GCRP 02/04
21 February 2002)

THE NATIONAL GRID COMPANY plc

GRID CODE REVIEW PANEL

GRID CODE IMPLICATIONS OF CUSC AMENDMENT PROPOSAL No. 2 (CAP002) TO CLARIFY CLAUSE 6.5.1

1. Introduction

1.1. Proposals have been developed to modify Clause 6.5.1 of the Connection and Use of System Code (CUSC) to clarify the requirements for notification by Network Operators to National Grid about Embedded Generation connected to their system. The proposed clarification will remove the requirement for smaller Embedded Generators to enter into an agreement with National Grid. As a result therefore, they will no longer be bound by the existing Grid Code provisions. The CUSC change proposal also highlights areas where consequent changes to data exchange areas of the Grid Code Planning Code (PC), Connection Conditions (CC) and Operating Codes (OCs) are probably required as well as areas of the Distribution Code where changes may be appropriate. It is expected that the CUSC Amendment Report to Ofgem will recommend an implementation date to coincide with the date of changes to other affected Core Industry Documents. This paper proposes a process for bringing the Grid Code into line with revised working arrangements.

2. Discussion

2.1. The proposed changes to the CUSC will introduce a requirement for Network Operators to provide National Grid with details of Embedded Power Stations above a certain size such that National Grid can assess whether any work is required on the Transmission System to accommodate the new Power Station. A consequence of the proposed CUSC amendment will be to remove the contractual link that binds Embedded Small or Medium Power Stations directly to National Grid in relation to the Grid Code. A revision to the Grid Code obligations is therefore required, affecting provisions in the Planning Code, Connection Conditions and several of the Operating Codes. The relevant data flows and obligations can be maintained by the replacement of the Grid Code obligation on the Generators with an obligation on the appropriate Network Operator to ensure that an appropriate equivalent position is reached. As the Grid Code does not include obligations in respect of Embedded Small Power Stations, any changes will only apply to the position of Embedded Medium Power Stations. This will reflect the additional role of Network Operators, who may choose to manage this by placing additional obligations in the Distribution Code on Embedded Medium Power Stations to be consistent with current Grid Code requirements.

2.2. In addition, a number of the existing requirements on Embedded Generators in the Grid Code have continued from the period of operation under the Pool trading arrangements, and could be considered to be inappropriate under NETA. Changes were not made at the time of the introduction of NETA, as time constraints made it necessary to merely deal with Grid Code changes that were essential to permit the introduction of NETA. To simplify the National Grid

control interface for embedded generation, reflecting the NETA structure, it is desirable to reduce the exchange of data about Network Operator network planning to a minimum, so that the National Grid control interface is concentrated at the SGT boundary at any site.

2.3. An example of this exists in Operating Code No 2 (OC2) where co-ordination plans for generation and network outages are compiled. As Large Power Stations were centrally despatched under the Pool, data from those which are embedded was required (amongst other things) for the management of constraints on the system in which the generation is embedded. This data flow has continued under NETA, although management of these constraints is not now undertaken by National Grid. It may, therefore be appropriate to amend OC2 to provide for that data no longer to be given direct to National Grid in respect of Embedded Large Power Stations.

2.4. An analysis of required data flows relating to **all** Embedded Power Stations is being undertaken by National Grid with a view to reducing National Grid's requirements to a minimum.

2.5. It is felt that the identification of appropriate Grid Code changes to be consistent with the clarification to CUSC 6.5.1 should take into account a review of all of those aspects of the Grid Code affecting embedded generation. This could best be achieved by the creation of an industry working group with appropriate terms of reference.

2.6. However, in order to avoid any undue delays to the implementation of the proposed CUSC Amendment, it is suggested changes to the Grid Code should initially be limited to the replacement of the obligations on Generators with an obligation on the appropriate Network Operator in respect of Embedded Medium Power Stations, as identified in Appendix 1 to this paper. These relate to the Planning Code, Connection Conditions, OC1, OC5, BC1 and BC2. The working group could then work in parallel with this process to consider the provisions affecting all Embedded Power Stations, leading to possible further Grid Code changes at a later date. Areas to be considered would include OC2 and OC9, but may also relate to further changes to the Codes to be amended initially.

3. The Next Steps

3.1. The proposed way forward is as follows:-

- National Grid prepares and issues a Grid Code Consultation Paper to include the proposals shown in Appendix 1 to this paper (A change to the Distribution Code may be pursued by the Distribution Code Review Panel);

- the issues related to the requirements on Embedded Power Stations should be discussed and developed in conjunction with interested Grid Code Review Panel members. This will take place by the establishment of a working group (Chaired by National Grid) to include representatives of Network Operators and Embedded Generators. Draft Terms of Reference, etc are shown in Appendix 2

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4. **Working Group Nominations**

4.1. In order to ensure correct representation at any working group, the Grid Code Review Panel is asked to nominate representatives to contribute to this working group. The first working group meeting could be held in March 2002, provided nominations are submitted to the Panel secretary by the 28th February 2002.

5. Recommendation

5.1. The Grid Code Review Panel is invited to agree the proposed way forward.

APPENDIX 1

A Extracts from Planning Code

PC.3.2 In the case of **Embedded Power Stations**, unless provided otherwise, the following provisions apply with regard to the provision of data under this **PC**:

(a) each **Generator** shall provide the data direct to **NGC** in respect of **Embedded Large Power Stations** ~~and **Embedded Medium Power Stations**~~;

(b) although data is not normally required specifically on **Embedded Small Power Stations** or **Embedded Medium Power Stations** under this **PC**, each **Network Operator** in whose **System** they are **Embedded** should provide the data (contained in the Appendix) to **NGC** in respect of **Embedded Small Power Stations** or **Embedded Medium Power Stations** if:

(i) it falls to be supplied pursuant to the application for a **CUSC Contract** or in the **Statement of Readiness** to be supplied in connection with a **Bilateral Agreement** and/or **Construction Agreement,** by the **Network Operator**; or

(ii) it is specifically requested by **NGC** in the circumstances provided for under this **PC**.

PC.3.3 Certain data does not normally need to be provided in respect of certain **Embedded Power Stations**, as provided in PC.A.1.12.

PC.4 PLANNING PROCEDURES

PC.4.1 Pursuant to Supplementary Standard Condition C7G of the **Transmission Licence**, the means by which **Users** and proposed **Users** of the **NGC Transmission System** are able to assess opportunities for connecting to, and using, the **NGC Transmission System** comprise two distinct parts, namely:

(a) a statement, prepared by **NGC** under the **Transmission Licence**, showing for each of the seven succeeding **NGC Financial Years**, the opportunities available for connecting to and using the **NGC Transmission System** and indicating those parts of the **NGC Transmission System** most suited to new connections and transport of further quantities of electricity (the "**Seven Year Statement**"); and

(b) an offer, in accordance with the **Transmission Licence**, by **NGC** to enter into a **CUSC Contract** for connection to (or, in the case of **Embedded Large Power Stations** ~~and **Embedded Medium Power Stations**~~, use of) the **NGC Transmission System**. A **Bilateral Agreement** is to be entered into for every **Connection Site** (and for certain **Embedded Power Stations**, as explained above) within the first two of the following

categories and the existing **Bilateral Agreement** may be required to be varied in the case of the third category:

(i) existing **Connection Sites** (and for certain **Embedded Power Stations**, as detailed above) as at the **Transfer Date;**

(ii) new **Connection Sites** (and for certain **Embedded Power Stations**, as detailed above) with effect from the **Transfer Date**;

(iii) a **Modification** at a **Connection Site** (or in relation to the connection of certain **Embedded Power Stations**, as detailed above) (whether such **Connection Site** or connection exist on the **Transfer Date** or are new thereafter) with effect from the **Transfer Date**.

In this **PC**, unless the context otherwise requires, "connection" means any of these 3 categories.

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APPENDIX A

PLANNING DATA REQUIREMENTS

PC.A.1.2

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(d) The routine annual update of data, referred to in (a)(iii) above, need not be submitted in respect of **Medium Power Stations** or **Small Power Stations** (except as provided in PC.3.2.(b)), or unless specifically requested by **NGC**, or unless otherwise specifically provided.

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PART 1

STANDARD PLANNING DATA

PC.A.2 **USER'S SYSTEM** DATA

PC.A.2.1 Introduction

PC.A.2.1.1 Each **User**, whether connected directly via an existing **Connection Point** to the **NGC Transmission System,** or seeking such a direct connection, shall provide **NGC** with data on its **User System** which relates to the **Connection Site** and/or which may have a system effect on the performance of the **NGC Transmission System**. Such data, current and forecast, is specified in PC.A.2.2 to PC.A.2.5. In addition each **Generator** with **Embedded Large Power Stations** ~~or **Embedded Medium Power Stations** connected to the **Subtransmission System,**~~ shall provide **NGC** with fault infeed data as specified in PC.A.2.5.5. Each **Network Operator** shall provide such fault infeed data in respect of **Embedded Medium Power Stations** connected to the **Subtransmission System** forming part of its **User System** if requested by **NGC**.

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PCA.2.5.5 Data from **Generators**

PC.A.2.5.5.1 For each **Generating Unit** with one or more associated **Unit Transformers**, the **Generator** (or **Network Operator** as provided in PC.A.2.1.1) is required to provide values for the contribution of the **Power Station Auxiliaries** (including **Auxiliary Gas Turbines** or **Auxiliary Diesel Engines**) to the fault current flowing through the **Unit Transformer(s)**.

The data items listed under the following parts of PC.A.2.5.6(a) should be provided:-

(i), (ii) and (v);

(iii) if the associated **Generating Unit** step-up transformer can supply zero phase sequence current from the **Generating Unit** side to the **NGC Transmission System;**

(iv) if the value is not 1.0 p.u;

and the data items shall be provided in accordance with the detailed provisions of PC.A.2.5.6(c) - (f), and with the following parts of this PC.A.2.5.5.

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Embedded

PC.A.3.1.2 (a) Each **Generator** with an existing, or proposed, **Embedded Large Power Station** ~~and/or an **Embedded Medium Power Station** connected to the **Sub-Transmission System**~~, shall provide **NGC** with data relating to that **Power Station,** both current and forecast, as specified in PC.A.3.2 to PC.A.3.4.

(b) No data need be supplied in relation to any **Small Power Station** or any **Medium Power Station,** connected at a voltage level at or below the voltage level of the **Subtransmission System** ~~except:-~~

~~(i) in connection with an application for, or under, a **CUSC Contract**, or~~

~~(ii)~~ unless specifically requested by **NGC** under PC.A.3.1.4, in which case it will be provided by the **Network Operator** in whose **User System** the **Small Power Station** or **Medium Power Station** is connected.

PC.A.3.1.3 (a) Each **Network Operator**) shall provide **NGC** with the data specified in PC.A.3.2.2(c).

(b) **Network Operators** need not submit planning data in respect of an **Embedded Medium Power Station** or an **Embedded Small Power Station** unless required to do so under PC.A.1.2(b) or unless specifically requested under PC.A.3.1.4 below, in which case they will supply such data.

PC.A.3.1.4 (a) PC.A.4.2.3(b) and PC.A.4.3.2(a) explain that the forecast **Demand** submitted by each **Network Operator** must be net of the output of all **Small Power Stations** and **Medium Power Stations** and **Customer Generating Plant Embedded** in that **Network Operator's System**. The **Network Operator** must inform **NGC** of the number of such **Embedded Power Stations** (including the number of **Generating Units**) together with their summated capacity.

(b) On receipt of this data, the **Network Operator** ~~or **Generator** (if the data relates to **Power Stations** referred to in PC.A.3.1.2)~~ may be further required, at **NGC's** reasonable discretion, to provide details of **Embedded Small Power Stations** and **Embedded Medium Power Stations** and **Customer Generating Plant**, both current and forecast, as specified in PC.A.3.2 to PC.A.3.4. Such requirement would arise where **NGC** reasonably considers that the collective effect of a number of such **Embedded Power Stations** and **Customer Generating Plants** may have a significant system effect on the **NGC Transmission System**.

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PART 2

DETAILED PLANNING DATA

PC.A.5 **GENERATING UNIT** DATA

PC.A.5.1 Introduction

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Embedded

PC.A.5.1.2 Each **Generator**, with existing or proposed **Embedded Large Power Stations** ~~and **Embedded Medium Power Stations**~~ shall provide **NGC** with data relating to each of those **Large Power Stations** ~~and/or **Medium Power Stations**~~, both current and forecast, as specified in PC.A.5.2 and PC.A.5.3. ~~However, n~~No data need be supplied in relation to ~~those~~ **Embedded Medium Power Stations** if they are connected at a voltage level at or below the voltage level of the **Subtransmission System** ~~except in connection with an application for, or under a, **CUSC Contract** or~~ unless specifically requested by **NGC** under PC.A.5.1.4, in which case the data will be provided in accordance with PC.A.5.1.3 below.

PC.A.5.1.3 Each **Network Operator** need not submit **Planning Data** in respect of **Embedded Small Power Stations** or **Embedded Medium Power Stations** unless required to do so under PC.A.1.2(b) or unless specifically requested under PC.A.5.1.4 below, in which case they will supply such data.

B Extracts from Connection Conditions

CC.3 SCOPE

CC.3.1 The **CC** applies to **NGC** and to **Users**, which in the **CC** means:

(a) **Generators** (other than those which only have **Embedded Small Power Stations**, and subject as provided in the **CC** in relation to **Embedded Medium Power Stations**)

(b) **Network Operators**;

(c) **Non-Embedded Customers;** and

(d) **BM Participants** and **Externally Interconnected System Operators** in respect of CC.6.5 only**.**

The above categories of **User** will become bound by the **CC** prior to them generating, distributing, supplying or consuming, as the case may be, and references to the various categories should, therefore, be taken as referring to them in that prospective role as well as to **Users** actually connected. In the case of **Embedded Medium Power Stations**, each **Network Operator** is required to ensure through its **Distribution Code** that the **Distribution Code** "users" in relation to any **Medium Power Station** connected, or proposing to connect, to its **User System** meets the requirements of the following provisions of the **Connection Conditions**:-

CC.5.2,
CC.5.3,
CC.6.3,
CC.6.5,
CC.6.6 and
CC.8,

in each case as if it were bound directly by the **CC**. Therefore references to "**User**" and/or "**Generator"** in this **CC** shall include generators bound to comply in relation to an **Embedded Medium Power Station** by the **Distribution Code**.

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CC.5. CONNECTION

CC.5.1 The provisions relating to connecting to the **NGC Transmission System** (or to a **User's System** in the case of a connection of an **Embedded Large Power Station** ~~or **Embedded Medium Power Station**~~**)** are contained in the **CUSC** and/or **CUSC Contract** (or in the relevant application form or offer for a **CUSC Contract**), and include provisions relating to both the submission of information and reports relating to compliance with the relevant **Connection Conditions** for that **User**, **Safety Rules**, commissioning programmes, **Operation Diagrams** and approval to connect. References in this **CC** to the "**Bilateral Agreement**" and/or "**Construction Agreement**" shall be deemed to include references to the application form or offer therefor.

CC.5.2 Prior to the **Completion Date** under the **Bilateral Agreement** and/or **Construction Agreement**, the following is submitted pursuant to the terms of the **Bilateral Agreement** and/or **Construction Agreement**:

(a) updated **Planning Code** data (both **Standard Planning Data** and **Detailed Planning Data**), with any estimated values assumed for planning purposes confirmed or, where practical, replaced by validated actual values and by updated estimates for the future and by updated forecasts for **Forecast Data** items such as **Demand**, pursuant to the requirements of the **Planning Code**;

(b) details of the **Protection** arrangements and settings referred to in CC.6;

(c) copies of all **Safety Rules** and **Local Safety Instructions** applicable at **Users' Sites** which will be used at the **NGC/User** interface (which, for the purpose of **OC8,** must be to **NGC's** satisfaction regarding the procedures for **Isolation** and **Earthing**);

(d) information to enable **NGC** to prepare **Site Responsibility Schedules** on the basis of the provisions set out in Appendix 1;

(e) an **Operation Diagram** for all **HV Apparatus** on the **User** side of the **Connection Point** as described in CC.7;

(f) the proposed name of the **User Site** (which shall not be the same as, or confusingly similar to, the name of any **NGC Site** or of any other **User Site**);

(g) written confirmation that **Safety Coordinators** acting on behalf of the **User** are authorised and competent pursuant to the requirements of **OC8**;

(h) **RISSP** prefixes pursuant to the requirements of **OC8. NGC** is required to circulate prefixes utilising a proforma in accordance with **OC8**;

(i) a list of the telephone numbers for **Joint System Incidents** at which senior management representatives nominated for the purpose can be contacted and confirmation that they are fully authorised to make binding decisions on behalf of the **User**, pursuant to **OC9**;

(j) a list of managers who have been duly authorised to sign **Site Responsibility Schedules** on behalf of the **User**;

(k) information to enable **NGC** to prepare **Site Common Drawings** as described in CC.7; and

(l) a list of the telephone numbers for the **Users** facsimile machines referred to in CC.6.5.9.

CC.5.3 As explained in the **Bilateral Agreement** and/or **Construction Agreement**, of the list, items (c), (e), (g), (h) and (k) need not be supplied

in respect of **Embedded Power Stations**, item (i) need not be supplied in respect of **Embedded Small Power Stations** and **Medium Power Stations** and (d) and (j) are only needed in the case where the **Embedded Power Station** is within a **Connection Site** with another **User**. In relation to an **Embedded Medium Power Station**, the data items required will be procured by, and supplied to **NGC** by, the **Network Operator** in whose **User System** the **Embedded Medium Power Station** is situated.

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CC.6.6 **SYSTEM** MONITORING

CC.6.6.1 Monitoring equipment is provided on the **NGC Transmission System** to enable **NGC** to monitor its power system dynamic performance conditions. Where this monitoring equipment requires voltage and current signals on the **Generating Unit** circuit from the **User**, **NGC** will inform the **User** and they will be provided by the **User** with both the timing of the installation of the equipment for receiving such signals and its exact position being agreed (the **User's** agreement not to be unreasonably withheld) and the costs being dealt with, pursuant to the terms of the **Bilateral Agreement** (which will be the **Bilateral Agreement** with the **Network Operator** in the case of **Embedded Medium Power Stations**).

C Extract from Operating Code No1 (OC1)

OC1.3 SCOPE

OC1 applies to **NGC** and to **Users** which in this **OC1** means:-

(a) **Generators**,

(b) **Network Operators**, and

(c) **Suppliers**.

In relation to an **Embedded Medium Power Station**, the **Network Operator** to whose **System** it is connected must ensure that it receives sufficient data under its **Distribution Code** to enable it to fulfil its obligations under this **OC1** in relation to such **Power Station**.

OC1.4 DATA REQUIRED BY **NGC** IN THE **OPERATIONAL PLANNING PHASE**

OC1.4.1 (a) Each **User**, as specified in (b) below, shall provide **NGC** with the data requested in OC1.4.2 below.

(b) The data will need to be supplied by:-

(i) each **Network Operator** directly connected to the **NGC Transmission System** in relation to **Demand Control** and in relation to each **Embedded Medium Power Station** within its **User System**; and

(ii) each **Generator** with respect to the output of non-embedded **Medium Power Stations**.

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OC1.5 DATA REQUIRED BY **NGC** IN THE **PROGRAMMING PHASE**, **CONTROL PHASE** and **POST-CONTROL PHASE**

OC1.5.1 Programming Phase

For the period of 2 to 8 weeks ahead the following will be supplied to **NGC** in writing by 1000 hours each Monday:

(a) ***Demand Control:***
Each **Network Operator** will supply MW profiles of the amount and duration of their proposed use of **Demand Control** which may result in a **Demand** change of 12MW or more (averaged over any half hour on any **Grid Supply Point**) on a half hourly and **Grid Supply Point** basis;

(b) ***Medium Power Station** Operation:*
Each **Generator** (or **Network Operator** in the case of **Embedded Medium Power Stations**) will, if reasonably required by **NGC**, supply MW schedules for the operation of **Medium Power Stations** on a half hourly and **Grid Supply Point** basis.

OC1.5.2 For the period 2 to 12 days ahead the following will be supplied to **NGC** in writing by 1200 hours each Wednesday:

(a) ***Demand Control:***
Each **Network Operator** will supply MW profiles of the amount and duration of their proposed use of **Demand Control** which may result in a **Demand** change of 12MW or more (averaged over any half hour on any **Grid Supply Point**) on a half hourly and **Grid Supply Point** basis;

(b) ***Medium Power Station** Operation:*
Each **Generator** (or **Network Operator** in the case of **Embedded Medium Power Stations**) will, if reasonably required by **NGC**, supply MW schedules for the operation of **Medium Power Stations** on a half hourly and **Grid Supply Point** basis.

OC1.5.3 **Medium Power Station** Output:
Each **Generator** (or **Network Operator** in the case of **Embedded Medium Power Stations**) will, if reasonably required by **NGC**, supply **NGC** with MW schedules for the operation of **Medium Power Stations** on a half hourly and **Grid Supply Point** basis in writing by 1000 hours each day (or such other time specified by **NGC** from time to time) for the next day (except that it will be for the next 3 days on Fridays and 2 days on Saturdays and may be longer (as specified by **NGC** at least one week in advance) to cover holiday periods).

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D Extract from Operating Code No5 (OC5)

OC5.3 SCOPE

OC5 applies to **NGC** and to **Users**, which in **OC5** means:

(a) **Generators**;

(b) **Network Operators;**

(c) **Non-Embedded Customers**; and

(d) **Suppliers.**

In the case of **Embedded Medium Power Stations**, each **Network Operator** is required to ensure through its **Distribution Code** that the **Distribution Code** "user" in relation to any **Medium Power Station** connected to its **User System** meets the requirements of **OC5** as if it were bound directly by **OC5.** Therefore, references to "**User**" or "**Generator**" in this **OC5** shall include generators bound to comply in relation to an **Embedded Medium Power Station** by the **Distribution Code**.

E Extract from Balancing Code No 1 (BC1)

BC1.3 SCOPE

BC1 applies to **NGC** and to **Users**, which in this **BC1** means:-

(a) **BM Participants;**

(b) **Externally Interconnected System Operators**; and

(c) **Network Operators**.

In the case of each **Embedded Medium Power Station** which is a **BM Unit**, each **Network Operator** is required to ensure through its **Distribution Code** that the **Distribution Code** "user" in relation to that **Embedded Medium Power Station** complies with the provisions of **BC1** as if it was bound directly by **BC1.** Therefore, references to "**User**" and/or "**Generator**" in this **BC1** shall include generators bound to comply in relation to an **Embedded Medium Power Station** by the **Distribution Code**.

F Extract from Balancing Code No 2 (BC2)

BC2.3 SCOPE

BC2 applies to **NGC** and to **Users**, which in this **BC2** means:-

(a) **BM Participants;**

(b) **Externally Interconnected System Operators**, and

(c) **Network Operators.**

In the case of each **Embedded Medium Power Station** which is a **BM Unit**, each **Network Operator** is required to ensure through its **Distribution Code** that the **Distribution Code** "user" in relation to that **Embedded Medium Power Station** complies with the provisions of **BC2** as if it was bound directly by **BC2**. Therefore, references to "**User**" and/or "**Generator**" in this **BC2** shall include generators bound to comply in relation to an **Embedded Medium Power Station** by the **Distribution Code**.

APPENDIX 2

Grid Code Embedded Power Station Working Group

Proposed Terms of Reference

Stage 1

To review all the existing provisions in the Grid Code applying to Embedded Medium or Small Power Stations relating to connection to the system, operational and outage co-ordination and data exchange.

To assess the implications of the elimination or minimisation of these provisions in the Grid Code resulting from a transfer of obligations to Network Operators, consistent with the revision to CUSC 6.5.1.

To formulate proposals for changes to the Grid Code (possibly in conjunction with changes to the Distribution Code or other industry documents).

Stage 2

To extend the Stage 1 work to include consideration of requirements on Embedded Large Power Stations with a view to minimising any duplication of work between National Grid and Network Operators.

Membership

National Grid (Chair & Secretary)
Representatives from: Network Operators (2)
Embedded Generators (2)

Timescales

A report arising from the work of Stage 1 to be presented to the Grid Code Review Panel in September 2002, to be followed by a report on Stage 2 by February 2003.