter**, where it exists, shall be demonstrated by testing its response to a step increase in the **Automatic Voltage Regulator** reference voltage that results in operation of the **Over Excitation Limiter**. Prior to application of the step the **Generating Unit** shall be generating **Rated Active Power** and operating within its continuous **Reactive Power** capability. The size of the step will be determined by the minimum value necessary to operate the Over-Excitation Limiter and will shall be agreed by **NGET** and the **Generator**. The resulting operation beyond the **Over-Excitation Limit** shall be controlled by the **Over-Excitation Limiter** without the operation of any protection that could trip the **Generating Unit**. The step shall be removed immediately on completion of the test.

#### CC.A.7.2.2.1

The **Non-Synchronous Generating Unit, DC Converter or Power Park Module** shall provide continuous steady state control of the voltage at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**) with a **Setpoint Voltage** and **Slope** characteristic as illustrated in Figure CC.A.7.2.2a. It should be noted that where the Reactive Power capability requirement of a directly connected Non-Synchronous Generating Unit, DC Converter or Power Park Module in Scotland, as specified in CC.6.3.2 (c), is not at the Grid Entry Point, the values of Qmin and Qmax shown in this figure will be as modified by the 33/132kV or 33/275kV or 33/400kV transformer.

#### CC.A.7.2.2.4

Figure CC.A.7.2.2b shows the required envelope of operation for **Non-Synchronous Generating Units, DC Converters and Power Park Modules** except for those **Embedded** at 33kV and below or directly connected to the **GB Transmission System** in England and Wales at 33kV and below. It should be noted that where the Reactive Power capability requirement of a directly connected Non-Synchronous Generating Unit, DC Converter or Power Park Module in Scotland, as specified in CC.6.3.2 (c), is not at the Grid Entry Point, the values of Qmin and Qmax shown in this figure will be as modified by the 33/132kV or 33/275kV or 33/400kV transformer. Figure CC.A.7.2.2c shows the required envelope of operation for **Non-Synchronous Generating Units, DC Converters and Power Park Modules Embedded** at 33kV and below or directly connected to the **GB Transmission System** in England and Wales at 33kV and below. The enclosed area within points ABCDEFGH is the required capability range within which the **Slope** and **Setpoint Voltage** can be changed.