

All Recipients of the Serviced Grid Code

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21 August 2014

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Dear Sir/Madam

**THE SERVICED GRID CODE – ISSUE 5 REVISION 11**

Issue 5 Revision 11 of the Grid Code has been approved by the Authority for implementation on **21 August 2014**.

In order to ensure your copy of the Grid Code remains up to date, you will need to replace the sections affected with the revised versions available on the National Grid website.

The revisions document provides an overview of the changes made to the Grid Code since the previous issue.

Yours faithfully,

Lucy Hudson  
Frameworks Administrator  
Transmission Network Service - Operations (Governance)

## **THE GRID CODE – ISSUE 5 REVISION 11**

### **INCLUSION OF REVISED SECTIONS**

Cover Page

Planning Code

Data Registration Code

### **SUMMARY OF CHANGES**

The changes arise from the implementation of modifications proposed in the following Consultation Papers:

#### **GC0042 - Information on Embedded Small Power Stations**

##### **Summary of Proposal**

This proposal seeks to modify the Grid Code and the Distribution Code to expand Network Operators' (DNOs') Week 24 data submissions to include information on Embedded Small Power Stations of Registered Capacity of 1MW or more. The proposal also includes provisions for the DNOs to collect the required information.

The categories of Users affected by this revision to the Grid Code are:

- Distribution Network Operators
- Distributed Generators

# **THE GRID CODE**

**ISSUE 5**

**REVISION 11**

**21 August 2014**

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# PLANNING CODE

(PC)

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- PC.1 INTRODUCTION
- PC.1.1 The **Planning Code** ("PC") specifies the technical and design criteria and procedures to be applied by **NGET** in the planning and development of the **National Electricity Transmission System** and to be taken into account by **Users** in the planning and development of their own **Systems**. In the case of **OTSUA**, the **PC** also specifies the technical and design criteria and procedures to be applied by the **User** in the planning and development of the **OTSUA**. It details information to be supplied by **Users** to **NGET**, and certain information to be supplied by **NGET** to **Users**. In Scotland and **Offshore**, **NGET** has obligations under the **STC** to inform **Relevant Transmission Licensees** of data required for the planning of the **National Electricity Transmission System**. In respect of **PC** data, **NGET** may pass on **User** data to a **Relevant Transmission Licensee**, as detailed in PC.3.4 and PC.3.5.
- PC.1.1A Provisions of the **PC** which apply in relation to **OTSDUW** and **OTSUA** shall apply up to the **OTSUA Transfer Time**, whereupon such provisions shall (without prejudice to any prior non-compliance) cease to apply, without prejudice to the continuing application of provisions of the **PC** applying in relation to the relevant **Offshore Transmission System** and/or **Connection Site**.
- PC.1.1B As used in the **PC**:
- (a) **National Electricity Transmission System** excludes **OTSDUW Plant and Apparatus** (prior to the **OTSUA Transfer Time**) unless the context otherwise requires;
  - (b) and User Development includes **OTSDUW** unless the context otherwise requires.
- PC.1.2 The **Users** referred to above are defined, for the purpose of the **PC**, in PC.3.1.
- PC.1.3 Development of the **National Electricity Transmission System**, involving its reinforcement or extension, will arise for a number of reasons including, but not limited to:
- (a) a development on a **User System** already connected to the **National Electricity Transmission System**;
  - (b) the introduction of a new **Connection Site** or the **Modification** of an existing **Connection Site** between a **User System** and the **National Electricity Transmission System**;
  - (c) the cumulative effect of a number of such developments referred to in (a) and (b) by one or more **Users**.
- PC.1.4 Accordingly, the reinforcement or extension of the **National Electricity Transmission System** may involve work:
- (a) at a substation at a **Connection Site** where **User's Plant** and/or **Apparatus** is connected to the **National Electricity Transmission System** (or in the case of **OTSDUW**, at a substation at an **Interface Point**);
  - (b) on transmission lines or other facilities which join that **Connection Site** (or in the case of **OTSDUW**, **Interface Point**) to the remainder of the **National Electricity Transmission System**;
  - (c) on transmission lines or other facilities at or between points remote from that **Connection Site** (or in the case of **OTSDUW**, **Interface Point**).
- PC.1.5 The time required for the planning and development of the **National Electricity Transmission System** will depend on the type and extent of the necessary reinforcement and/or extension work, the need or otherwise for statutory planning consent, the associated possibility of the need for a public inquiry and the degree of complexity in undertaking the new work while maintaining satisfactory security and quality of supply on the existing **National Electricity Transmission System**.

PC.2

OBJECTIVE

PC.2.1

The objectives of the **PC** are:

- (a) to promote **NGET/User** interaction in respect of any proposed development on the **User System** which may impact on the performance of the **National Electricity Transmission System** or the direct connection with the **National Electricity Transmission System**;
- (b) to provide for the supply of information to **NGET** from **Users** in order that planning and development of the **National Electricity Transmission System** can be undertaken in accordance with the relevant **Licence Standards**, to facilitate existing and proposed connections, and also to provide for the supply of certain information from **NGET** to **Users** in relation to short circuit current contributions and **OTSUA**; and
- (c) to specify the **Licence Standards** which will be used in the planning and development of the **National Electricity Transmission System**; and
- (d) to provide for the supply of information required by **NGET** from **Users** in respect of the following to enable **NGET** to carry out its duties under the **Act** and the **Transmission Licence**:
  - (i) **Mothballed Generating Units**; and
  - (ii) capability of gas-fired **Generating Units** to run using alternative fuels.

**NGET** will use the information provided under PC.2.1(d) in providing reports to the **Authority** and the **Secretary of State** and, where directed by the **Authority** or the **Secretary of State** to do so, **NGET** may publish the information. Where it is known by **NGET** that such information is intended for wider publication the information provided under PC.2.1(d) shall be aggregated such that individual data items should not be identifiable.

- (e) in the case of **OTSUA**:
  - (i) to specify the minimum technical and design criteria and procedures to be applied by **Users** in the planning and development of **OTSUA**; and thereby
  - (ii) to ensure that the **OTSUA** can from the **OTSUA Transfer Time** be operated as part of the **National Electricity Transmission System**; and
  - (iii) to provide for the arrangements and supply of information and data between **NGET** and a **User** to ensure that the **User** is able to undertake **OTSDUW**; and
  - (iv) to promote **NGET/User** interaction and co-ordination in respect of any proposed development on the **National Electricity Transmission System** or the **OTSUA**, which may impact on the **OTSUA** or (as the case may be) the **National Electricity Transmission System**.

PC.3

SCOPE

PC.3.1

The **PC** applies to **NGET** and to **Users**, which in the **PC** means:

- (a) **Generators**;
- (b) **Generators** undertaking **OTSDUW**;
- (c) **Network Operators**;
- (d) **Non-Embedded Customers**; and
- (e) **DC Converter Station** owners.

The above categories of **User** will become bound by the **PC** prior to them generating, operating, or consuming or importing/exporting, as the case may be, and references to the various categories (or to the general category) of **User** should, therefore, be taken as referring to them in that prospective role as well as to **Users** actually connected.

PC.3.2

In the case of **Embedded Power Stations** and **Embedded DC Converter 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 **NGET** in respect of (i) **Embedded Large Power Stations**, (ii) **Embedded Medium Power Stations** subject to a **Bilateral Agreement** and (iii) **Embedded Small Power Stations** which form part of a **Cascade Hydro Scheme**;
- (b) each **DC Converter** owner shall provide the data direct to **NGET** in respect of **Embedded DC Converter Stations** subject to a **Bilateral Agreement**;
- (c) each **Network Operator** shall provide the data to **NGET** in respect of each **Embedded Medium Power Station** not subject to a **Bilateral Agreement** or **Embedded DC Converter Station** not subject to a **Bilateral Agreement** connected, or proposed to be connected within such **Network Operator's System**;
- (d) although data is not normally required specifically on **Embedded Small Power Stations** or on **Embedded** installations of direct current converters which do not form a **DC Converter Station** under this **PC**, each **Network Operator** in whose **System** they are **Embedded** should provide the data (contained in the Appendix) to **NGET** in respect of **Embedded Small Power Stations** or **Embedded** installations of direct current converters which do not form a **DC Converter Station** 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 **NGET** 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** or **Embedded DC Converter Stations**, as provided in PC.A.1.12.

In summary, **Network Operators** are required to supply the following data in respect of **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** or **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** connected, or is proposed to be connected, within such **Network Operator's System**:

- PC.A.2.1.1
- PC.A.2.2.2
- PC.A.2.5.5.2
- PC.A.2.5.5.7
- PC.A.2.5.6
- PC.A.3.1.5
- PC.A.3.2.2
- PC.A.3.3.1
- PC.A.3.4.1
- PC.A.3.4.2
- PC.A.5.2.2
- PC.A.5.3.2
- PC.A.5.4
- PC.A.5.5.1
- PC.A.5.6

For the avoidance of doubt **Network Operators** are required to supply the above data in respect of **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** which are located **Offshore** and which are connected or proposed to be connected within such **Network Operator's System**. This is because **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** are treated as **Onshore Generators** or **Onshore DC Converter Station** owners connected to an **Onshore User System Entry Point**.

PC.3.4 **NGET** may provide to the **Relevant Transmission Licensees** any data which has been submitted to **NGET** by any **Users** pursuant to the following paragraphs of the **PC**. For the avoidance of doubt, **NGET** will not provide to the **Relevant Transmission Licensees**, the types of data specified in Appendix D. The **Relevant Transmission Licensees'** use of such data is detailed in the **STC**.

PC.A.2.2

PC.A.2.5

PC.A.3.1

PC.A.3.2.1

PC.A.3.2.2

PC.A.3.3

PC.A.3.4

PC.A.4

PC.A.5.1

PC.A.5.2

PC.A.5.3.1

PC.A.5.3.2

PC.A.5.4.1

PC.A.5.4.2

PC.A.5.4.3.1

PC.A.5.4.3.2

PC.A.5.4.3.3

PC.A.5.4.3.4

PC.A.7

(and in addition in respect of the data submitted in respect of the **OTSUA**)

PC.A.2.2

PC.A.2.3

PC.A.2.4

PC.A.2.5

PC.A.3.2.2

PC.A.3.3.1(d)

PC.A.4

PC.A.5.4.3.1

PC.A.5.4.3.2

PC.A.6.2

PC.A.6.3

PC.A.6.4

PC.A.6.5

PC.A.6.6

PC.A.7

PC.3.5 In addition to the provisions of PC.3.4 **NGET** may provide to the **Relevant Transmission Licensees** any data which has been submitted to **NGET** by any **Users** in respect of **Relevant Units** pursuant to the following paragraphs of the **PC**.

PC.A.2.3

PC.A.2.4

PC.A.5.5

PC.A.5.7

PC.A.6.2

PC.A.6.3

PC.A.6.4

PC.A.6.5

PC.A.6.6

PC.3.6 In the case of **Offshore Embedded Power Stations** connected to an **Offshore User System** which directly connects to an **Offshore Transmission System**, any additional data requirements in respect of such **Offshore Embedded Power Stations** may be specified in the relevant **Bilateral Agreement** with the **Network Operator** or in any **Bilateral Agreement** between **NGET** and such **Offshore Embedded Power Station**.

PC.3.7 In the case of a **Generator** undertaking **OTSDUW** connecting to an **Onshore Network Operator's System**, any additional requirements in respect of such **OTSDUW Plant and Apparatus** will be specified in the relevant **Bilateral Agreement** with the **Generator**. For the avoidance of doubt, requirements applicable to **Generators** undertaking **OTSDUW** and connecting to a **Network Operator's User System**, shall be consistent with those applicable requirements of **Generators** undertaking **OTSDUW** and connecting to a **Transmission Interface Point**.

#### PC.4 PLANNING PROCEDURES

PC.4.1 Pursuant to Condition C11 of **NGET's Transmission Licence**, the means by which **Users** and proposed **Users** of the **National Electricity Transmission System** are able to assess opportunities for connecting to, and using, the **National Electricity Transmission System** comprise two distinct parts, namely:

- (a) a statement, prepared by **NGET** under its **Transmission Licence**, showing for each of the seven succeeding **Financial Years**, the opportunities available for connecting to and using the **National Electricity Transmission System** and indicating those parts of the **National Electricity 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 its **Transmission Licence**, by **NGET** to enter into a **CUSC Contract**. A **Bilateral Agreement** is to be entered into for every **Connection Site** (and for certain **Embedded Power Stations** and **Embedded DC Converter Stations**) 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 at the **Transfer Date**;

- (ii) new **Connection Sites** (and for certain **Embedded Power Stations** and for **Embedded DC Converter Stations**) with effect from the **Transfer Date**;
- (iii) a **Modification** at a **Connection Site** (or in relation to the connection of certain **Embedded Power Stations** and for **Embedded DC Converter Stations** whether or not the subject of a **Bilateral Agreement**) (whether such **Connection Site** or connection exists on the **Transfer Date** or is new thereafter) with effect from the **Transfer Date**.

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

PC.4.2 Introduction to Data

User Data

PC.4.2.1 Under the **PC**, two types of data to be supplied by **Users** are called for:

- (a) **Standard Planning Data**; and
- (b) **Detailed Planning Data**,

as more particularly provided in PC.A.1.4.

PC.4.2.2 The **PC** recognises that these two types of data, namely **Standard Planning Data** and **Detailed Planning Data**, are considered at three different levels:

- (a) **Preliminary Project Planning Data**;
- (b) **Committed Project Planning Data**; and
- (c) **Connected Planning Data**,

as more particularly provided in PC.5

PC.4.2.3 **Connected Planning Data** is itself divided into:

- (a) **Forecast Data**;
- (b) **Registered Data**; and
- (c) **Estimated Registered Data**,

as more particularly provided in PC.5.5

PC.4.2.4 Clearly, an existing **User** proposing a new **Connection Site** (or **Embedded Power Station** or **Embedded DC Converter Station** in the circumstances outlined in PC.4.1) will need to supply data both in an application for a **Bilateral Agreement** and under the **PC** in relation to that proposed new **Connection Site** (or **Embedded Power Station** or **Embedded DC Converter Station** in the circumstances outlined in PC.4.1) and that will be treated as **Preliminary Project Planning Data** or **Committed Project Planning Data** (as the case may be), but the data it supplies under the **PC** relating to its existing **Connection Sites** will be treated as **Connected Planning Data**.

Network Data

PC.4.2.5 In addition, there is **Network Data** supplied by **NGET** in relation to short circuit current contributions and in relation to **OTSUA**.

PC.4.3 Data Provision

PC.4.3.1 Seven Year Statement

To enable the **Seven Year Statement** to be prepared, each **User** is required to submit to **NGET** (subject to the provisions relating to **Embedded Power Stations** and **Embedded DC Converter Stations** in PC.3.2) both the **Standard Planning Data** and the **Detailed Planning Data** as listed in parts 1 and 2 of the Appendix. This data should be submitted in calendar week 24 of each year (although **Network Operators** may delay the submission of data (other than that to be submitted pursuant to PC.3.2(c) and PC.3.2(d)) until calendar week 28) and should cover each of the seven succeeding **Financial Years** (and in certain instances, the current year). Where, from the date of one submission to another, there is no change in the data (or in some of the data) to be submitted, instead of re-submitting the data, a **User** may submit a written statement that there has been no change from the data (or in some of the data) submitted the previous time. In addition, **NGET** will also use the **Transmission Entry Capacity** and **Connection Entry Capacity** data from the **CUSC Contract**, and any data submitted by **Network Operators** in relation to an **Embedded Medium Power Station** not subject to a **Bilateral Agreement** or **Embedded DC Converter Station** not subject to a **Bilateral Agreement**, in the preparation of the **Seven Year Statement** and to that extent the data will not be treated as confidential.

PC.4.3.2 Network Data

To enable **Users** to model the **National Electricity Transmission System** in relation to short circuit current contributions, **NGET** is required to submit to **Users** the **Network Data** as listed in Part 3 of the Appendix. The data will be submitted in week 42 of each year and will cover that **Financial Year**.

PC.4.3.3 To enable **Users** to model the **National Electricity Transmission System** in relation to **OTSUA**, **NGET** is required to submit to **Users** the **Network Data** as listed in Part 3 of Appendix A and Appendix F. **NGET** shall provide the **Network Data** with the offer of a **CUSC Contract** in the case of the data in PC F2.1 and otherwise in accordance with the **OTSDUW Development and Data Timetable**.

PC.4.4 Offer of Terms for Connection

PC.4.4.1 CUSC Contract – Data Requirements/Offer Timing

The completed application form for a **CUSC Contract** to be submitted by a **User** when making an application for a **CUSC Contract** will include:

- (a) a description of the **Plant** and/or **Apparatus** (excluding **OTSDUW Plant and Apparatus**) to be connected to the **National Electricity Transmission System** or of the **Modification** relating to the **User's Plant** and/or **Apparatus** (and prior to the **OTSUA Transfer Time**, any **OTSUA**) already connected to the **National Electricity Transmission System** or, as the case may be, of the proposed new connection or **Modification** to the connection within the **User System** of the **User**, each of which shall be termed a "**User Development**" in the **PC**;
- (b) the relevant **Standard Planning Data** as listed in Part 1 of the Appendix (except in respect of any **OTSUA**); and
- (c) the desired **Completion Date** of the proposed **User Development**.
- (d) the desired **Connection Entry Capacity** and **Transmission Entry Capacity**.

The completed application form for a **CUSC Contract** will be sent to **NGET** as more particularly provided in the application form.

PC.4.4.2 Any offer of a **CUSC Contract** will provide that it must be accepted by the applicant **User** within the period stated in the offer, after which the offer automatically lapses. Except as provided in the **CUSC Contract**, acceptance of the offer renders the **National Electricity Transmission System** works relating to that **User Development**, reflected in the offer, committed and binds both parties to the terms of the offer. The User shall then provide the **Detailed Planning Data** as listed in Part 2 of the Appendix (and in the case of **OTSUA** the **Standard Planning Data** as listed in Part 1 of Appendix A within the timeline provided in PC.A.1.4). In respect of **DPD I** this shall generally be provided within 28 days (or such shorter period as **NGET** may determine, or such longer period as **NGET** may agree, in any particular case) of acceptance of the offer and in respect of **DPD II** this shall generally be provided at least two years (or such longer period as **NGET** may determine, or such shorter period as **NGET** may agree, in any particular case or in the case of **OTSUA** such shorter period as **NGET** shall require) prior to the **Completion Date** of the **User Development**.

PC.4.4.3 Embedded Development Agreement - Data Requirements

The **Network Operator** shall submit the following data in relation to an **Embedded Medium Power Station** not subject to, or proposed to be subject to, a **Bilateral Agreement** or **Embedded DC Converter Station** not subject to, or proposed to be subject to, a **Bilateral Agreement** as soon as reasonably practicable after receipt of an application from an **Embedded Person** to connect to its **System**:

- (a) details of the proposed new connection or variation (having a similar effect on the **Network Operator's System** as a **Modification** would have on the **National Electricity Transmission System**) to the connection within the **Network Operator's System**, each of which shall be termed an "**Embedded Development**" in the **PC** (where a **User Development** has an impact on the **Network Operator's System** details shall be supplied in accordance with PC.4.4 and PC.4.5);
- (b) the relevant **Standard Planning Data** as listed in Part 1 of the Appendix;
- (c) the proposed completion date (having a similar meaning in relation to the **Network Operator's System** as **Completion Date** would have in relation to the **National Electricity Transmission System**) of the **Embedded Development**; and
- (d) upon the request of **NGET**, the relevant **Detailed Planning Data** as listed in Part 2 of the Appendix.

PC.4.4.4 The **Network Operator** shall provide the **Detailed Planning Data** as listed in Part 2 of the Appendix. In respect of **DPD I** this shall generally be provided within 28 days (or such shorter period as **NGET** may determine, or such longer period as **NGET** may agree, in any particular case) of entry into the **Embedded Development Agreement** and in respect to **DPD II** this shall generally be provided at least two years (or such longer period as **NGET** may determine, or such shorter period as **NGET** may agree, in any particular case) prior to the **Completion Date** of the **Embedded Development**.

PC.4.5 Complex Connections

PC.4.5.1 The magnitude and complexity of any **National Electricity Transmission System** extension or reinforcement will vary according to the nature, location and timing of the proposed **User Development** which is the subject of the application and it may, in the event, be necessary for **NGET** to carry out additional more extensive system studies to evaluate more fully the impact of the proposed **User Development** on the **National Electricity Transmission System**. Where **NGET** judges that such additional more detailed studies are necessary the offer may indicate the areas that require more detailed analysis and before such additional studies are required, the **User** shall indicate whether it wishes **NGET** to undertake the work necessary to proceed to make a revised offer within the 3 month period normally allowed or, where relevant, the timescale consented to by the **Authority**.

PC.4.5.2 To enable **NGET** to carry out any of the above mentioned necessary detailed system studies, the **User** may, at the request of **NGET**, be required to provide some or all of the **Detailed Planning Data** listed in part 2 of the Appendix in advance of the normal timescale referred in PC.4.4.2 provided that **NGET** can reasonably demonstrate that it is relevant and necessary.

PC.4.5.3 To enable **NGET** to carry out any necessary detailed system studies, the relevant **Network Operator** may, at the request of **NGET**, be required to provide some or all of the **Detailed Planning Data** listed in Part 2 of the Appendix in advance of the normal timescale referred in PC.4.4.4 provided that **NGET** can reasonably demonstrate that it is relevant and necessary.

PC.5 PLANNING DATA

PC.5.1 As far as the **PC** is concerned, there are three relevant levels of data in relation to **Users**. These levels, which relate to levels of confidentiality, commitment and validation, are described in the following paragraphs.

Preliminary Project Planning Data

PC.5.2 At the time the **User** applies for a **CUSC Contract** but before an offer is made and accepted by the applicant **User**, the data relating to the proposed **User Development** will be considered as **Preliminary Project Planning Data**. Data relating to an **Embedded Development** provided by a **Network Operator** in accordance with PC.4.4.3, and PC.4.4.4 if requested, will be considered as **Preliminary Project Planning Data**. All such data will be treated as confidential within the scope of the provisions relating to confidentiality in the **CUSC**.

PC.5.3 **Preliminary Project Planning Data** will normally only contain the **Standard Planning Data** unless the **Detailed Planning Data** is required in advance of the normal timescale to enable **NGET** to carry out additional detailed system studies as described in PC.4.5.

Committed Project Planning Data

PC.5.4 Once the offer for a **CUSC Contract** is accepted, the data relating to the **User Development** already submitted as **Preliminary Project Planning Data**, and subsequent data required by **NGET** under this **PC**, will become **Committed Project Planning Data**. Once an **Embedded Person** has entered into an **Embedded Development Agreement**, as notified to **NGET** by the **Network Operator**, the data relating to the **Embedded Development** already submitted as **Preliminary Project Planning Data**, and subsequent data required by **NGET** under the **PC**, will become **Committed Project Planning Data**. Such data, together with **Connection Entry Capacity** and **Transmission Entry Capacity** data from the **CUSC Contract** and other data held by **NGET** relating to the **National Electricity Transmission System** will form the background against which new applications by any **User** will be considered and against which planning of the **National Electricity Transmission System** will be undertaken. Accordingly, **Committed Project Planning Data**, **Connection Entry Capacity** and **Transmission Entry Capacity** data will not be treated as confidential to the extent that **NGET**:

- (a) is obliged to use it in the preparation of the **Seven Year Statement** and in any further information given pursuant to the **Seven Year Statement**;
- (b) is obliged to use it when considering and/or advising on applications (or possible applications) of other **Users** (including making use of it by giving data from it, both orally and in writing, to other **Users** making an application (or considering or discussing a possible application) which is, in **NGET's** view, relevant to that other application or possible application);
- (c) is obliged to use it for operational planning purposes;
- (d) is obliged under the terms of an **Interconnection Agreement** to pass it on as part of system information on the **Total System**;
- (e) is obliged to disclose it under the **STC**;
- (f) is obliged to use and disclose it in the preparation of the **Offshore Development Information Statement**;
- (g) is obliged to use it in order to carry out its **EMR Functions** or is obliged to disclose it under an **EMR Document**.

To reflect different types of data, **Preliminary Project Planning Data** and **Committed Project Planning Data** are themselves divided into:

- (a) those items of **Standard Planning Data** and **Detailed Planning Data** which will always be forecast, known as **Forecast Data**; and
- (b) those items of **Standard Planning Data** and **Detailed Planning Data** which relate to **Plant** and/or **Apparatus** which upon connection will become **Registered Data**, but which prior to connection, for the seven succeeding **Financial Years**, will be an estimate of what is expected, known as **Estimated Registered Data**.

#### Connected Planning Data

PC.5.5

The **PC** requires that, at the time that a **Statement of Readiness** is submitted under the **Bilateral Agreement** and/or **Construction Agreement**, any estimated values assumed for planning purposes are 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**. In the case of an **Embedded Development** the relevant **Network Operator** will update any estimated values assumed for planning purposes with validated actual values as soon as reasonably practicable after energisation. This data is then termed **Connected Planning Data**.

To reflect the three types of data referred to above, **Connected Planning Data** is itself divided into:

- (a) those items of **Standard Planning Data** and **Detailed Planning Data** which will always be forecast data, known as **Forecast Data**; and
- (b) those items of **Standard Planning Data** and **Detailed Planning Data** which upon connection become fixed (subject to any subsequent changes), known as **Registered Data**; and
- (c) those items of **Standard Planning Data** and **Detailed Planning Data** which for the purposes of the **Plant** and/or **Apparatus** concerned as at the date of submission are **Registered Data** but which for the seven succeeding **Financial Years** will be an estimate of what is expected, known as **Estimated Registered Data**,

as more particularly provided in the Appendix.

PC.5.6

**Connected Planning Data**, together with **Connection Entry Capacity** and **Transmission Entry Capacity** data from the **CUSC Contract**, and other data held by **NGET** relating to the **National Electricity Transmission System**, will form the background against which new applications by any **User** will be considered and against which planning of the **National Electricity Transmission System** will be undertaken. Accordingly, **Connected Planning Data**, **Connection Entry Capacity** and **Transmission Entry Capacity** data will not be treated as confidential to the extent that **NGET**:

- (a) is obliged to use it in the preparation of the **Seven Year Statement** and in any further information given pursuant to the **Seven Year Statement**;
- (b) is obliged to use it when considering and/or advising on applications (or possible applications) of other **Users** (including making use of it by giving data from it, both orally and in writing, to other **Users** making an application (or considering or discussing a possible application) which is, in **NGET's** view, relevant to that other application or possible application);
- (c) is obliged to use it for operational planning purposes;
- (d) is obliged under the terms of an **Interconnection Agreement** to pass it on as part of system information on the **Total System**.
- (e) is obliged to disclose it under the **STC**;
- (f) is obliged to use it in order to carry out its **EMR Functions** or is obliged to disclose it under an **EMR Document**.

PC.5.7

**Committed Project Planning Data** and **Connected Planning Data** will each contain both **Standard Planning Data** and **Detailed Planning Data**.

PC.6 PLANNING STANDARDS

- PC.6.1 **NGET** shall apply the **Licence Standards** relevant to planning and development, in the planning and development of its **Transmission System**. **NGET** shall procure that each **Relevant Transmission Licensee** shall apply the **Licence Standards** relevant to planning and development, in the planning and development of the **Transmission System** of each **Relevant Transmission Licensee** and that a **User** shall apply the **Licence Standards** relevant to planning and development, in the planning and development of the **OTSUA**.
- PC.6.2 In relation to Scotland, Appendix C lists the technical and design criteria applied in the planning and development of each **Relevant Transmission Licensee's Transmission System**. The criteria are subject to review in accordance with each **Relevant Transmission Licensee's Transmission Licence** conditions. Copies of these documents are available from **NGET** on request. **NGET** will charge an amount sufficient to recover its reasonable costs incurred in providing this service.
- PC.6.3 In relation to **Offshore**, Appendix E lists the technical and design criteria applied in the planning and development of each **Offshore Transmission System**. The criteria are subject to review in accordance with each **Offshore Transmission Licensee's Transmission Licence** conditions. Copies of these documents are available from **NGET** on request. **NGET** will charge an amount sufficient to recover its reasonable costs incurred in providing this service.
- PC.6.4 In planning and developing the **OTSUA**, the **User** shall comply with (and shall ensure that (as at the **OTSUA Transfer Time**) the **OTSUA** comply with):
- (a) the **Licence Standards**; and
  - (b) the technical and design criteria in Appendix E.
- PC.6.5 In addition the **User** shall, in the planning and development of the **OTSUA**, to the extent it is reasonable and practicable to do so, take into account the reasonable requests of **NGET** (in the context of its obligation to develop an efficient, co-ordinated and economical system) relating to the planning and development of the **National Electricity Transmission System**.
- PC.6.6 In planning and developing the **OTSUA** the **User** shall take into account the **Network Data** provided to it by **NGET** under Part 3 of Appendix A and Appendix F, and act on the basis that the **Plant** and **Apparatus** of other **Users** complies with:
- (a) the minimum technical design and operational criteria and performance requirements set out in CC.6.1, CC.6.2, CC.6.3 and CC.6.4; or
  - (b) such other criteria or requirements as **NGET** may from time to time notify the **User** are applicable to specified **Plant** and **Apparatus** pursuant to PC.6.7.
- PC.6.7 Where the **OTSUA** are likely to be materially affected by the design or operation of another **User's Plant** and **Apparatus** and **NGET**:
- (a) becomes aware that such other User has or is likely to apply for a derogation under the Grid Code;
  - (b) is itself applying for a derogation under the Grid Code in relation to the **Connection Site** on which such other **User's Plant** and **Apparatus** is located or to which it otherwise relates; or
  - (c) is otherwise notified by such other **User** that specified **Plant** or **Apparatus** is normally capable of operating at levels better than those set out in CC.6.1, CC.6.2, CC.6.3 and CC.6.4,
- NGET** shall notify the **User**.

PC.7 PLANNING LIAISON

PC.7.1 This PC.7 applies to **NGET** and **Users**, which in PC.7 means

- (a) **Network Operators**
- (b) **Non-Embedded Customers**

PC.7.2 As described in PC.2.1 (b) an objective of the **PC** is to provide for the supply of information to **NGET** by **Users** in order that planning and development of the **National Electricity Transmission System** can be undertaken in accordance with the relevant **Licence Standards**.

PC.7.3 **Grid Code** amendment B/07 (“Amendment B/07”) implemented changes to the **Grid Code** which included amendments to the datasets provided by both **NGET** and **Users** to inform the planning and development of the **National Electricity Transmission System**. The **Authority** has determined that these changes are to have a phased implementation. Consequently the provisions of Appendix A to the **PC** include specific years (ranging from 2009 to 2011) with effect from which certain of the specific additional obligations brought about by Amendment B/07 on **NGET** and **Users** are to take effect. Where specific provisions of paragraphs PC.A.4.1.4, PC.A.4.2.2 and PC.A.4.3.1 make reference to a year, then the obligation on **NGET** and the **Users** shall be required to be met by the relevant calendar week (as specified within such provision) in such year.

In addition to the phased implementation of aspects of Amendment B/07, **Users** must discuss and agree with **NGET** by no later than 31 March 2009 a more detailed implementation programme to facilitate the implementation of **Grid Code** amendment B/07.

It shall also be noted by **NGET** and **Users** that the dates set out in PC.A.4 are intended to be minimum requirements and are not intended to restrict a **User** and **NGET** from the earlier fulfilment of the new requirements prior to the specified years. Where **NGET** and a **User** wish to follow the new requirements from earlier dates than those specified, this will be set out in the more detailed implementation programme agreed between **NGET** and the **User**.

The following provisions of PC.7 shall only apply with effect from 1 January 2011.

PC.7.4 Following the submission of data by a **User** in or after week 24 of each year **NGET** will provide information to **Users** by calendar week 6 of the following year regarding the results of any relevant assessment that has been made by **NGET** based upon such data submissions to verify whether **Connection Points** are compliant with the relevant **Licence Standards**.

PC.7.5 Where the result of any assessment identifies possible future non-compliance with the relevant **Licence Standards** **NGET** shall notify the relevant **User(s)** of this fact as soon as reasonably practicable and shall agree with **Users** any opportunity to resubmit data to allow for a reassessment in accordance with PC.7.6.

PC.7.6 Following any notification by **NGET** to a **User** pursuant to PC.7.5 and following any further discussions held between the **User** and **NGET**:

- (i) **NGET** and the **User** may agree revisions to the **Access Periods** for relevant **Transmission Interface Circuits**, such revisions shall not however permit an **Access Period** to be less than 4 continuous weeks in duration or to occur other than between calendar weeks 10 and 43 (inclusive); and/or,
- (ii) The **User** shall as soon as reasonably practicable
  - (a) submit further relevant data to **NGET** that is to **NGET’s** reasonable satisfaction; and/or,
  - (b) modify data previously submitted pursuant to this **PC**, such modified data to be to **NGET’s** reasonable satisfaction; and/or
  - (c) notify **NGET** that it is the intention of the **User** to leave the data as originally submitted to **NGET** to stand as its submission.

PC.7.7 Where an **Access Period** is amended pursuant to PC.7.6 (i) **NGET** shall notify **The Authority** that it has been necessary to do so.

- PC.7.8 When it is agreed that any resubmission of data is unlikely to confirm future compliance with the relevant **Licence Standards** the **Modification** process in the **CUSC** may apply.
- PC.7.9 A **User** may at any time, in writing, request further specified **National Electricity Transmission System** network data in order to provide **NGET** with viable **User** network data (as required under this **PC**). Upon receipt of such request **NGET** shall consider, and where appropriate provide such **National Electricity Transmission System** network data to the **User** as soon as reasonably practicable following the request.
- PC.8 OTSDUW PLANNING LIAISON
- PC.8.1 This PC.8 applies to **NGET** and **Users**, which in PC.8 means **Users** undertaking **OTSDUW**
- PC.8.2 As described in PC.2.1 (e) an objective of the **PC** is to provide for the supply of information between **NGET** and a **User** undertaking **OTSDUW** in order that planning and development of the **National Electricity Transmission System** can beco-ordinated.
- PC.8.3 Where the **OTSUA** also require works to be undertaken by **NGET** and/or any **Relevant Transmission Licensee** on its **Transmission System** **NGET** and the **User** shall throughout the construction and commissioning of such works:
- (a) co-operate and assist each other in the development of co-ordinated construction programmes or any other planning or, in the case of **NGET**, analysis it undertakes in respect of the works; and
  - (b) provide to each other all information relating to its own works (and in the case of **NGET** the works on other **Transmission Systems**) reasonably necessary to assist each other in the performance of that other's part of the works, and shall use all reasonable endeavours to co-ordinate and integrate their respective part of the works; and
- the **User** shall plan and develop the **OTSUA**, taking into account to the extent that it is reasonable and practicable to do so the reasonable requests of **NGET** relating to the planning and development of the **National Electricity Transmission System**.
- PC.8.4 Where **NGET** becomes aware that changes made to the investment plans of **NGET** and any **Relevant Transmission Licensee** may have a material effect on the **OTSUA**, **NGET** shall notify the **User** and provide the **User** with the necessary information about the relevant **Transmission Systems** sufficient for the **User** to assess the impact on the **OTSUA**.

## APPENDIX A - PLANNING DATA REQUIREMENTS

### PC.A.1 INTRODUCTION

PC.A.1.1 The Appendix specifies data requirements to be submitted to **NGET** by **Users**, and in certain circumstances to **Users** by **NGET**.

### PC.A.1.2 Submissions by Users

- (a) Planning data submissions by **Users** shall be:
- (i) with respect to each of the seven succeeding **Financial Years** (other than in the case of **Registered Data** which will reflect the current position and data relating to **Demand** forecasts which relates also to the current year);
  - (ii) provided by **Users** in connection with a **CUSC Contract** (PC.4.1, PC.4.4 and PC.4.5 refer);
  - (iii) provided by **Users** on a routine annual basis in calendar week 24 of each year to maintain an up-to-date data bank (although **Network Operators** may delay the submission of data (other than that to be submitted pursuant to PC.3.2(c) and PC.3.2(d)) until calendar week 28). Where from the date of one annual submission to another there is no change in the data (or in some of the data) to be submitted, instead of re-submitting the data, a **User** may submit a written statement that there has been no change from the data (or some of the data) submitted the previous time; and
  - (iv) provided by **Network Operators** in connection with **Embedded Development** (PC.4.4 refers).
- (b) Where there is any change (or anticipated change) in **Committed Project Planning Data** or a significant change in **Connected Planning Data** in the category of **Forecast Data** or any change (or anticipated change) in **Connected Planning Data** in the categories of **Registered Data** or **Estimated Registered Data** supplied to **NGET** under the **PC**, notwithstanding that the change may subsequently be notified to **NGET** under the **PC** as part of the routine annual update of data (or that the change may be a **Modification** under the **CUSC**), the **User** shall, subject to PC.A.3.2.3 and PC.A.3.2.4, notify **NGET** in writing without delay.
- (c) The notification of the change will be in the form required under this **PC** in relation to the supply of that data and will also contain the following information:
- (i) the time and date at which the change became, or is expected to become, effective;
  - (ii) if the change is only temporary, an estimate of the time and date at which the data will revert to the previous registered form.
- (d) The routine annual update of data, referred to in (a)(iii) above, need not be submitted in respect of **Small Power Stations** or **Embedded** installations of direct current converters which do not form a **DC Converter Station** (except as provided in PC.3.2.(c)), or unless specifically requested by **NGET**, or unless otherwise specifically provided.

### PC.A.1.3 Submissions by NGET

**Network Data** release by **NGET** shall be:

- (a) with respect to the current **Financial Year**;
- (b) provided by **NGET** on a routine annual basis in calendar week 42 of each year. Where from the date of one annual submission to another there is no change in the data (or in some of the data) to be released, instead of repeating the data, **NGET** may release a written statement that there has been no change from the data (or some of the data) released the previous time.

The three parts of the Appendix

PC.A.1.4 The data requirements listed in this Appendix are subdivided into the following four parts:

(a) Standard Planning Data

This data (as listed in Part 1 of the Appendix) is first to be provided by a **User** at the time of an application for a **CUSC Contract** or in accordance with PC.4.4.3. It comprises data which is expected normally to be sufficient for **NGET** to investigate the impact on the **National Electricity Transmission System** of any **User Development** or **Embedded Development** associated with an application by the **User** for a **CUSC Contract**. **Users** should note that the term **Standard Planning Data** also includes the information referred to in PC.4.4.1.(a) and PC.4.4.3.(a). In the case of **OTSUA**, this data is first to be provided by a **User** in accordance with the time line in Appendix F.

(b) Detailed Planning Data

This data (as listed in Part 2 of the Appendix) includes both **DPD I** and **DPD II** and is to be provided in accordance with PC.4.4.2 and PC.4.4.4. It comprises additional, more detailed, data not normally expected to be required by **NGET** to investigate the impact on the **National Electricity Transmission System** of any **User Development** associated with an application by the **User** for a **CUSC Contract** or **Embedded Development Agreement**. **Users** and **Network Operators** in respect of **Embedded Developments** should note that the term **Detailed Planning Data** also includes **Operation Diagrams** and **Site Common Drawings** produced in accordance with the **CC**.

The **User** may, however, be required by **NGET** to provide the **Detailed Planning Data** in advance of the normal timescale before **NGET** can make an offer for a **CUSC Contract**, as explained in PC.4.5.

(c) Network Data

The data requirements for **NGET** in this Appendix are in Part 3.

(d) Offshore Transmission System (OTSDUW) Data

**Generators** who are undertaking **OTSDUW** are required to submit data in accordance with Appendix A as summarised in Schedule 18 of the **Data Registration Code**.

Forecast Data, Registered Data and Estimated Registered Data

PC.A.1.5 As explained in PC.5.4 and PC.5.5, **Planning Data** is divided into:

- (i) those items of **Standard Planning Data** and **Detailed Planning Data** known as **Forecast Data**; and
- (ii) those items of **Standard Planning Data** and **Detailed Planning Data** known as **Registered Data**; and
- (iii) those items of **Standard Planning Data** and **Detailed Planning Data** known as **Estimated Registered Data**.

PC.A.1.6 The following paragraphs in this Appendix relate to **Forecast Data**:

3.2.2(b), (h), (i) and (j)

4.2.1

4.3.1

4.3.2

4.3.3

4.3.4

4.3.5

4.5

4.7.1

5.2.1

5.2.2

5.6.1

PC.A.1.7 The following paragraphs in this Appendix relate to **Registered Data** and **Estimated Registered Data**:

2.2.1

2.2.4

2.2.5

2.2.6

2.3.1

2.4.1

2.4.2

3.2.2(a), (c), (d), (e), (f), (g), (i)(part) and (j)

3.4.1

3.4.2

4.2.3

4.5(a)(i), (a)(iii), (b)(i) and (b)(iii)

4.6

5.3.2

5.4

5.4.2

5.4.3

5.5

5.6.3

6.2

6.3

PC.A.1.8 The data supplied under PC.A.3.3.1, although in the nature of **Registered Data**, is only supplied either upon application for a **CUSC Contract**, or in accordance with PC.4.4.3, and therefore does not fall to be **Registered Data**, but is **Estimated Registered Data**.

PC.A.1.9 **Forecast Data** must contain the **User's** best forecast of the data being forecast, acting as a reasonable and prudent **User** in all the circumstances.

PC.A.1.10 **Registered Data** must contain validated actual values, parameters or other information (as the case may be) which replace the estimated values, parameters or other information (as the case may be) which were given in relation to those data items when they were **Preliminary Project Planning Data** and **Committed Project Planning Data**, or in the case of changes, which replace earlier actual values, parameters or other information (as the case may be). Until amended pursuant to the **Grid Code**, these actual values, parameters or other information (as the case may be) will be the basis upon which the **National Electricity Transmission System** is planned, designed, built and operated in accordance with, amongst other things, the **Transmission Licences**, the **STC** and the **Grid Code**, and on which **NGET** therefore relies. In following the processes set out in the **BC**, **NGET** will use the data which has been supplied to it under the **BC** and the data supplied under **OC2** in relation to **Gensets**, but the provision of such data will not alter the data supplied by **Users** under the **PC**, which may only be amended as provided in the **PC**.

PC.A.1.11 **Estimated Registered Data** must contain the **User's** best estimate of the values, parameters or other information (as the case may be), acting as a reasonable and prudent **User** in all the circumstances.

- PC.A.1.12 Certain data does not need to be supplied in relation to **Embedded Power Stations** or **Embedded DC Converter Stations** where these are connected at a voltage level below the voltage level directly connected to the **National Electricity Transmission System** except in connection with a **CUSC Contract**, or unless specifically requested by **NGET**.
- PC.A.1.13 In the case of **OTSUA**, Schedule 18 of the **Data Registration Code** shall be construed in such a manner as to achieve the intent of such provisions by reference to the **OTSUA** and the **Interface Point** and all **Connection Points**.

## PART 1 - STANDARD PLANNING DATA

### PC.A.2 USER'S SYSTEM (AND OTSUA) DATA

#### PC.A.2.1 Introduction

PC.A.2.1.1 Each **User**, whether connected directly via an existing **Connection Point** to the **National Electricity Transmission System**, or seeking such a direct connection, or providing terms for connection of an **Offshore Transmission System** to its **User System** to **NGET**, shall provide **NGET** with data on its **User System** (and any **OTSUA**) which relates to the **Connection Site** (and in the case of **OTSUA**, the **Interface Point**) and/or which may have a system effect on the performance of the **National Electricity Transmission System**. Such data, current and forecast, is specified in PC.A.2.2 to PC.A.2.5. In addition each **Generator** in respect of its **Embedded Large Power Stations** and its **Embedded Medium Power Stations** subject to a **Bilateral Agreement** and each **Network Operator** in respect of **Embedded Medium Power Stations** within its **System** not subject to a **Bilateral Agreement** connected to the **Subtransmission System**, shall provide **NGET** with fault infeed data as specified in PC.A.2.5.5 and each **DC Converter** owner with **Embedded DC Converter Stations** subject to a **Bilateral Agreement**, or **Network Operator** in the case of **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**, connected to the **Subtransmission System** shall provide **NGET** with fault infeed data as specified in PC.A.2.5.6.

PC.A.2.1.2 Each **User** must reflect the system effect at the **Connection Site(s)** of any third party **Embedded** within its **User System** whether existing or proposed.

PC.A.2.1.3 Although not itemised here, each **User** with an existing or proposed **Embedded Small Power Station**, **Embedded Medium Power Station** or **Embedded DC Converter Station** with a **Registered Capacity** of less than 100MW or an **Embedded** installation of direct current converters which does not form a **DC Converter Station** in its **User System** may, at **NGET's** reasonable discretion, be required to provide additional details relating to the **User's System** between the **Connection Site** and the existing or proposed **Embedded Small Power Station**, **Embedded Medium Power Station** or **Embedded DC Converter Station** or **Embedded** installation of direct current converters which does not form a **DC Converter Station**.

PC.A.2.1.4 At **NGET's** reasonable request, additional data on the **User's System** (or **OTSUA**) will need to be supplied. Some of the possible reasons for such a request, and the data required, are given in PC.A.6.2, PC.A.6.4, PC.A.6.5 and PC.A.6.6.

#### PC.A.2.2 User's System (and OTSUA) Layout

PC.A.2.2.1 Each **User** shall provide a **Single Line Diagram**, depicting both its existing and proposed arrangement(s) of load current carrying **Apparatus** relating to both existing and proposed **Connection Points** (including in the case of **OTSUA**, **Interface Points**).

PC.A.2.2.2 The **Single Line Diagram** (three examples are shown in Appendix B) must include all parts of the **User System** operating at **Supergrid Voltage** throughout **Great Britain** and, in Scotland and **Offshore**, also all parts of the **User System** operating at 132kV, and those parts of its **Subtransmission System** at any **Transmission Site**. In the case of **OTSDUW**, the **Single Line Diagram** must also include the **OTSUA**. In addition, the **Single Line Diagram** must include all parts of the **User's Subtransmission System** (and any **OTSUA**) throughout **Great Britain** operating at a voltage greater than 50kV, and, in Scotland and **Offshore**, also all parts of the **User's Subtransmission System** (and any **OTSUA**) operating at a voltage greater than 30kV, which, under either intact network or **Planned Outage** conditions:-

- (a) normally interconnects separate **Connection Points**, or busbars at a **Connection Point** which are normally run in separate sections; or
- (b) connects **Embedded Large Power Stations**, or **Embedded Medium Power Stations**, or **Embedded DC Converter Stations** or **Offshore Transmission Systems** connected to the **User's Subtransmission System**, to a **Connection Point** or **Interface Point**.

At the **User's** discretion, the **Single Line Diagram** can also contain additional details of the **User's Subtransmission System** (and any **OTSUA**) not already included above, and also details of the transformers connecting the **User's Subtransmission System** to a lower voltage. With **NGET's** agreement, the **Single Line Diagram** can also contain information about the **User's System** (and any **OTSUA**) at a voltage below the voltage of the **Subtransmission System**.

The **Single Line Diagram** for a **Power Park Module** must include all parts of the System connecting generating equipment to the **Grid Entry Point** (or **User System Entry Point** if **Embedded**). As an alternative the **User** may choose to submit a **Single Line Diagram** with the equipment between the equivalent **Power Park Unit** and the **Common Collection Busbar** reduced to an electrically equivalent network. The format for a **Single Line Diagram** for a **Power Park Module** electrically equivalent system is shown in Appendix B.

The **Single Line Diagram** must include the points at which **Demand** data (provided under PC.A.4.3.4 and PC.A.4.3.5, or in the case of **Generators**, PC.A.5.) and fault infeed data (provided under PC.A.2.5) are supplied.

PC.A.2.2.3 The above mentioned **Single Line Diagram** shall include:

- (a) electrical circuitry (ie. overhead lines, identifying which circuits are on the same towers, underground cables, power transformers, reactive compensation equipment and similar equipment); and
- (b) substation names (in full or abbreviated form) with operating voltages.

In addition, for all load current carrying **Apparatus** operating at **Supergrid Voltage** throughout **Great Britain** and, in Scotland and **Offshore**, also at 132kV, (and any **OTSUA**) the **Single Line Diagram** shall include:-

- (a) circuit breakers
- (b) phasing arrangements.

PC.A.2.2.3.1 For the avoidance of doubt, the **Single Line Diagram** to be supplied is in addition to the **Operation Diagram** supplied pursuant to CC.7.4.

PC.A.2.2.4 For each circuit shown on the **Single Line Diagram** provided under PC.A.2.2.1, each **User** shall provide the following details relating to that part of its **User System** and **OTSUA**:

Circuit Parameters:

Rated voltage (kV)

Operating voltage (kV)

Positive phase sequence reactance

Positive phase sequence resistance

Positive phase sequence susceptance

Zero phase sequence reactance (both self and mutual)

Zero phase sequence resistance (both self and mutual)

Zero phase sequence susceptance (both self and mutual)

In the case of a **Single Line Diagram** for a **Power Park Module** electrically equivalent system the data should be on a 100MVA base. Depending on the equivalent system supplied an equivalent tap changer range may need to be supplied. Similarly mutual values, rated voltage and operating voltage may be inappropriate. Additionally in the case of **OTSUA**, seasonal maximum continuous ratings and circuit lengths are to be provided in addition to the data required under PC.A.2.2.4.

PC.A.2.2.5 For each transformer shown on the **Single Line Diagram** provided under PC.A.2.2.1, each **User** (including those undertaking **OTSDUW**) shall provide the following details:

Rated MVA

Voltage Ratio

Winding arrangement

Positive sequence reactance (max, min and nominal tap)

Positive sequence resistance (max, min and nominal tap)

Zero sequence reactance

PC.A.2.2.5.1. In addition, for all interconnecting transformers between the **User's Supergrid Voltage System** and the **User's Subtransmission System** throughout **Great Britain** and, in Scotland and **Offshore**, also for all interconnecting transformers between the **User's 132kV System** and the **User's Subtransmission System** (and any **OTSUA**) the **User** shall supply the following information:-

Tap changer range

Tap change step size

Tap changer type: on load or off circuit

Earthing method: Direct, resistance or reactance

Impedance (if not directly earthed )

PC.A.2.2.6 Each **User** shall supply the following information about the **User's** equipment installed at a **Transmission Site** (or in the case of **OTSUA**, all **OTSDUW Plant and Apparatus**):-

(a) Switchgear. For all circuit breakers:-

Rated voltage (kV)

Operating voltage (kV)

Rated 3-phase rms short-circuit breaking current, (kA)

Rated 1-phase rms short-circuit breaking current, (kA)

Rated 3-phase peak short-circuit making current, (kA)

Rated 1-phase peak short-circuit making current, (kA)

Rated rms continuous current (A)

DC time constant applied at testing of asymmetrical breaking abilities (secs)

In the case of **OTSDUW Plant and Apparatus** operating times for circuit breaker, **Protection**, trip relay and total operating time should be provided.

(b) Substation Infrastructure. For the substation infrastructure (including, but not limited to, switch disconnectors, disconnectors, current transformers, line traps, busbars, through bushings, etc):-

Rated 3-phase rms short-circuit withstand current (kA)

Rated 1-phase rms short-circuit withstand current (kA).

Rated 3-phase short-circuit peak withstand current (kA)

Rated 1- phase short-circuit peak withstand current (kA)

Rated duration of short circuit withstand (secs)

Rated rms continuous current (A)

A single value for the entire substation may be supplied, provided it represents the most restrictive item of current carrying apparatus.

PC.A.2.2.7 In the case of **OTSUA** the following should also be provided

(a) Automatic switching scheme schedules including diagrams and an explanation of how the **System** will operate and what plant will be affected by the schemes **Operation**.

- (b) **Intertripping** schemes both **Generation** and **Demand**. In each case a diagram of the scheme and an explanation of how the **System** will operate and what **Plant** will be affected by the schemes **Operation**.

PC.A.2.3 Lumped System Susceptance

PC.A.2.3.1 For all parts of the **User's Subtransmission System** (and any **OTSUA**) which are not included in the **Single Line Diagram** provided under PC.A.2.2.1, each **User** shall provide the equivalent lumped shunt susceptance at nominal **Frequency**.

PC.A.2.3.1.1 This should include shunt reactors connected to cables which are not normally in or out of service independent of the cable (ie. they are regarded as part of the cable).

PC.A.2.3.1.2 This should not include:

- (a) independently switched reactive compensation equipment connected to the **User's System** specified under PC.A.2.4, or;
- (b) any susceptance of the **User's System** inherent in the **Demand (Reactive Power)** data specified under PC.A.4.3.1.

PC.A.2.4 Reactive Compensation Equipment

PC.A.2.4.1 For all independently switched reactive compensation equipment (including any **OTSUA**), including that shown on the **Single Line Diagram**, not operated by **NGET** and connected to the **User's System** at 132kV and above in England and Wales and 33kV and above in Scotland and **Offshore** (including any **OTSDUW Plant and Apparatus** operating at **High Voltage**), other than power factor correction equipment associated directly with **Customers' Plant and Apparatus**, the following information is required:

- (a) type of equipment (eg. fixed or variable);
- (b) capacitive and/or inductive rating or its operating range in MVar;
- (c) details of any automatic control logic to enable operating characteristics to be determined;
- (d) the point of connection to the **User's System** (including **OTSUA**) in terms of electrical location and **System** voltage.
- (e) In the case of **OTSDUW Plant and Apparatus** the **User** should also provide:-
  - (i) Connection node, voltage, rating, power loss, tap range and connection arrangement.
  - (ii) A mathematical representation in block diagram format to model the control of any dynamic compensation plant. The model should be suitable for RMS dynamic stability type studies where each time constant should be no less than 10ms.
  - (iii) For Static Var Compensation equipment the **User** should provide:

HV Node

LV Node

Control Node

Nominal Voltage (kV)

Target Voltage (kV)

Maximum MVar at HV

Minimum MVar at HV

Slope %

Voltage dependant Q Limit

Normal Running Mode

Positive and zero phase sequence resistance and reactance

Transformer winding type

Connection arrangements

PC.A.2.4.2 **DC Converter Station** owners (and a **User** where the **OTSUA** includes an **OTSDUW DC Converter**) are also required to provide information about the reactive compensation and harmonic filtering equipment required to ensure that their **Plant** and **Apparatus** (and the **OTSUA**) complies with the criteria set out in CC.6.1.5.

PC.A.2.5 Short Circuit Contribution to National Electricity Transmission System

PC.A.2.5.1 General

- (a) To allow **NGET** to calculate fault currents, each **User** is required to provide data, calculated in accordance with **Good Industry Practice**, as set out in the following paragraphs of PC.A.2.5.
- (b) The data should be provided for the **User's System** with all **Generating Units, Power Park Units** and **DC Converters Synchronised** to that **User's System** (and any **OTSUA** where appropriate). The **User** must ensure that the pre-fault network conditions reflect a credible **System** operating arrangement.
- (c) The list of data items required, in whole or part, under the following provisions, is set out in PC.A.2.5.6. Each of the relevant following provisions identifies which data items in the list are required for the situation with which that provision deals.

The fault currents in sub-paragraphs (a) and (b) of the data list in PC.A.2.5.6 should be based on an a.c. load flow that takes into account any pre-fault current flow across the **Point of Connection** (and in the case of **OTSUA, Interface Points** and **Connection Points**) being considered.

Measurements made under appropriate **System** conditions may be used by the **User** to obtain the relevant data.

- (d) **NGET** may at any time, in writing, specifically request for data to be provided for an alternative **System** condition, for example minimum plant, and the **User** will, insofar as such request is reasonable, provide the information as soon as reasonably practicable following the request.

PC.A.2.5.2 **Network Operators** and **Non-Embedded Customers** are required to submit data in accordance with PC.A.2.5.4. **Generators, DC Converter Station** owners and **Network Operators**, in respect of **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** within such **Network Operator's Systems** are required to submit data in accordance with PC.A.2.5.5.

PC.A.2.5.3 Where prospective short-circuit currents on equipment owned, operated or managed by **NGET** are close to the equipment rating, and in **NGET's** reasonable opinion more accurate calculations of the prospective short circuit currents are required, then **NGET** will request additional data as outlined in PC.A.6.6 below.

PC.A.2.5.4 Data from Network Operators and Non-Embedded Customers

PC.A.2.5.4.1 Data is required to be provided at each node on the **Single Line Diagram** provided under PC.A.2.2.1 at which motor loads and/or **Embedded Small Power Stations** and/or **Embedded Medium Power Stations** and/or **Embedded** installations of direct current converters which do not form a **DC Converter Station** are connected, assuming a fault at that location, as follows:-

The data items listed under the following parts of PC.A.2.5.6:-

- (a) (i), (ii), (iii), (iv), (v) and (vi);

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

PC.A.2.5.4.2 **Network Operators** shall provide the following data items in respect of each **Interface Point** within their **User System**:

- (a) **Maximum Export Capacity**;

- (b) **Maximum Import Capacity**; and,
- (c) **Interface Point Target Voltage/Power Factor**

**Network Operators** shall alongside these parameters include details of any manual or automatic post fault actions to be taken by the owner / operator of the **Offshore Transmission System** connected to such **Interface Point** that are required by the **Network Operator**.

PC.A.2.5.5 Data from Generators (including Generators undertaking OTSDUW), DC Converter Station owners and from Network Operators in respect of Embedded Medium Power Stations not subject to a Bilateral Agreement and Embedded DC Converter Stations not subject to a Bilateral Agreement within such Network Operator's Systems.

PC.A.2.5.5.1 For each **Generating Unit** with one or more associated **Unit Transformers**, the **Generator**, or the **Network Operator** in respect of **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** within such **Network Operator's System** 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 **National Electricity 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.

PC.A.2.5.5.2 Auxiliary motor short circuit current contribution and any **Auxiliary Gas Turbine Unit** contribution through the **Unit Transformers** must be represented as a combined short circuit current contribution at the **Generating Unit's** terminals, assuming a fault at that location.

PC.A.2.5.5.3 If the **Power Station** or **DC Converter Station** (or **OTSDUW Plant and Apparatus** which provides a fault infeed) has separate **Station Transformers**, data should be provided for the fault current contribution from each transformer at its high voltage terminals, assuming a fault at that location, as follows:-

The data items listed under the following parts of PC.A.2.5.6

- (a) (i), (ii), (iii), (iv), (v) and (vi);

and the data items shall be provided in accordance with the detailed provisions of PC.A.2.5.6(b) - (f).

PC.A.2.5.5.4 Data for the fault infeeds through both **Unit Transformers** and **Station Transformers** shall be provided for the normal running arrangement when the maximum number of **Generating Units** are **Synchronised** to the **System** or when all the **DC Converters** at a **DC Converter Station** are transferring **Rated MW** in either direction. Where there is an alternative running arrangement (or transfer in the case of a **DC Converter Station**) which can give a higher fault infeed through the **Station Transformers**, then a separate data submission representing this condition shall be made.

PC.A.2.5.5.5 Unless the normal operating arrangement within the **Power Station** is to have the **Station** and **Unit Boards** interconnected within the **Power Station**, no account should be taken of the interconnection between the **Station Board** and the **Unit Board**.

PC.A.2.5.5.6 Auxiliary motor short circuit current contribution and any auxiliary **DC Converter Station** contribution through the **Station Transformers** must be represented as a combined short circuit current contribution through the **Station Transformers**.

PC.A.2.5.5.7 Where a **Manufacturer's Data & Performance Report** exists in respect of the model of the **Power Park Unit**, the **User** may opt to reference the **Manufacturer's Data & Performance Report** as an alternative to the provision of data in accordance with this PC.A.2.5.5.7. For the avoidance of doubt, all other data provision pursuant to the Grid Code shall still be provided including a Single Line Diagram and those data pertaining thereto.

For each **Power Park Module** and each type of **Power Park Unit** (eg. Doubly Fed Induction Generator) (and any **OTSDUW Plant and Apparatus** which provides a fault infeed), including any **Auxiliaries**, positive, negative and zero sequence root mean square current values are to be provided of the contribution to the short circuit current flowing at:

- (i) the **Power Park Unit** terminals, or the **Common Collection Busbar** if an equivalent **Single Line Diagram** and associated data as described in PC.A.2.2.2 is provided, and
- (ii) the **Grid Entry Point** (and in case of **OTSUA, Transmission Interface Point**), or **User System Entry Point** if **Embedded**

for the following solid faults at the **Grid Entry Point** (and in case of **OTSUA, Interface Point**), or **User System Entry Point** if **Embedded**:

- (i) a symmetrical three phase short circuit
- (ii) a single phase to earth short circuit
- (iii) a phase to phase short circuit
- (iv) a two phase to earth short circuit

For a **Power Park Module** in which one or more of the **Power Park Units** utilise a protective control such as a crowbar circuit, the data should indicate whether the protective control will act in each of the above cases and the effects of its action shall be included in the data. For any case in which the protective control will act, the data for the fault shall also be submitted for the limiting case in which the protective circuit will not act, which may involve the application of a non-solid fault, and the positive, negative and zero sequence retained voltages at

- (i) the **Power Park Unit** terminals, or the **Common Collection Busbar** if an equivalent **Single Line Diagram** and associated data is provided and
- (ii) the **Grid Entry Point**, or **User System Entry Point** if **Embedded**

in this limiting case shall be provided.

For each fault for which data is submitted, the data items listed under the following parts of PC.A.2.5.6(a) shall be provided:-

- (iv), (vii), (viii), (ix), (x);

In addition, if an equivalent **Single Line Diagram** has been provided the data items listed under the following parts of PC.A.2.5.6(a) shall be provided:-

- (xi), (xii), (xiii);

In addition, for a **Power Park Module** in which one or more of the **Power Park Units** utilise a protective control such as a crowbar circuit:-

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

- (xiv), (xv);

All of the above data items shall be provided in accordance with the detailed provisions of PC.A.2.5.6(c), (d), (f).

Should actual data in respect of fault infeeds be unavailable at the time of the application for a **CUSC Contract** or **Embedded Development Agreement**, a limited subset of the data, representing the maximum fault infeed that may result from all of the plant types being considered, shall be submitted. This data will, as a minimum, represent the root mean square of the positive, negative and zero sequence components of the fault current for both single phase and three phase solid faults at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**) at the time of fault application and 50ms following fault application. Actual data in respect of fault infeeds shall be submitted to **NGET** as soon as it is available, in line with PC.A.1.2

#### PC.A.2.5.6

##### Data Items

- (a) The following is the list of data utilised in this part of the **PC**. It also contains rules on the data which generally apply:-
- (i) Root mean square of the symmetrical three-phase short circuit current infeed at the instant of fault, ( $I_1''$ );
  - (ii) Root mean square of the symmetrical three-phase short circuit current after the subtransient fault current contribution has substantially decayed, ( $I_1'$ );
  - (iii) the zero sequence source resistance and reactance values of the **User's System** as seen from the node on the **Single Line Diagram** provided under PC.A.2.2.1 (or **Station Transformer** high voltage terminals or **Generating Unit** terminals or **DC Converter** terminals, as appropriate) consistent with the infeed described in PC.A.2.5.1.(b);
  - (iv) root mean square of the pre-fault voltage at which the maximum fault currents were calculated;
  - (v) the positive sequence X/R ratio at the instant of fault;
  - (vi) the negative sequence resistance and reactance values of the **User's System** seen from the node on the **Single Line Diagram** provided under PC.A.2.2.1 (or **Station Transformer** high voltage terminals, or **Generating Unit** terminals or **DC Converter** terminals if appropriate) if substantially different from the values of positive sequence resistance and reactance which would be derived from the data provided above;
  - (vii) A continuous trace and a table showing the root mean square of the positive, negative and zero sequence components of the short circuit current between zero and 140ms at 10ms intervals;
  - (viii) The **Active Power** (or **Interface Point Capacity** being exported pre-fault by the **OTSDUW Plant and Apparatus**) being generated pre-fault by the **Power Park Module** and by each type of **Power Park Unit**;
  - (ix) The reactive compensation shown explicitly on the **Single Line Diagram** that is switched in;
  - (x) The **Power Factor** of the **Power Park Module** and of each **Power Park Unit** type;
  - (xi) The positive sequence X/R ratio of the equivalent at the **Common Collection Busbar** or **Interface Point** in the case of **OTSUA**;
  - (xii) The minimum zero sequence impedance of the equivalent seen from the **Common Collection Busbar** or **Interface Point** in the case of **OTSUA** ;
  - (xiii) The number of **Power Park Units** represented in the equivalent **Power Park Unit**;
  - (xiv) The additional rotor resistance and reactance (if any) that is applied to the **Power Park Unit** under a fault condition;
  - (xv) A continuous trace and a table showing the root mean square of the positive, negative and zero sequence components of the retained voltage at the fault point and **Power Park Unit** terminals, or the **Common Collection Busbar** if an equivalent **Single Line Diagram** and associated data as described in **PC.A.2.2.2** is provided or **Interface Point** in the case of **OTSUA**, representing the limiting case, which may involve the application of a non-solid fault, required to not cause operation of the protective

control;

- (b) In considering this data, unless the **User** notifies **NGET** accordingly at the time of data submission, **NGET** will assume that the time constant of decay of the subtransient fault current corresponding to the change from  $I_1''$  to  $I_1'$ , ( $T''$ ) is not significantly different from 40ms. If that assumption is not correct in relation to an item of data, the **User** must inform **NGET** at the time of submission of the data.
- (c) The value for the X/R ratio must reflect the rate of decay of the d.c. component that may be present in the fault current and hence that of the sources of the initial fault current. All shunt elements and loads must therefore be deleted from any system model before the X/R ratio is calculated.
- (d) In producing the data, the **User** may use "time step analysis" or "fixed-point-in-time analysis" with different impedances.
- (e) If a fixed-point-in-time analysis with different impedances method is used, then in relation to the data submitted under (a) (i) above, the data will be required for "time zero" to give  $I_1''$ . The figure of 120ms is consistent with a decay time constant  $T''$  of 40ms, and if that figure is different, then the figure of 120ms must be changed accordingly.
- (f) Where a "time step analysis" is carried out, the X/R ratio may be calculated directly from the rate of decay of the d.c. component. The X/R ratio is not that given by the phase angle of the fault current if this is based on a system calculation with shunt loads, but from the Thévenin equivalent of the system impedance at the instant of fault with all non-source shunts removed.

### PC.A.3 GENERATING UNIT AND DC CONVERTER DATA

#### PC.A.3.1 Introduction

##### Directly Connected

- PC.A.3.1.1 Each **Generator** and **DC Converter Station** owner (and a **User** where the **OTSUA** includes an **OTSDUW DC Converter**) with an existing, or proposed, **Power Station** or **DC Converter Station** directly connected, or to be directly connected, to the **National Electricity Transmission System** (or in the case of **OTSUA**, the **Interface Point**), shall provide **NGET** with data relating to that **Power Station** or **DC Converter Station**, both current and forecast, as specified in PC.A.3.2 to PC.A.3.4.

##### Embedded

- PC.A.3.1.2 (a) Each Generator and DC Converter Station owner in respect of its existing, and/or proposed, Embedded Large Power Stations and/or Embedded DC Converter Stations and/or its Embedded Medium Power Stations subject to a Bilateral Agreement and each Network Operator in respect of its Embedded Medium Power Stations not subject to a Bilateral Agreement and/or Embedded DC Converter Stations not subject to a Bilateral Agreement within such Network Operator's System in each case connected to the Subtransmission System, shall provide **NGET** with data relating to that Power Station or DC Converter 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** or installations of direct current converters which do not form a **DC Converter Station**, connected at a voltage level 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 **NGET** under PC.A.3.1.4.
- PC.A.3.1.3 (a) Each **Network Operator** shall provide **NGET** with the data specified in PC.A.3.2.2(c)(i) and (ii) and PC.A.3.2.2(i).

(b) **Network Operators** need not submit planning data in respect of 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.4.2.4(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** and all installations of direct current converters which do not form a **DC Converter Station, Embedded** within that **Network Operator's System**. The **Network Operator** must inform **NGET** of:

(i) the number of such **Embedded Power Stations** and such **Embedded** installations of direct current converters (including the number of **Generating Units** or **Power Park Modules** or **DC Converters**) together with their summated capacity; and

(ii) beginning from the 2015 Week 24 data submission, for each **Embedded Small Power Station** of registered capacity (as defined in the **Distribution Code**) of 1MW or more:

1. A reference which is unique to each Network Operator;

2. The production type as follows:

a) In the case of an Embedded Small Power Station first connected on or after 1 January 2015, the production type must be selected from the list below derived from the Manual of Procedures for the ENTSO-E Central Information Transparency Platform:

- Biomass;
- Fossil brown coal/lignite;
- Fossil coal-derived gas;
- Fossil gas;
- Fossil hard coal;
- Fossil oil;
- Fossil oil shale;
- Fossil peat;
- Geothermal;
- Hydro pumped storage;
- Hydro run-of-river and poundage;
- Hydro water reservoir;
- Marine;
- Nuclear;
- Other renewable;
- Solar;
- Waste;
- Wind offshore;
- Wind onshore; or
- Other;

together with a statement as to whether the generation forms part of a CHP scheme;

b) In the case of an **Embedded Small Power Station** first connected to the **Users' System** before 1 January 2015, as an alternative to the production type, the technology type(s) used, selected from the list set out at paragraph 2.23 in Version 2 of the Regulatory Instructions and

Guidance relating to the distributed generation incentive, innovation funding incentive and registered power zones, reference 83/07, published by Ofgem in April 2007;

3. The registered capacity (as defined in the **Distribution Code**) in MW;
  4. The lowest voltage level node that is specified on the most up-to-date **Single Line Diagram** to which it connects or where it will export most of its power;
  5. Where it generates electricity from wind or PV, the geographical location using either latitude or longitude or grid reference coordinates of the primary or higher voltage substation to which it connects;
  6. The reactive power and voltage control mode, including the voltage set-point and reactive range, where it operates in voltage control mode, or the target **Power Factor**, where it operates in **Power Factor** mode;
  7. Details of the types of loss of mains **Protection** in place and their relay settings which in the case of **Embedded Small Power Stations** first connected to the **Users' System** before 1 January 2015 shall be provided on a reasonable endeavours basis.
- (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 **NGET's** reasonable discretion, to provide details of **Embedded Small Power Stations** and **Embedded Medium Power Stations** and **Customer Generating Plant** and **Embedded** installations of direct current converters which do not form a **DC Converter Station**, both current and forecast, as specified in PC.A.3.2 to PC.A.3.4. Such requirement would arise where **NGET** reasonably considers that the collective effect of a number of such **Embedded Power Stations** and **Customer Generating Plants** and **Embedded** installations of direct current converters may have a significant system effect on the **National Electricity Transmission System**.

#### Busbar Arrangements

PC.A.3.1.5 Where **Generating Units**, which term includes **CCGT Units** and **Power Park Modules**, and **DC Converters**, are connected to the **National Electricity Transmission System** via a busbar arrangement which is or is expected to be operated in separate sections, the section of busbar to which each **Generating Unit**, **DC Converter** or **Power Park Module** is connected is to be identified in the submission.

#### PC.A.3.2 Output Data

##### PC.A.3.2.1 (a) **Large Power Stations** and **Gensets**

Data items PC.A.3.2.2 (a), (b), (c), (d), (e), (f) and (h) are required with respect to each **Large Power Station** and each **Generating Unit** and **Power Park Module** of each **Large Power Station** and for each **Genset** (although (a) is not required for **CCGT Units** and (b), (d) and (e) are not normally required for **CCGT Units** and (a), (b), (c), (d), (e), (f) and (h) are not normally required for **Power Park Units**).

##### (b) **Embedded Small Power Stations** and **Embedded Medium Power Stations**

Data item PC.A.3.2.2 (a) is required with respect to each **Embedded Small Power Station** and **Embedded Medium Power Station** and each **Generating Unit** and **Power Park Module** of each **Embedded Small Power Station** and **Embedded Medium Power Station** (although (a) is not required for **CCGT Units** or **Power Park Units**). In addition, data item PC.A.3.2.2(c)(ii) is required with respect to each **Embedded Medium Power Station**.

##### (c) **CCGT Units/Modules**

- (i) Data item PC.A.3.2.2 (g) is required with respect to each **CCGT Unit**;
- (ii) data item PC.A.3.2.2 (a) is required with respect to each **CCGT Module**; and
- (iii) data items PC.A.3.2.2 (b), (c), (d) and (e) are required with respect to each **CCGT**

**Module** unless **NGET** informs the relevant **User** in advance of the submission that it needs the data items with respect to each **CCGT Unit** for particular studies, in which case it must be supplied on a **CCGT Unit** basis.

Where any definition utilised or referred to in relation to any of the data items does not reflect **CCGT Units**, such definition shall be deemed to relate to **CCGT Units** for the purposes of these data items. Any **Schedule** in the DRC which refers to these data items shall be interpreted to incorporate the **CCGT Unit** basis where appropriate;

(d) **Cascade Hydro Schemes**

Data item PC.A.3.2.2(i) is required with respect to each **Cascade Hydro Scheme**.

(e) **Power Park Units/Modules**

Data items PC.A.3.2.2 (k) is required with respect to each **Power Park Module**.

(f) **DC Converters**

Data items PC.A.3.2.2 (a), (b), (c), (d) (e) (f) (h) and (i) are required with respect to each **DC Converter Station** and each **DC Converter** in each **DC Converter Station**. For installations of direct current converters which do not form a **DC Converter Station** only data item PC.A.3.2.2.(a) is required.

PC.A.3.2.2

Items (a), (b), (d), (e), (f), (g), (h), (i), (j) and (k) are to be supplied by each **Generator, DC Converter Station** owner or **Network Operator** (as the case may be) in accordance with PC.A.3.1.1, PC.A.3.1.2, PC.A.3.1.3 and PC.A.3.1.4. Items (a), and (f)(iv) are to be supplied (as applicable) by a **User** in the case of **OTSUA** which includes an **OTSDUW DC Converter**. Item (c) is to be supplied by each **Network Operator** in all cases:-

- (a) **Registered Capacity (MW) or Interface Point Capacity** in the case of **OTSDUW**;
- (b) **Output Usable (MW)** on a monthly basis;
- (c) (i) **System Constrained Capacity (MW)** ie. any constraint placed on the capacity of the **Embedded Generating Unit, Embedded Power Park Module, an Offshore Transmission System** at an **Interface Point** or **DC Converter** at an **Embedded DC Converter Station** due to the **Network Operator's System** in which it is **Embedded**. **Where Generating Units** (which term includes **CCGT Units**), **Power Park Modules, Offshore Transmission Systems** at an **Interface Point** or **DC Converters** are connected to a **Network Operator's User System** via a busbar arrangement which is or is expected to be operated in separate sections, details of busbar running arrangements and connected circuits at the substation to which the **Embedded Generating Unit, Embedded Power Park Module, Offshore Transmission System** at an **Interface Point** or **Embedded DC Converter** is connected sufficient for **NGET** to determine where the MW generated by each **Generating Unit, Power Park Module** or **DC Converter** at that **Power Station** or **DC Converter Station** or **Offshore Transmission System** at an **Interface Point** would appear onto the **National Electricity Transmission System**;
- (ii) any **Reactive Despatch Network Restrictions**;
- (d) **Minimum Generation (MW)**;
- (e) MW obtainable from **Generating Units, Power Park Modules** or **DC Converters** at a **DC Converter Station** in excess of **Registered Capacity**;
- (f) **Generator Performance Chart**:
  - (i) at the **Onshore Synchronous Generating Unit** stator terminals
  - (ii) at the electrical point of connection to the **Offshore Transmission System** for an **Offshore Synchronous Generating Unit**.
  - (iii) at the electrical point of connection to the **National Electricity Transmission System** (or **User System** if **Embedded**) for a **Non Synchronous Generating Unit** (excluding a **Power Park Unit**), **Power Park Module** and **DC Converter** at a **DC Converter**

**Station;**

- (iv) at the **Interface Point** for **OTSDUW Plant and Apparatus**

Where a **Reactive Despatch Network Restriction** applies, its existence and details should be highlighted on the **Generator Performance Chart**, in sufficient detail for **NET** to determine the nature of the restriction.

- (g) a list of the **CCGT Units** within a **CCGT Module**, identifying each **CCGT Unit**, and the **CCGT Module** of which it forms part, unambiguously. In the case of a **Range CCGT Module**, details of the possible configurations should also be submitted, together:-
- (i) (in the case of a **Range CCGT Module** connected to the **National Electricity Transmission System**) with details of the single **Grid Entry Point** (there can only be one) at which power is provided from the **Range CCGT Module**;
- (ii) (in the case of an **Embedded Range CCGT Module**) with details of the single **User System Entry Point** (there can only be one) at which power is provided from the **Range CCGT Module**;

Provided that, nothing in this sub-paragraph (g) shall prevent the busbar at the relevant point being operated in separate sections;

- (h) expected running regime(s) at each **Power Station** or **DC Converter Station** and type of **Generating Unit**, eg. **Steam Unit**, **Gas Turbine Unit**, **Combined Cycle Gas Turbine Unit**, **Power Park Module**, **Novel Units** (specify by type), etc;
- (i) a list of **Power Stations** and **Generating Units** within a **Cascade Hydro Scheme**, identifying each **Generating Unit** and **Power Station** and the **Cascade Hydro Scheme** of which each form part unambiguously. In addition:
- (i) details of the **Grid Entry Point** at which **Active Power** is provided, or if **Embedded** the **Grid Supply Point(s)** within which the **Generating Unit** is connected;
- (ii) where the **Active Power** output of a **Generating Unit** is split between more than one **Grid Supply Points** the percentage that would appear under normal and outage conditions at each **Grid Supply Point**.

- (j) The following additional items are only applicable to **DC Converters** at **DC Converter Stations**.

**Registered Import Capacity** (MW);

**Import Usable** (MW) on a monthly basis;

**Minimum Import Capacity** (MW);

MW that may be absorbed by a **DC Converter** in excess of **Registered Import Capacity** and the duration for which this is available;

- (k) the number and types of the **Power Park Units** within a **Power Park Module**, identifying each **Power Park Unit**, the **Power Park Module** of which it forms part and identifying the **BM Unit** of which each **Power Park Module** forms part, unambiguously. In the case of a **Power Station** directly connected to the **National Electricity Transmission System** with multiple **Power Park Modules** where **Power Park Units** can be selected to run in different **Power Park Modules** and/or **Power Park Modules** can be selected to run in different **BM Units**, details of the possible configurations should also be submitted. In addition for **Offshore Power Park Modules**, the number of **Offshore Power Park Strings** that are aggregated into one **Offshore Power Park Module** should also be submitted.

PC.A.3.2.3 Notwithstanding any other provision of this PC, the **CCGT Units** within a **CCGT Module**, details of which are required under paragraph (g) of PC.A.3.2.2, can only be amended in accordance with the following provisions:-

- (a) if the **CCGT Module** is a **Normal CCGT Module**, the **CCGT Units** within that **CCGT Module** can only be amended such that the **CCGT Module** comprises different **CCGT Units** if **NGET** gives its prior consent in writing. Notice of the wish to amend the **CCGT Units** within such a **CCGT Module** must be given at least 6 months before it is wished for the amendment to take effect;
- (b) if the **CCGT Module** is a **Range CCGT Module**, the **CCGT Units** within that **CCGT Module** and the **Grid Entry Point** at which the power is provided can only be amended as described in BC1.A1.6.4.

PC.A.3.2.4 Notwithstanding any other provision of this **PC**, the **Power Park Units** within a **Power Park Module**, and the **Power Park Modules** within a **BM Unit**, details of which are required under paragraph (k) of PC.A.3.2.2, can only be amended in accordance with the following provisions:-

- (a) if the **Power Park Units** within that **Power Park Module** can only be amended such that the **Power Park Module** comprises different **Power Park Units** due to repair/replacement of individual **Power Park Units** if **NGET** gives its prior consent in writing. Notice of the wish to amend a **Power Park Unit** within such a **Power Park Module** must be given at least 4 weeks before it is wished for the amendment to take effect;
- (b) if the **Power Park Units** within that **Power Park Module** and/or the **Power Park Modules** within that **BM Unit** can be selected to run in different **Power Park Modules** and/or **BM Units** as an alternative operational running arrangement the **Power Park Units** within the **Power Park Module**, the **BM Unit** of which each **Power Park Module** forms part, and the **Grid Entry Point** at which the power is provided can only be amended as described in BC1.A.1.8.4.

PC.A.3.3. Rated Parameters Data

PC.A.3.3.1 The following information is required to facilitate an early assessment, by **NGET**, of the need for more detailed studies;

- (a) for all **Generating Units** (excluding **Power Park Units**) and **Power Park Modules**:
  - Rated MVA
  - Rated MW**;
- (b) for each **Synchronous Generating Unit**:
  - Short circuit ratio
  - Direct axis transient reactance;
  - Inertia constant (for whole machine), MWsecs/MVA;
- (c) for each **Synchronous Generating Unit** step-up transformer:
  - Rated MVA
  - Positive sequence reactance (at max, min and nominal tap);
- (d) for each **DC Converter** at a **DC Converter Station** or **DC Converter** connecting a **Power Park Module** (including when forming part of **OTSUA**).
  - DC Converter** type (e.g. current/voltage sourced)
  - Rated MW** per pole for import and export
  - Number of poles and pole arrangement
  - Rated DC voltage/pole (kV)
  - Return path arrangement
  - Remote AC connection arrangement (excluding **OTSDUW DC Converters**)
- (e) for each type of **Power Park Unit** in a **Power Park Module** not connected to the **Total System** by a **DC Converter**:
  - Rated MVA

## Rated MW

Rated terminal voltage

Inertia constant, (MWsec/MVA)

Additionally, for **Power Park Units** that are squirrel-cage or doubly-fed induction generators driven by wind turbines:

Stator reactance.

Magnetising reactance.

Rotor resistance (at rated running)

Rotor reactance (at rated running)

The generator rotor speed range (minimum and maximum speeds in RPM) (for doubly-fed induction generators only)

Converter MVA rating (for doubly-fed induction generators only)

For a **Power Park Unit** consisting of a synchronous machine in combination with a back-to-back **DC Converter**, or for a **Power Park Unit** not driven by a wind turbine, the data to be supplied shall be agreed with **NGET** in accordance with PC.A.7.

This information should only be given in the data supplied in accordance with PC.4.4 and PC.4.5.

### PC.A.3.4 General Generating Unit Power Park Module and DC Converter Data

PC.A.3.4.1 The point of connection to the **National Electricity Transmission System** or the **Total System**, if other than to the **National Electricity Transmission System**, in terms of geographical and electrical location and system voltage is also required.

PC.A.3.4.2 (a) Type of **Generating Unit** (ie **Synchronous Generating Unit**, **Non-Synchronous Generating Unit**, **DC Converter** or **Power Park Module**).

(b) In the case of a **Synchronous Generating Unit** details of the **Exciter** category, for example whether it is a rotating **Exciter** or a static **Exciter** or in the case of a **Non-Synchronous Generating Unit** the voltage control system.

(c) Whether a **Power System Stabiliser** is fitted.

### PC.A.4 DEMAND AND ACTIVE ENERGY DATA

#### PC.A.4.1 Introduction

PC.A.4.1.1 Each **User** directly connected to the **National Electricity Transmission System** with **Demand** shall provide **NGET** with the **Demand** data, historic, current and forecast, as specified in PC.A.4.2 and PC.A.4.3. Paragraphs PC.A.4.1.2 and PC.A.4.1.3 apply equally to **Active Energy** requirements as to **Demand** unless the context otherwise requires.

PC.A.4.1.2 Data will need to be supplied by:

(a) each **Network Operator**, in relation to **Demand** and **Active Energy** requirements on its **User System**;

(b) each **Non-Embedded Customer** (including **Pumped Storage Generators** with respect to Pumping **Demand**) in relation to its **Demand** and **Active Energy** requirements.

(c) each **DC Converter Station** owner in relation to **Demand** and **Active Energy** transferred (imported) to its **DC Converter Station**.

(d) each **OTSDUW DC Converter** in relation to the Demand at each **Interface Point** and **Connection Point**.

**Demand** of **Power Stations** directly connected to the **National Electricity Transmission System** is to be supplied by the **Generator** under PC.A.5.2.

- PC.A.4.1.3 References in this **PC** to data being supplied on a half hourly basis refer to it being supplied for each period of 30 minutes ending on the hour or half-hour in each hour.
- PC.A.4.1.4 **Access Periods and Access Groups**
- PC.A.4.1.4.1 Each **Connection Point** must belong to one, and only one, **Access Group**.
- PC.A.4.1.4.2 Each **Transmission Interface Circuit** must have an **Access Period**.
- PC.A.4.1.4.3 The **Access Period** shall
- (a) normally be a minimum of 8 continuous weeks and can occur in any one of three maintenance years during the period from calendar week 13 to calendar week 43 (inclusive) in each year; or,
  - (b) exceptionally and provided that agreement is reached between **NGET** and the relevant **User(s)**, such agreement to be sought in accordance with PC.7, the **Access Period** may be of a period not less than 4 continuous weeks and can occur in any one of three maintenance years during the period from calendar week 10 to calendar week 43 (inclusive) in each year.
- PC.A.4.1.4.4 **NGET** shall submit in writing no later than calendar week 6 in each year:
- (a) the calendar weeks defining the proposed start and finish of each **Access Period** for each **Transmission Interface Circuit**; and
  - (b) the **Connection Points** in each **Access Group**.
- The submission by **NGET** under PC.A.4.1.4.4 (a) above shall commence in 2010 and shall then continue each year thereafter. The submission by **NGET** under PC.A.4.1.4.4 (b) shall commence in 2009 and then continue each year thereafter.
- PC.A.4.1.4.5 It is permitted for **Access Periods** to overlap in the same **Access Group** and in the same maintenance year. However, where possible **Access Periods** will be sought by **NGET** that do not overlap with any other **Access Period** within that **Access Group** for each maintenance year. Where it is not possible to avoid overlapping **Access Periods**, **NGET** will indicate to **Users** by calendar week 6 its initial view of which **Transmission Interface Circuits** will need to be considered out of service concurrently for the purpose of assessing compliance to **Licence Standards**. The obligation on **NGET** to indicate which **Transmission Interface Circuits** will need to be considered out of service concurrently for the purpose of assessing compliance to **Licence Standards** shall commence in 2010 and shall continue each year thereafter.
- PC.A.4.1.4.6 Following the submission(s) by **NGET** by week 6 in each year and where required by either party, both **NGET** and the relevant **User(s)** shall use their reasonable endeavours to agree the appropriate **Access Group(s)** and **Access Period** for each **Transmission Interface Circuit** prior to week 17 in each year. The requirement on **NGET** and the relevant **User(s)** to agree, shall commence in respect of **Access Groups** only in 2010. This paragraph PC.A.4.1.4.6 shall apply in its entirety in 2011 and shall then continue each year thereafter.
- PC.A.4.1.4.7 In exceptional circumstances, and with the agreement of all parties concerned, where a **Connection Point** is specified for the purpose of the **Planning Code** as electrically independent **Subtransmission Systems**, then data submissions can be on the basis of two (or more) individual **Connection Points**.
- PC.A.4.2 User's User System Demand (Active Power) and Active Energy Data
- PC.A.4.2.1 Forecast daily **Demand (Active Power)** profiles, as specified in (a), (b) and (c) below, in respect of each of the **User's User Systems** (each summated over all **Grid Supply Points** in each **User System**) are required for:
- (a) peak day on each of the **User's User Systems** (as determined by the **User**) giving the numerical value of the maximum **Demand (Active Power)** that in the **Users'** opinion could reasonably be imposed on the **National Electricity Transmission System**;
  - (b) day of peak **National Electricity Transmission System Demand (Active Power)** as notified by **NGET** pursuant to PC.A.4.2.2;

- (c) day of minimum **National Electricity Transmission System Demand (Active Power)** as notified by **NGET** pursuant to PC.A.4.2.2.

In addition, the total **Demand (Active Power)** in respect of the time of peak **National Electricity Transmission System Demand** in the preceding **Financial Year** in respect of each of the **User's User Systems** (each summated over all **Grid Supply Points** in each **User System**) both outturn and weather corrected shall be supplied.

PC.A.4.2.2 No later than calendar week 17 each year **NGET** shall notify each **Network Operator** and **Non-Embedded Customer** in writing of the following, for the current **Financial Year** and for each of the following seven **Financial Years**, which will, until replaced by the following year's notification, be regarded as the relevant specified days and times under PC.A.4.2.1:

- (a) the date and time of the annual peak of the **National Electricity Transmission System Demand**;
- (b) the date and time of the annual minimum of the **National Electricity Transmission System Demand**;
- (c) the relevant **Access Period** for each **Transmission Interface Circuit**; and,
- (d) Concurrent **Access Periods** of two or more **Transmission Interface Circuits** (if any) that are situated in the same **Access Group**.

The submissions by **NGET** made under PC.A.4.2.1 (c) and PC.A.4.2.1 (d) above shall commence in 2010 and shall then continue in respect of each year thereafter.

PC.A.4.2.3 The total **Active Energy** used on each of the **Network Operators'** or **Non-Embedded Customers' User Systems** (each summated over all **Grid Supply Points** in each **User System**) in the preceding **Financial Year**, both outturn and weather corrected, together with a prediction for the current financial year, is required. Each **Active Energy** submission shall be subdivided into the following categories of **Customer** tariff:

LV1  
LV2  
LV3  
HV  
EHV  
Traction  
Lighting

In addition, the total **User System** losses and the **Active Energy** provided by **Embedded Small Power Stations** and **Embedded Medium Power Stations** shall be supplied.

PC.A.4.2.4 All forecast **Demand (Active Power)** and **Active Energy** specified in PC.A.4.2.1 and PC.A.4.2.3 shall:

- (a) in the case of PC.A.4.2.1 (a), (b) and (c), be such that the profiles comprise average **Active Power** levels in 'MW' for each time marked half hour throughout the day;
- (b) in the case of PC.A.4.2.1 (a), (b) and (c), be that remaining after any deductions reasonably considered appropriate by the **User** to take account of the output profile of all **Embedded Small Power Stations** and **Embedded Medium Power Stations** and **Customer Generating Plant** and imports across **Embedded External Interconnections** including imports across **Embedded** installations of direct current converters which do not form a **DC Converter Station** and **Embedded DC Converter Stations** with a **Registered Capacity** of less than 100MW;
- (c) be based upon **Annual ACS Conditions** for times that occur during week 44 through to week 12 (inclusive) and based on **Average Conditions** for weeks 13 to 43 (inclusive).

PC.A.4.3 Connection Point Demand (Active and Reactive Power)

PC.A.4.3.1 Forecast **Demand (Active Power)** and **Power Factor** (values of the **Power Factor** at maximum and minimum continuous excitation may be given instead where more than 95% of the total **Demand** at a **Connection Point** is taken by synchronous motors) to be met at each **Connection Point** within each **Access Group** is required for:

- (a) the time of the maximum **Demand (Active Power)** at the **Connection Point** (as determined by the **User**) that in the **User's** opinion could reasonably be imposed on the **National Electricity Transmission System**;
- (b) the time of peak **National Electricity Transmission System Demand** as provided by **NGET** under PC.A.4.2.2;
- (c) the time of minimum **National Electricity Transmission System Demand** as provided by **NGET** under PC.A.4.2.2;
- (d) the time of the maximum **Demand (Apparent Power)** at the **Connection Point** (as determined by the **User**) during the **Access Period** of each **Transmission Interface Circuit**;
- (e) at a time specified by either **NGET** or a **User** insofar as such a request is reasonable.

Instead of such forecast **Demand** to be met at each **Connection Point** within each **Access Group** the **User** may (subject to PC.A.4.3.4) submit such **Demand** at each node on the **Single Line Diagram**.

In addition, the **Demand** in respect of each of the time periods referred to in PC.A.4.3.1 (a) to (e) in the preceding **Financial Year** in respect of each **Connection Point** within each **Access Group** both outturn and weather corrected shall be supplied. The "weather correction" shall normalise outturn figures to **Annual ACS Conditions** for times that occur during calendar week 44 through to calendar week 12 (inclusive) or **Average Conditions** for the period calendar weeks 13 to calendar week 43 (inclusive) and shall be performed by the relevant **User** on a best endeavours basis.

The submission by a **User** pursuant to PC.A.4.3.1 (d) shall commence in 2011 and shall then continue each year thereafter.

PC.A.4.3.2 All forecast **Demand** specified in PC.A.4.3.1 shall:

- (a) be that remaining after any deductions reasonably considered appropriate by the **User** to take account of the output of all **Embedded Small Power Stations** and **Embedded Medium Power Stations** and **Customer Generating Plant** and imports across **Embedded External Interconnections**, including **Embedded** installations of direct current converters which do not form a **DC Converter Station** and **Embedded DC Converter Stations** and such deductions should be separately stated;
- (b) include any **User's System** series reactive losses but exclude any reactive compensation equipment specified in PC.A.2.4 and exclude any network susceptance specified in PC.A.2.3;
- (c) be based upon **Annual ACS Conditions** for times that occur during calendar week 44 through to calendar week 12 (inclusive) and based on **Average Conditions** for calendar weeks 13 to calendar week 43 (inclusive), both corrections being made on a best endeavours basis;
- (d) reflect the **User's** opinion of what could reasonably be imposed on the **National Electricity Transmission System**.

PC.A.4.3.3 The date and time of the forecast maximum **Demand (Apparent Power)** at the **Connection Point** as specified in PC.A.4.3.1 (a) and (d) is required.

PC.A.4.3.4 Each **Single Line Diagram** provided under PC.A.2.2.2 shall include the **Demand (Active Power)** and **Power Factor** (values of the **Power Factor** at maximum and minimum continuous excitation may be given instead where more than 95% of the **Demand** is taken by synchronous motors) at the time of the peak **National Electricity Transmission System Demand** (as provided under PC.A.4.2.2) at each node on the **Single Line Diagram**. These **Demands** shall be consistent with those provided under PC.A.4.3.1(b) above for the relevant year.

PC.A.4.3.5 The **Single Line Diagram** must represent the **User's User System** layout under the period specified in PC.A.4.3.1(b) (at the time of peak **National Electricity Transmission System Demand**). Should the **User's User System** layout during the other times specified in PC.A.4.3.1 be planned to be materially different from the **Single Line Diagram** submitted to **NGET** pursuant to PC.A.2.2.1 the **User** shall in respect of such other times submit:

- (i) an alternative **Single Line Diagram** that accurately reflects the revised layout and in such case shall also include appropriate associated data representing the relevant changes, or;
- (ii) submit an accurate and unambiguous description of the changes to the **Single Line Diagram** previously submitted for the time of peak **National Electricity Transmission System Demand**.

Where a **User** does not submit any changes, **NGET** will assume that the **Single Line Diagram** (and associated circuit and node data) provided at the time of peak **National Electricity Transmission System Demand** will be valid for all other times. In respect of such other times, where the **User** does not submit such nodal demands at the times defined in PC.A.4.3.1(a), (c), (d) and (e), the nodal demands will be pro-rata, to be consistent with the submitted **Connection Point Demands**.

PC.A.4.4 **NGET** will assemble and derive in a reasonable manner, the forecast information supplied to it under PC.A.4.2.1, PC.A.4.3.1, PC.A.4.3.4 and PC.A.4.3.5 above into a cohesive forecast and will use this in preparing **Forecast Demand** information in the **Seven Year Statement** and for use in **NGET's Operational Planning**. If any **User** believes that the cohesive forecast **Demand** information in the **Seven Year Statement** does not reflect its assumptions on **Demand**, it should contact **NGET** to explain its concerns and may require **NGET**, on reasonable request, to discuss these forecasts. In the absence of such expressions, **NGET** will assume that **Users** concur with **NGET's** cohesive forecast.

PC.A.4.5 Post Fault User System Layout

PC.A.4.5.1 Where for the purposes of **NGET** assessing against the Licence Standards an **Access Group**, the **User** reasonably considers it appropriate that revised post fault **User System** layouts should be taken into account by **NGET**, the following information is required to be submitted by the **User**:

- (i) the specified **Connection Point** assessment period (PC.A.4.3.1,(a)-(e)) that is being evaluated;
- (ii) an accurate and unambiguous description of the **Transmission Interface Circuits** considered to be switched out due to a fault;
- (iii) appropriate revised **Single Line Diagrams** and/or associated revised nodal **Demand** and circuit data detailing the revised **User System(s)** conditions;
- (iv) where the **User's** planned post fault action consists of more than one component, each component must be explicitly identified using the **Single Line Diagram** and associated nodal **Demand** and circuit data;
- (v) the arrangements for undertaking actions (eg the time taken, automatic or manual and any other appropriate information);.

The **User** must not submit any action that it does not have the capability or the intention to implement during the assessment period specified (subject to there being no further unplanned outages on the **User's User System**).

PC.A.4.6 Control of Demand or Reduction of Pumping Load Offered as Reserve

Magnitude of <b>Demand</b> or pumping load which is tripped	MW
<b>System Frequency</b> at which tripping is initiated	Hz
Time duration of <b>System Frequency</b> below trip setting for tripping to be initiated	s
Time delay from trip initiation to tripping	s

PC.A.4.7 General Demand Data

PC.A.4.7.1 The following information is infrequently required and should be supplied (wherever possible) when requested by **NGET**:

- (a) details of any individual loads which have characteristics significantly different from the typical range of Domestic, Commercial or Industrial loads supplied;
- (b) the sensitivity of the **Demand (Active and Reactive Power)** to variations in voltage and **Frequency** on the **National Electricity Transmission System** at the time of the peak **Demand (Active Power)**. The sensitivity factors quoted for the **Demand (Reactive Power)** should relate to that given under PC.A.4.3.1 and, therefore, include any **User's System** series reactive losses but exclude any reactive compensation equipment specified in PC.A.2.4 and exclude any network susceptance specified in PC.A.2.3;
- (c) details of any traction loads, e.g. connection phase pairs and continuous load variation with time;
- (d) the average and maximum phase unbalance, in magnitude and phase angle, which the **User** would expect its **Demand** to impose on the **National Electricity Transmission System**;
- (e) the maximum harmonic content which the **User** would expect its **Demand** to impose on the **National Electricity Transmission System**;
- (f) details of all loads which may cause **Demand** fluctuations greater than those permitted under **Engineering Recommendation P28**, Stage 1 at a **Point of Common Coupling** including the **Flicker Severity (Short Term)** and the **Flicker Severity (Long Term)**.

## PART 2 - DETAILED PLANNING DATA

PC.A.5 GENERATING UNIT, POWER PARK MODULE, DC CONVERTER AND OTSDUW PLANT AND APPARATUS DATA

PC.A.5.1 Introduction

Directly Connected

PC.A.5.1.1 Each **Generator** (including those undertaking **OTSDUW**), with existing or proposed **Power Stations** directly connected, or to be directly connected, to the **National Electricity Transmission System**, shall provide **NGET** with data relating to that **Plant** and **Apparatus**, both current and forecast, as specified in PC.A.5.2, PC.A.5.3, PC.A.5.4 and PC.A.5.7 as applicable. Each **DC Converter Station** owner, with existing or proposed **DC Converter Stations** (including **Generators** undertaking **OTSDUW** which includes an **OTSDUW DC Converter**) directly connected, or to be directly connected, to the **National Electricity Transmission System**, shall provide **NGET** with data relating to that **Plant** and **Apparatus**, both current and forecast, as specified in PC.A.5.2 and PC.A.5.4.

Embedded

PC.A.5.1.2 Each **Generator**, in respect of its existing, or proposed, **Embedded Large Power Stations** and its **Embedded Medium Power Stations** subject to a **Bilateral Agreement** and each **Network Operator** in respect of **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** within its **System** shall provide **NGET** with data relating to each of those **Large Power Stations** and **Medium Power Stations**, both current and forecast, as specified in PC.A.5.2, PC.A.5.3, PC.A.5.4 and PC.A.5.7 as applicable. Each **DC Converter Station** owner, or **Network Operator** in the case of an **Embedded DC Converter Station** not subject to a **Bilateral Agreement** within its **System** with existing or proposed **DC Converter Stations** shall provide **NGET** with data relating to each of those **DC Converter Stations**, both current and forecast, as specified in PC.A.5.2 and PC.A.5.4. However, no data need be supplied in relation to those **Embedded Medium Power Stations** or **Embedded DC Converter Stations** if they are connected at a voltage level 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 **NGET** under PC.A.5.1.4.

PC.A.5.1.3 Each **Network Operator** need not submit **Planning Data** in respect of **Embedded Small Power Stations** unless required to do so under PC.A.1.2(b), PC.A.3.1.4 or unless specifically requested under PC.A.5.1.4 below, in which case they will supply such data.

PC.A.5.1.4 PC.A.4.2.4(b) and PC.A.4.3.2(a) explained that the forecast **Demand** submitted by each **Network Operator** must be net of the output of all **Medium Power Stations** and **Small Power Stations** and **Customer Generating Plant Embedded** within that **User's System**. In such cases, the **Network Operator** must provide **NGET** with the relevant information specified under PC.A.3.1.4 . On receipt of this data further details may be required at **NGET's** discretion as follows:

- (i) in the case of details required from the **Network Operator** for **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** and **Embedded Small Power Stations** and **Embedded DC Converters** in each case within such **Network Operator's System** and **Customer Generating Plant**; and
- (ii) in the case of details required from the **Generator** of **Embedded Large Power Stations** and **Embedded Medium Power Stations** subject to a **Bilateral Agreement**; and
- (iii) in the case of details required from the **DC Converter Station** owner of an **Embedded DC Converter** or **DC Converter Station** subject to a **Bilateral Agreement**.

both current and forecast, as specified in PC.A.5.2 and PC.A.5.3. Such requirement would arise when **NGET** reasonably considers that the collective effect of a number of such **Embedded Small Power Stations, Embedded Medium Power Stations, Embedded DC Converter Stations, DC Converters** and **Customer Generating Plants** may have a significant system effect on the **National Electricity Transmission System**.

PC.A.5.1.5 DPD I and DPD II

The **Detailed Planning Data** described in this Part 2 of the Appendix comprises both **DPD I** and **DPD II**. The required data is listed and collated in the **Data Registration Code**. The **Users** need to refer to the **DRC** to establish whether data referred to here is **DPD I** or **DPD II**.

PC.A.5.2 Demand

PC.A.5.2.1 For each **Generating Unit** which has an associated **Unit Transformer**, the value of the **Demand** supplied through this **Unit Transformer** when the **Generating Unit** is at **Rated MW** output is to be provided.

PC.A.5.2.2 Where the **Power Station** or **DC Converter Station** has associated **Demand** additional to the unit-supplied **Demand** of PC.A.5.2.1 which is supplied from either the **National Electricity Transmission System** or the **Generator's User System** the **Generator, DC Converter Station** owner or the **Network Operator** (in the case of **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** within its **System**), as the case may be, shall supply forecasts for each **Power Station** or **DC Converter Station** of:

- (a) the maximum **Demand** that, in the **User's** opinion, could reasonably be imposed on the **National Electricity Transmission System** or the **Generator's User System** as appropriate;
- (b) the **Demand** at the time of the peak **National Electricity Transmission System Demand**
- (c) the **Demand** at the time of minimum **National Electricity Transmission System Demand**.

PC.A.5.2.3 No later than calendar week 17 each year **NGET** shall notify each **Generator** in respect of its **Large Power Stations** and its **Medium Power Stations** and each **DC Converter** owner in respect of its **DC Converter Station** subject to a **Bilateral Agreement** and each **Network Operator** in respect of each **Embedded Medium Power Station** not subject to a **Bilateral Agreement** and each **Embedded DC Converter Station** not subject to a **Bilateral Agreement** within such **Network Operator's System** in writing of the following, for the current **Financial Year** and for each of the following seven **Financial Years**, which will be regarded as the relevant specified days and times under PC.A.5.2.2:

- (a) the date and time of the annual peak of the **National Electricity Transmission System Demand** at **Annual ACS Conditions**;
- (b) the date and time of the annual minimum of the **National Electricity Transmission System Demand** at **Average Conditions**.

PC.A.5.2.4 At its discretion, **NGET** may also request further details of the **Demand** as specified in PC.A.4.6

PC.A.5.2.5 In the case of **OTSDUW Plant and Apparatus** the following data shall be supplied:

- (a) The maximum **Demand** that could occur at the **Interface Point** and each **Connection Point** (in MW and MVA<sub>r</sub>);
- (b) **Demand** at specified time of annual peak half hour of **National Electricity Transmission System Demand** at **Annual ACS Conditions** (in MW and MVA<sub>r</sub>); and
- (c) **Demand** at specified time of annual minimum half-hour of **National Electricity Transmission System Demand** (in MW and MVA<sub>r</sub>).

For the avoidance of doubt, **Demand** data associate(d with **Generators** undertaking **OTSDUW** which utilise an **OTSDUW DC Converter** should supply data under PC.A.4.

PC.A.5.3 Synchronous Generating Unit and Associated Control System Data

PC.A.5.3.1 The data submitted below are not intended to constrain any **Ancillary Services Agreement**

PC.A.5.3.2 The following **Synchronous Generating Unit** and **Power Station** data should be supplied:

(a) **Synchronous Generating Unit** Parameters

Rated terminal volts (kV)

\* Rated MVA

\* **Rated MW**

\* Minimum Generation MW

\* Short circuit ratio

Direct axis synchronous reactance

\* Direct axis transient reactance

Direct axis sub-transient reactance

Direct axis short-circuit transient time constant.

Direct axis short-circuit sub-transient time constant.

Quadrature axis synchronous reactance

Quadrature axis sub-transient reactance

Quadrature axis short-circuit sub-transient time constant.

Stator time constant

Stator leakage reactance

Armature winding direct-current resistance.

Note: The above data item relating to armature winding direct-current resistance need only be supplied with respect to **Generating Units** commissioned after 1st March 1996 and in cases where, for whatever reason, the **Generator** or the **Network Operator**, as the case may be is aware of the value of the relevant parameter.

\* Turbogenerator inertia constant (MWsec/MVA)

Rated field current (amps) at **Rated MW** and MVA<sub>r</sub> output and at rated terminal voltage.

Field current (amps) open circuit saturation curve for **Generating Unit** terminal voltages ranging from 50% to 120% of rated value in 10% steps as derived from appropriate manufacturers test certificates.

(b) Parameters for **Generating Unit** Step-up Transformers

\* Rated MVA

Voltage ratio

\* Positive sequence reactance (at max, min, & nominal tap)

Positive sequence resistance (at max, min, & nominal tap)

Zero phase sequence reactance

Tap changer range

Tap changer step size

Tap changer type: on load or off circuit

(c) Excitation Control System parameters

Note: The data items requested under Option 1 below may continue to be provided in relation to **Generating Units** on the **System** at 09 January 1995 (in this paragraph, the "relevant date") or the new data items set out under Option 2 may be provided. **Generators** or **Network Operators**, as the case may be, must supply the data as set out under Option 2 (and not those under Option 1) for **Generating Unit** excitation control systems commissioned after the relevant date, those **Generating Unit** excitation control systems recommissioned for any reason such as refurbishment after the relevant date and **Generating Unit** excitation control systems where, as a result of testing or other process, the **Generator** or **Network Operator**, as the case may be, is aware of the data items listed under Option 2 in relation to that **Generating Unit**.

#### Option 1

DC gain of Excitation Loop

Rated field voltage

Maximum field voltage

Minimum field voltage

Maximum rate of change of field voltage (rising)

Maximum rate of change of field voltage (falling)

Details of Excitation Loop described in block diagram form showing transfer functions of individual elements.

Dynamic characteristics of **Over-excitation Limiter**.

Dynamic characteristics of **Under-excitation Limiter**

#### Option 2

**Excitation System Nominal Response**

**Rated Field Voltage**

**No-Load Field Voltage**

**Excitation System On-Load Positive Ceiling Voltage**

**Excitation System No-Load Positive Ceiling Voltage**

**Excitation System No-Load Negative Ceiling Voltage**

Details of **Excitation System** (including **PSS** if fitted) described in block diagram form showing transfer functions of individual elements.

Details of **Over-excitation Limiter** described in block diagram form showing transfer functions of individual elements.

Details of **Under-excitation Limiter** described in block diagram form showing transfer functions of individual elements.

The block diagrams submitted after 1 January 2009 in respect of the **Excitation System** (including the **Over-excitation Limiter** and the **Under-excitation Limiter**) for **Generating Units** with a **Completion date** after 1 January 2009 or subject to a **Modification** to the **Excitation System** after 1 January 2009, should have been verified as far as reasonably practicable by simulation studies as representing the expected behaviour of the system.

#### (d) Governor Parameters

Incremental Droop values (in %) are required for each **Generating Unit** at six MW loading points (MLP1 to MLP6) as detailed in PC.A.5.5.1 (this data item needs only be provided for **Large Power Stations**)

Note: The data items requested under Option 1 below may continue to be provided by **Generators** in relation to **Generating Units** on the **System** at 09 January 1995 (in this paragraph, the "relevant date") or they may provide the new data items set out under Option 2. **Generators** must supply the data as set out under Option 2 (and not those under Option 1) for **Generating Unit** governor control systems commissioned after the relevant date, those **Generating Unit** governor control systems recommissioned for any reason such as refurbishment after the relevant date and **Generating Unit** governor control systems where, as a result of testing or other process, the **Generator** is aware of the data items listed under Option 2 in relation to that **Generating Unit**.

Option 1

(i) Governor Parameters (for Reheat **Steam Units**)

- HP governor average gain MW/Hz
- Speeder motor setting range
- HP governor valve time constant
- HP governor valve opening limits
- HP governor valve rate limits
- Reheater time constant (**Active Energy** stored in reheater)

- IP governor average gain MW/Hz
- IP governor setting range
- IP governor valve time constant
- IP governor valve opening limits
- IP governor valve rate limits

Details of acceleration sensitive elements in HP & IP governor loop.  
A governor block diagram showing transfer functions of individual elements.

(ii) Governor Parameters (for Non-Reheat **Steam Units** and **Gas Turbine Units**)

- Governor average gain
- Speeder motor setting range
- Time constant of steam or fuel governor valve
- Governor valve opening limits
- Governor valve rate limits
- Time constant of turbine
- Governor block diagram

The following data items need only be supplied for **Large Power Stations**:

(iii) Boiler & Steam Turbine Data

- Boiler Time Constant (Stored **Active Energy**) s
- HP turbine response ratio:  
proportion of **Primary Response** arising from HP turbine %
- HP turbine response ratio:  
proportion of High Frequency Response arising from HP turbine %

[End of Option 1]

Option 2

(i) Governor and associated prime mover Parameters - All **Generating Units**

Governor Block Diagram showing transfer function of individual elements including acceleration sensitive elements.

Governor Time Constant (in seconds)

**Speeder Motor Setting Range (%)**

Average Gain (MW/Hz)

**Governor Deadband** (this data item need only be provided for **Large Power Stations**)

- Maximum Setting       $\pm$ Hz

- Normal Setting         $\pm$ Hz

- Minimum Setting       $\pm$ Hz

Where the **Generating Unit** governor does not have a selectable deadband facility, then the actual value of the deadband need only be provided.

The block diagrams submitted after 1 January 2009 in respect of the Governor system for **Generating Units** with a **Completion date** after 1 January 2009 or subject to a **Modification** to the governor system after 1 January 2009, should have been verified as far as reasonably practicable by simulation studies as representing the expected behaviour of the system.

(ii) Governor and associated prime mover Parameters - **Steam Units**

HP Valve Time Constant (in seconds)

HP Valve Opening Limits (%)

HP Valve Opening Rate Limits (%/second)

HP Valve Closing Rate Limits (%/second)

HP Turbine Time Constant (in seconds)

IP Valve Time Constant (in seconds)

IP Valve Opening Limits (%)

IP Valve Opening Rate Limits (%/second)

IP Valve Closing Rate Limits (%/second)

IP Turbine Time Constant (in seconds)

LP Valve Time Constant (in seconds)

LP Valve Opening Limits (%)

LP Valve Opening Rate Limits (%/second)

LP Valve Closing Rate Limits (%/second)

LP Turbine Time Constant (in seconds)

Reheater Time Constant (in seconds)

Boiler Time Constant (in seconds)

HP Power Fraction (%)

IP Power Fraction (%)

(iii) Governor and associated prime mover Parameters - **Gas Turbine Units**

Inlet Guide Vane Time Constant (in seconds)

Inlet Guide Vane Opening Limits (%)

Inlet Guide Vane Opening Rate Limits (%/second)

Inlet Guide Vane Closing Rate Limits (%/second)

Fuel Valve Constant (in seconds)

Fuel Valve Opening Limits (%)

Fuel Valve Opening Rate Limits (%/second)

Fuel Valve Closing Rate Limits (%/second)

Waste Heat Recovery Boiler Time Constant (in seconds)

(iv) Governor and associated prime mover Parameters - Hydro Generating Units

Guide Vane Actuator Time Constant (in seconds)

Guide Vane Opening Limits (%)

Guide Vane Opening Rate Limits (%/second)

Guide Vane Closing Rate Limits (%/second)

Water Time Constant (in seconds)

[End of Option 2]

(e) Unit Control Options

The following data items need only be supplied with respect to **Large Power Stations**:

Maximum <b>Droop</b>	%
Normal <b>Droop</b>	%
Minimum <b>Droop</b>	%
Maximum <b>Frequency</b> deadband	±Hz
Normal <b>Frequency</b> deadband	±Hz
Minimum <b>Frequency</b> deadband	±Hz
Maximum output deadband	±MW
Normal output deadband	±MW
Minimum output deadband	±MW

**Frequency** settings between which Unit Load Controller **Droop** applies:

- Maximum	Hz
- Normal	Hz
- Minimum	Hz

State if sustained response is normally selected.

(f) Plant Flexibility Performance

The following data items need only be supplied with respect to **Large Power Stations**, and should be provided with respect to each **Genset**:

- # Run-up rate to **Registered Capacity**,
- # Run-down rate from **Registered Capacity**,
- # **Synchronising Generation**,
- Regulating range
- Load rejection capability while still **Synchronised** and able to supply **Load**.

Data items marked with a hash (#) should be applicable to a **Genset** which has been **Shutdown** for 48 hours.

- \* Data items marked with an asterisk are already requested under part 1, PC.A.3.3.1, to facilitate an early assessment by **NGET** as to whether detailed stability studies will be required before an offer of terms for a **CUSC Contract** can be made. Such data items have been repeated here merely for completeness and need not, of course, be resubmitted unless their values, known or estimated, have changed.

(g) **Generating Unit Mechanical Parameters**

It is occasionally necessary for **NGET** to assess the interaction between the **Total System** and the mechanical components of **Generating Units**. For **Generating Units** with a **Completion Date** on or after 01 April 2015, the following data items should be supplied:

The number of turbine generator masses.

Diagram showing the Inertia and parameters for each turbine generator mass ( $\text{kgm}^2$ ) and Stiffness constants and parameters between each turbine generator mass for the complete drive train ( $\text{Nm/rad}$ ).

Number of poles.

Relative power applied to different parts of the turbine (%).

Torsional mode frequencies (Hz).

Modal damping decrement factors for the different mechanical modes.

PC.A.5.4 Non-Synchronous Generating Unit and Associated Control System Data

PC.A.5.4.1 The data submitted below are not intended to constrain any **Ancillary Services Agreement**

PC.A.5.4.2 The following **Power Park Unit**, **Power Park Module** and **Power Station** data should be supplied in the case of a **Power Park Module** not connected to the **Total System** by a **DC Converter** (and in the case of PC.A.5.4.2(f) any **OTSUA**):

Where a **Manufacturer's Data & Performance Report** exists in respect of the model of the **Power Park Unit**, the **User** may subject to **NGET's** agreement, opt to reference the **Manufacturer's Data & Performance Report** as an alternative to the provision of data in accordance with PC.A.5.4.2 except for:

- (1) the section marked thus # at sub paragraph (b); and
- (2) all of the harmonic and flicker parameters required under sub paragraph (h); and
- (3) all of the site specific model parameters relating to the voltage or frequency control systems required under sub paragraphs (d) and (e),

which must be provided by the **User** in addition to the **Manufacturer's Data & Performance Report** reference.

- (a) **Power Park Unit** model

A mathematical model of each type of **Power Park Unit** capable of representing its transient and dynamic behaviour under both small and large disturbance conditions. The model shall include non-linear effects and represent all equipment relevant to the dynamic performance of the **Power Park Unit** as agreed with **NGET**. The model shall be suitable for the study of balanced, root mean square, positive phase sequence time-domain behaviour, excluding the effects of electromagnetic transients, harmonic and sub-harmonic frequencies.

The model shall accurately represent the overall performance of the **Power Park Unit** over its entire operating range including that which is inherent to the **Power Park Unit** and that which is achieved by use of supplementary control systems providing either continuous or stepwise control. Model resolution should be sufficient to accurately represent **Power Park Unit** behaviour both in response to operation of **Transmission System** protection and in the context of longer-term simulations.

The overall structure of the model shall include:

- (i) any supplementary control signal modules not covered by (c), (d) and (e) below.
- (ii) any blocking, deblocking and protective trip features that are part of the **Power Park Unit** (e.g. "crowbar").
- (iii) any other information required to model the **Power Park Unit** behaviour to meet the model functional requirement described above.

The model shall be submitted in the form of a transfer function block diagram and may be accompanied by dynamic and algebraic equations.

This model shall display all the transfer functions and their parameter values, any non wind-up logic, signal limits and non-linearities.

The submitted **Power Park Unit** model and the supplementary control signal module models covered by (c), (d) and (e) below shall have been validated and this shall be confirmed by the **Generator**. The validation shall be based on comparing the submitted model simulation results against measured test results. Validation evidence shall also be submitted and this shall include the simulation and measured test results. The latter shall include appropriate short-circuit tests. In the case of an **Embedded Medium Power Station** not subject to a **Bilateral Agreement** the **Network Operator** will provide **NGET** with the validation evidence if requested by **NGET**. The validation of the supplementary control signal module models covered by (c), (d) and (e) below applies only to a **Power Park Module** with a **Completion Date** after 1 January 2009.

(b) **Power Park Unit** parameters

- \* Rated MVA
- \* **Rated MW**
- \* Rated terminal voltage
- \* Average site air density ( $\text{kg/m}^3$ ), maximum site air density ( $\text{kg/m}^3$ ) and minimum site air density ( $\text{kg/m}^3$ ) for the year

Year for which the air density is submitted

Number of pole pairs

Blade swept area ( $\text{m}^2$ )

Gear box ratio

Mechanical drive train

For each **Power Park Unit**, details of the parameters of the drive train represented as an equivalent two mass model should be provided. This model should accurately represent the behaviour of the complete drive train for the purposes of power system analysis studies and should include the following data items:-

Equivalent inertia constant (MWsec/MVA) of the first mass (e.g. wind turbine rotor

and blades) at minimum, synchronous and rated speeds

Equivalent inertia constant (MWsec/MVA) of the second mass (e.g. generator rotor) at minimum, synchronous and rated speeds

Equivalent shaft stiffness between the two masses (Nm/electrical radian)

Additionally, for **Power Park Units** that are induction generators (e.g. squirrel cage, doubly-fed) driven by wind turbines:

- \* Stator resistance
- \* Stator reactance
- \* Magnetising reactance.
- \* Rotor resistance.(at starting)
- \* Rotor resistance.(at rated running)
- \* Rotor reactance (at starting)
- \* Rotor reactance (at rated running)

Additionally for doubly-fed induction generators only:

The generator rotor speed range (minimum and maximum speeds in RPM)

The optimum generator rotor speed versus wind speed submitted in tabular format

Power converter rating (MVA)

The rotor power coefficient ( $C_p$ ) versus tip speed ratio ( $\lambda$ ) curves for a range of blade angles (where applicable) together with the corresponding values submitted in tabular format. The tip speed ratio ( $\lambda$ ) is defined as  $\Omega R/U$  where  $\Omega$  is the angular velocity of the rotor, R is the radius of the wind turbine rotor and U is the wind speed.

The electrical power output versus generator rotor speed for a range of wind speeds over the entire operating range of the **Power Park Unit**, together with the corresponding values submitted in tabular format.

The blade angle versus wind speed curve together with the corresponding values submitted in tabular format.

The electrical power output versus wind speed over the entire operating range of the **Power Park Unit**, together with the corresponding values submitted in tabular format.

Transfer function block diagram, including parameters and description of the operation of the power electronic converter and fault ride through capability (where applicable).

For a **Power Park Unit** consisting of a synchronous machine in combination with a back to back **DC Converter**, or for a **Power Park Unit** not driven by a wind turbine, the data to be supplied shall be agreed with **NGET** in accordance with PC.A.7.

(c) Torque / speed and blade angle control systems and parameters

For the **Power Park Unit**, details of the torque / speed controller and blade angle controller in the case of a wind turbine and power limitation functions (where applicable) described in block diagram form showing transfer functions and parameters of individual elements.

(d) Voltage/**Reactive Power/Power Factor** control system parameters

For the **Power Park Unit** and **Power Park Module** details of voltage/**Reactive Power/Power Factor** controller (and **PSS** if fitted) described in block diagram form showing transfer functions and parameters of individual elements.

(e) **Frequency** control system parameters

For the **Power Park Unit** and **Power Park Module** details of the **Frequency** controller described in block diagram form showing transfer functions and parameters of individual elements.

(f) **Protection**

Details of settings for the following **Protection** relays (to include): Under **Frequency**, over **Frequency**, under voltage, over voltage, rotor over current, stator over current, high wind speed shut down level.

(g) Complete **Power Park Unit** model, parameters and controls

An alternative to PC.A.5.4.2 (a), (b), (c), (d), (e) and (f), is the submission of a single complete model that consists of the full information required under PC.A.5.4.2 (a), (b), (c), (d), (e) and (f) provided that all the information required under PC.A.5.4.2 (a), (b), (c), (d), (e) and (f) individually is clearly identifiable.

(h) Harmonic and flicker parameters

When connecting a **Power Park Module**, it is necessary for **NGET** to evaluate the production of flicker and harmonics on **NGET** and **User's Systems**. At **NGET's** reasonable request, the **User** (a **Network Operator** in the case of an **Embedded Power Park Module** not subject to a **Bilateral Agreement**) is required to submit the following data (as defined in IEC 61400-21 (2001)) for each **Power Park Unit**:-

Flicker coefficient for continuous operation.

Flicker step factor.

Number of switching operations in a 10 minute window.

Number of switching operations in a 2 hour window.

Voltage change factor.

Current Injection at each harmonic for each **Power Park Unit** and for each **Power Park Module**

\* Data items marked with an asterisk are already requested under part 1, PC.A.3.3.1, to facilitate an early assessment by **NGET** as to whether detailed stability studies will be required before an offer of terms for a **CUSC Contract** can be made. Such data items have been repeated here merely for completeness and need not, of course, be resubmitted unless their values, known or estimated, have changed.

PC.A.5.4.3 DC Converter

PC.A.5.4.3.1 For a **DC Converter** at a **DC Converter Station** or a **Power Park Module** connected to the **Total System** by a **DC Converter** (or in the case of **OTSUA** which includes an **OTSDUW DC Converter**) the following information for each **DC Converter** and **DC Network** should be supplied:

(a) **DC Converter** parameters

- \* **Rated MW** per pole for transfer in each direction;
- \* **DC Converter** type (i.e. current or voltage source);
- \* Number of poles and pole arrangement;
- \* Rated DC voltage/pole (kV);
- \* Return path arrangement;

(b) **DC Converter** transformer parameters

Rated MVA

Nominal primary voltage (kV);  
Nominal secondary (converter-side) voltage(s) (kV);  
Winding and earthing arrangement;  
Positive phase sequence reactance at minimum, maximum and nominal tap;  
Positive phase sequence resistance at minimum, maximum and nominal tap;  
Zero phase sequence reactance;  
Tap-changer range in %;  
number of tap-changer steps;

(c) **DC Network** parameters

Rated DC voltage per pole;  
Rated DC current per pole;  
Single line diagram of the complete **DC Network**;  
Details of the complete **DC Network**, including resistance, inductance and capacitance of all DC cables and/or DC lines;  
Details of any DC reactors (including DC reactor resistance), DC capacitors and/or DC-side filters that form part of the **DC Network**;

(d) AC filter reactive compensation equipment parameters

Note: The data provided pursuant to this paragraph must not include any contribution from reactive compensation plant owned or operated by **NGET**.

Total number of AC filter banks.  
Type of equipment (e.g. fixed or variable)  
Single line diagram of filter arrangement and connections;  
**Reactive Power** rating for each AC filter bank, capacitor bank or operating range of each item of reactive compensation equipment, at rated voltage;  
Performance chart showing **Reactive Power** capability of the **DC Converter**, as a function of MW transfer, with all filters and reactive compensation plant, belonging to the **DC Converter Station** working correctly.

Note: Details in PC.A.5.4.3.1 are required for each **DC Converter** connected to the **DC Network**, unless each is identical or where the data has already been submitted for an identical **DC Converter** at another **Connection Point**.

Note: For a **Power Park Module** connected to the **Grid Entry point** or (**User System Entry Point** if **Embedded**) by a **DC Converter** the equivalent inertia and fault infeed at the **Power Park Unit** should be given.

DC Converter Control System Models

PC.A.5.4.3.2 The following data is required by **NGET** to represent **DC Converters** and associated **DC Networks** (and including **OTSUA** which includes an **OTSDUW DC Converter**) in dynamic power system simulations, in which the AC power system is typically represented by a positive sequence equivalent. **DC Converters** are represented by simplified equations and are not modelled to switching device level.

- (i) Static  $V_{DC}-I_{DC}$  (DC voltage - DC current) characteristics, for both the rectifier and inverter modes for a current source converter. Static  $V_{DC}-P_{DC}$  (DC voltage - DC power) characteristics, for both the rectifier and inverter modes for a voltage source converter. Transfer function block diagram including parameters representation of the control systems of each **DC Converter** and of the **DC Converter Station**, for both the rectifier and inverter modes. A suitable model would feature the **DC Converter** firing angle as the output variable.

- (ii) Transfer function block diagram representation including parameters of the **DC Converter** transformer tap changer control systems, including time delays
- (iii) Transfer function block diagram representation including parameters of AC filter and reactive compensation equipment control systems, including any time delays.
- (iv) Transfer function block diagram representation including parameters of any **Frequency** and/or load control systems.
- (v) Transfer function block diagram representation including parameters of any small signal modulation controls such as power oscillation damping controls or sub-synchronous oscillation damping controls, that have not been submitted as part of the above control system data.
- (vi) Transfer block diagram representation of the **Reactive Power** control at converter ends for a voltage source converter.

### Plant Flexibility Performance

PC.A.5.4.3.3 The following information on plant flexibility and performance should be supplied (and also in respect of **OTSUA** which includes an **OTSDUW DC Converter**):

- (i) Nominal and maximum (emergency) loading rate with the **DC Converter** in rectifier mode.
- (ii) Nominal and maximum (emergency) loading rate with the **DC Converter** in inverter mode.
- (iii) Maximum recovery time, to 90% of pre-fault loading, following an AC system fault or severe voltage depression.
- (iv) Maximum recovery time, to 90% of pre-fault loading, following a transient **DC Network** fault.

### Harmonic Assessment Information

PC.A.5.4.3.4 **DC Converter** owners shall provide such additional further information as required by **NGET** in order that compliance with CC.6.1.5 can be demonstrated.

\* Data items marked with an asterisk are already requested under part 1, PC.A.3.3.1, to facilitate an early assessment by **NGET** as to whether detailed stability studies will be required before an offer of terms for a **CUSC Contract** can be made. Such data items have been repeated here merely for completeness and need not, of course, be resubmitted unless their values, known or estimated, have changed.

PC.A.5.5 Response Data For Frequency Changes

The information detailed below is required to describe the actual frequency response capability profile as illustrated in Figure CC.A.3.1 of the **Connection Conditions**, and need only be provided for each:

- (i) **Genset at Large Power Stations**; and
- (ii) **Generating Unit, Power Park Module or CCGT Module** at a **Medium Power Station** or **DC Converter Station** that has agreed to provide **Frequency** response in accordance with a **CUSC Contract**.

In the case of (ii) above for the rest of this PC.A.5.5 where reference is made to **Gensets**, it shall include such **Generating Units, CCGT Modules, Power Park Modules** and **DC Converters** as appropriate, but excludes **OTSDUW Plant and Apparatus** utilising **OTSDUW DC Converters**.

In this **PC.A.5.5**, for a **CCGT Module** with more than one **Generating Unit**, the phrase **Minimum Generation** applies to the entire **CCGT Module** operating with all **Generating Units Synchronised** to the **System**. Similarly for a **Power Park Module** with more than one **Power Park Unit**, the phrase **Minimum Generation** applies to the entire **Power Park Module** operating with all **Power Park Units Synchronised** to the **System**.

PC.A.5.5.1 MW Loading Points At Which Data Is Required

Response values are required at six MW loading points (MLP1 to MLP6) for each **Genset**. **Primary** and **Secondary Response** values need not be provided for MW loading points which are below **Minimum Generation**. MLP1 to MLP6 must be provided to the nearest MW.

Prior to the **Genset** being first **Synchronised**, the MW loading points must take the following values :

MLP1	<b>Designed Minimum Operating Level</b>
MLP2	<b>Minimum Generation</b>
MLP3	70% of <b>Registered Capacity</b>
MLP4	80% of <b>Registered Capacity</b>
MLP5	95% of <b>Registered Capacity</b>
MLP6	<b>Registered Capacity</b>

When data is provided after the **Genset** is first **Synchronised**, the MW loading points may take any value between **Designed Minimum Operating Level** and **Registered Capacity** but the value of the **Designed Minimum Operating Level** must still be provided if it does not form one of the MW loading points.

PC.A.5.5.2 Primary And Secondary Response To Frequency Fall

**Primary** and **Secondary Response** values for a -0.5Hz ramp are required at six MW loading points (MLP1 to MLP6) as detailed above

PC.A.5.5.3 High Frequency Response To Frequency Rise

**High Frequency Response** values for a +0.5Hz ramp are required at six MW loading points (MLP1 to MLP6) as detailed above.

PC.A.5.6 Mothballed Generating Unit Mothballed Power Park Module Or Mothballed DC Converter At A DC Converter Station And Alternative Fuel Information

Data identified under this section PC.A.5.6 must be submitted as required under PC.A.1.2 and at **NGET**'s reasonable request.

In the case of **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**, upon request from **NGET** each **Network Operator** shall provide the information required in PC.A.5.6.1, PC.A.5.6.2, PC.A.5.6.3 and PC.A.5.6.4 on respect of such **Embedded Medium Power Stations** and **Embedded DC Converters Stations** with their **System**.

PC.A.5.6.1 Mothballed Generating Unit Information

**Generators** and **DC Converter Station** owners must supply with respect to each **Mothballed Generating Unit, Mothballed Power Park Module** or **Mothballed DC Converter** at a **DC Converter Station** the estimated **MW** output which could be returned to service within the following time periods from the time that a decision to return was made:

- < 1 month;
- 1-2 months;
- 2-3 months;
- 3-6 months;
- 6-12 months; and
- >12 months.

The return to service time should be determined in accordance with **Good Industry Practice** assuming normal working arrangements and normal plant procurement lead times. The MW output values should be the incremental values made available in each time period as further described in the **DRC**.

PC.A.5.6.2 **Generators** and **DC Converter Station** owners must also notify **NGET** of any significant factors which may prevent the **Mothballed Generating Unit, Mothballed Power Park Module** or **Mothballed DC Converter** at a **DC Converter Station** achieving the estimated values provided under PC.A.5.6.1 above, excluding factors relating to **Transmission Entry Capacity**.

PC.A.5.6.3 Alternative Fuel Information

The following data items must be supplied with respect to each **Generating Unit** whose main fuel is gas.

For each alternative fuel type (if facility installed):

- (a) Alternative fuel type e.g. oil distillate, alternative gas supply
- (b) For the changeover from main to alternative fuel:
  - Time to carry out off-line and on-line fuel changeover (minutes).

- Maximum output following off-line and on-line changeover (MW).
- Maximum output during on-line fuel changeover (MW).
- Maximum operating time at full load assuming typical and maximum possible stock levels (hours).
- Maximum rate of replacement of depleted stocks (MWh electrical/day) on the basis of **Good Industry Practice**.
- Is changeover to alternative fuel used in normal operating arrangements?
- Number of successful changeovers carried out in the last **NGET Financial Year** (choice of 0, 1-5, 6-10, 11-20, >20).

(c) For the changeover back to main fuel:

- Time to carry out off-line and on-line fuel changeover (minutes).
- Maximum output during on-line fuel changeover (MW).

PC.A.5.6.4 **Generators** must also notify **NGET** of any significant factors and their effects which may prevent the use of alternative fuels achieving the estimated values provided under PC.A.5.6.3 above (e.g. emissions limits, distilled water stocks etc.)

PC.A.5.7 Black Start Related Information

Data identified under this section PC.A.5.7 must be submitted as required under PC.A.1.2. This information may also be requested by **NGET** during a **Black Start** and should be provided by **Generators** where reasonably possible. **Generators** in this section PC.A.5.7 means **Generators** only in respect of their **Large Power Stations**.

The following data items/text must be supplied, from each **Generator** to **NGET**, with respect to each **BM Unit** at a **Large Power Station** (excluding the **Generating Units** that are contracted to provide **Black Start Capability**, **Power Park Modules** or **Generating Units** with an **Intermittent Power Source**);

- (a) Expected time for each **BM Unit** to be **Synchronised** following a **Total Shutdown** or **Partial Shutdown**. The assessment should include the **Power Station's** ability to re-synchronise all **BM Units**, if all were running immediately prior to the **Total Shutdown** or **Partial Shutdown**. Additionally this should highlight any specific issues (i.e. those that would impact on the **BM Unit's** time to be **Synchronised**) that may arise, as time progresses without external supplies being restored.
- (b) **Block Loading Capability**. This should be provided in either graphical or tabular format showing the estimated block loading capability from 0MW to **Registered Capacity**. Any particular 'hold' points should also be identified. The data of each **BM Unit** should be provided for the condition of a 'hot' unit that was **Synchronised** just prior to the **Total Shutdown** or **Partial Shutdown** and also for the condition of a 'cold' unit. The block loading assessment should be done against a frequency variation of 49.5Hz – 50.5Hz.

PC.A.6 USERS' SYSTEM DATA

PC.A.6.1 Introduction

PC.A.6.1.1 Each **User**, whether connected directly via an existing **Connection Point** to the **National Electricity Transmission System** or seeking such a direct connection, or providing terms for connection of an **Offshore Transmission System** to its **User System** to **NGET** or undertaking **OTSDUW**, shall provide **NGET** with data on its **User System** or **OTSDUW Plant and Apparatus** which relates to the **Connection Site** containing the **Connection Point** (or **Interface Points** or **Connection Points** in the case of **OTSUA**) both current and forecast, as specified in PC.A.6.2 to PC.A.6.6.

PC.A.6.1.2 Each **User** must reflect the system effect at the **Connection Site(s)** of any third party **Embedded** within its **User System** whether existing or proposed.

PC.A.6.1.3 PC.A.6.2, and PC.A.6.4 to PC.A.6.6 consist of data which is only to be supplied to **NGET** at **NGET's** reasonable request. In the event that **NGET** identifies a reason for requiring this data, **NGET** shall write to the relevant **User(s)**, requesting the data, and explaining the reasons for the request. If the **User(s)** wishes, **NGET** shall also arrange a meeting at which the request for data can be discussed, with the objective of identifying the best way in which **NGET's** requirements can be met.

PC.A.6.2 Transient Overvoltage Assessment Data

PC.A.6.2.1 It is occasionally necessary for **NGET** to undertake transient overvoltage assessments (e.g. capacitor switching transients, switchgear transient recovery voltages, etc). At **NGET's** reasonable request, each **User** is required to provide the following data with respect to the **Connection Site** (and in the case of **OTSUA**, **Interface Points** and **Connection Points**), current and forecast, together with a **Single Line Diagram** where not already supplied under PC.A.2.2.1, as follows:

- (a) busbar layout plan(s), including dimensions and geometry showing positioning of any current and voltage transformers, through bushings, support insulators, disconnectors, circuit breakers, surge arresters, etc. Electrical parameters of any associated current and voltage transformers, stray capacitances of wall bushings and support insulators, and grading capacitances of circuit breakers;
- (b) Electrical parameters and physical construction details of lines and cables connected at that busbar. Electrical parameters of all plant e.g., transformers (including neutral earthing impedance or zig-zag transformers, if any), series reactors and shunt compensation equipment connected at that busbar (or to the tertiary of a transformer) or by lines or cables to that busbar;
- (c) Basic insulation levels (BIL) of all **Apparatus** connected directly, by lines or by cables to the busbar;
- (d) characteristics of overvoltage **Protection** devices at the busbar and at the termination points of all lines, and all cables connected to the busbar;
- (e) fault levels at the lower voltage terminals of each transformer connected directly or indirectly to the **National Electricity Transmission System** (including **OTSUA** at each **Interface Point** and **Connection Point**) without intermediate transformation;
- (f) the following data is required on all transformers operating at **Supergrid Voltage** throughout **Great Britain** and, in Scotland and **Offshore**, also at 132kV (including **OTSUA**): three or five limb cores or single phase units to be specified, and operating peak flux density at nominal voltage;
- (g) an indication of which items of equipment may be out of service simultaneously during **Planned Outage** conditions.

PC.A.6.3 User's Protection Data

PC.A.6.3.1 Protection

The following information is required which relates only to **Protection** equipment which can trip or inter-trip or close any **Connection Point** circuit-breaker or any **Transmission** circuit-breaker (or in the case of **OTSUA**, any **Interface Point** or **Connection Point** circuit breaker). This information need only be supplied once, in accordance with the timing requirements set out in PC.A.1.4(b), and need not be supplied on a routine annual basis thereafter, although **NGET** should be notified if any of the information changes

- (a) a full description, including estimated settings, for all relays and **Protection** systems installed or to be installed on the **User's System**;
- (b) a full description of any auto-reclose facilities installed or to be installed on the **User's System**, including type and time delays;
- (c) a full description, including estimated settings, for all relays and **Protection** systems or to be installed on the generator, generator transformer, **Station Transformer** and their associated connections;

- (d) for **Generating Units** (other than **Power Park Units**) or **Power Park Modules** or **DC Converters** at a **DC Converter Station** or **OTSDUW Plant and Apparatus** having (or intended to have) a circuit breaker at the generator terminal voltage, clearance times for electrical faults within the **Generating Unit** (other than a **Power Park Unit**) or **Power Park Module** zone, or within the **OTSDUW Plant and Apparatus**;
- (e) the most probable fault clearance time for electrical faults on any part of the **User's System** directly connected to the **National Electricity Transmission System** including **OTSDUW Plant and Apparatus**; and
- (f) in the case of **OTSDUW Plant and Apparatus**, synchronisation facilities and delayed auto reclose sequence schedules (where applicable).

#### PC.A.6.4 Harmonic Studies

PC.A.6.4.1 It is occasionally necessary for **NGET** to evaluate the production/magnification of harmonic distortion on **NGET** and **User's Systems** (and **OTSUA**), especially when **NGET** is connecting equipment such as capacitor banks. At **NGET's** reasonable request, each **User** is required to submit data with respect to the **Connection Site** (and in the case of **OTSUA**, each **Interface Point** and **Connection Point**), current and forecast, and where not already supplied under PC.A.2.2.4 and PC.A.2.2.5, as follows:

PC.A.6.4.2 Overhead lines and underground cable circuits of the **User's Subtransmission System** must be differentiated and the following data provided separately for each type:

- Positive phase sequence resistance;
- Positive phase sequence reactance;
- Positive phase sequence susceptance;

and for all transformers connecting the **User's Subtransmission System** and **OTSDUW Plant and Apparatus** to a lower voltage:

- Rated MVA;
- Voltage Ratio;
- Positive phase sequence resistance;
- Positive phase sequence reactance;

and at the lower voltage points of those connecting transformers:

- Equivalent positive phase sequence susceptance;
- Connection voltage and MVA rating of any capacitor bank and component design parameters if configured as a filter;
- Equivalent positive phase sequence interconnection impedance with other lower voltage points;
- The minimum and maximum **Demand** (both MW and MVA) that could occur;
- Harmonic current injection sources in Amps at the Connection voltage points. Where the harmonic injection current comes from a diverse group of sources, the equivalent contribution may be established from appropriate measurements;
- Details of traction loads, eg connection phase pairs, continuous variation with time, etc;
- An indication of which items of equipment may be out of service simultaneously during **Planned Outage** conditions.

#### PC.A.6.5 Voltage Assessment Studies

It is occasionally necessary for **NGET** to undertake detailed voltage assessment studies (e.g., to examine potential voltage instability, voltage control co-ordination or to calculate voltage step changes). At **NGET's** reasonable request, each **User** is required to submit the following data where not already supplied under PC.A.2.2.4 and PC.A.2.2.5:

For all circuits of the **User's Subtransmission System** (and any **OTSUA**):-

Positive Phase Sequence Reactance;  
Positive Phase Sequence Resistance;  
Positive Phase Sequence Susceptance;  
MVA<sub>r</sub> rating of any reactive compensation equipment;

and for all transformers connecting the **User's Subtransmission System** to a lower voltage (and any **OTSUA**):

Rated MVA;  
Voltage Ratio;  
Positive phase sequence resistance;  
Positive Phase sequence reactance;  
Tap-changer range;  
Number of tap steps;  
Tap-changer type: on-load or off-circuit;  
AVC/tap-changer time delay to first tap movement;  
AVC/tap-changer inter-tap time delay;

and at the lower voltage points of those connecting transformers (and any **OTSUA**):-

Equivalent positive phase sequence susceptance;  
MVA<sub>r</sub> rating of any reactive compensation equipment;  
Equivalent positive phase sequence interconnection impedance with other lower voltage points;  
The maximum **Demand** (both MW and MVA<sub>r</sub>) that could occur;  
Estimate of voltage insensitive (constant power) load content in % of total load at both winter peak and 75% off-peak load conditions.

#### PC.A.6.6 Short Circuit Analysis

PC.A.6.6.1 Where prospective short-circuit currents on equipment owned, operated or managed by **NGET** are greater than 90% of the equipment rating, and in **NGET's** reasonable opinion more accurate calculations of short-circuit currents are required, then at **NGET's** request each **User** is required to submit data with respect to the **Connection Site** (and in the case of **OTSUA**, each **Interface Point** and **Connection Point**), current and forecast, and where not already supplied under PC.A.2.2.4 and PC.A.2.2.5, as follows:

PC.A.6.6.2 For all circuits of the **User's Subtransmission System** (and any **OTSUA**):

Positive phase sequence resistance;  
Positive phase sequence reactance;  
Positive phase sequence susceptance;  
Zero phase sequence resistance (both self and mutuals);  
Zero phase sequence reactance (both self and mutuals);  
Zero phase sequence susceptance (both self and mutuals);

and for all transformers connecting the **User's Subtransmission System** to a lower voltage (and any **OTSUA**):

Rated MVA;  
Voltage Ratio;  
Positive phase sequence resistance (at max, min and nominal tap);

Positive Phase sequence reactance (at max, min and nominal tap);

Zero phase sequence reactance (at nominal tap);

Tap changer range;

Earthing method: direct, resistance or reactance;

Impedance if not directly earthed;

and at the lower voltage points of those connecting transformers (and any **OTSUA**):

The maximum **Demand** (in MW and MVar) that could occur;

Short-circuit infeed data in accordance with PC.A.2.5.6 unless the **User's** lower voltage network runs in parallel with the **User's Subtransmission System**, when to prevent double counting in each node infeed data, a  $\pi$  equivalent comprising the data items of PC.A.2.5.6 for each node together with the positive phase sequence interconnection impedance between the nodes shall be submitted.

PC.A.7

ADDITIONAL DATA FOR NEW TYPES OF POWER STATIONS, DC CONVERTER STATIONS, OTSUA AND CONFIGURATIONS

Notwithstanding the **Standard Planning Data** and **Detailed Planning Data** set out in this Appendix, as new types of configurations and operating arrangements of **Power Stations, DC Converter Stations and OTSUA** emerge in future, **NGET** may reasonably require additional data to represent correctly the performance of such **Plant and Apparatus** on the **System**, where the present data submissions would prove insufficient for the purpose of producing meaningful **System** studies for the relevant parties.

## PART 3 - DETAILED PLANNING DATA

PC.A.8 To allow a **User** to model the **National Electricity Transmission System**, **NGET** will provide, upon request, the following **Network Data** to **Users**, calculated in accordance with **Good Industry Practice**:

To allow a **User** to assess undertaking **OTSDUW** and except where provided for in Appendix F, **NGET** will provide upon request the following **Network Data** to **Users**, calculated in accordance with **Good Industry Practice**:

PC.A.8.1 Single Point of Connection

For a **Single Point of Connection** to a **User's System** (and **OTSUA**), as an equivalent 400kV or 275kV source and also in Scotland and **Offshore** as an equivalent 132kV source, the data (as at the HV side of the **Point of Connection** (and in the case of **OTSUA**, each **Interface Point** and **Connection Point**) reflecting data given to **NGET** by **Users**) will be given to a **User** as follows:

The data items listed under the following parts of PC.A.8.3:

(a) (i), (ii), (iii), (iv), (v) and (vi)

and the data items shall be provided in accordance with the detailed provisions of PC.A.8.3 (b) - (e).

PC.A.8.2 Multiple Point of Connection

For a **Multiple Point of Connection** to a **User's System** equivalents suitable for use in loadflow and fault level analysis shall be provided. These equivalents will normally be in the form of a  $\pi$  model or extension with a source (or demand for a loadflow equivalent) at each node and a linking impedance. The boundary nodes for the equivalent shall be either at the **Connection Point** (and in the case of **OTSDUW**, each **Interface Point** and **Connection Point**) or (where **NGET** agrees) at suitable nodes (the nodes to be agreed with the **User**) within the **National Electricity Transmission System**. The data at the **Connection Point** (and in the case of **OTSDUW**, each **Interface Point** and **Connection Point**) will be given to a **User** as follows:

The data items listed under the following parts of PC.A.8.3:-

(a) (i), (ii), (iv), (v), (vi), (vii), (viii), (ix), (x) and (xi)

and the data items shall be provided in accordance with the detailed provisions of PC.A.8.3 (b) - (e).

When an equivalent of this form is not required **NGET** will not provide the data items listed under the following parts of PC.A.8.3:-

(a) (vii), (viii), (ix), (x) and (xi)

PC.A.8.3 Data Items

(a) The following is a list of data utilised in this part of the **PC**. It also contains rules on the data which generally apply.

- (i) symmetrical three-phase short circuit current infeed at the instant of fault from the **National Electricity Transmission System**, ( $I_1''$ );
- (ii) symmetrical three-phase short circuit current from the **National Electricity Transmission System** after the subtransient fault current contribution has substantially decayed, ( $I_1'$ );
- (iii) the zero sequence source resistance and reactance values at the **Point of Connection** (and in case of **OTSUA**, each **Interface Point** and **Connection Point**), consistent with the maximum infeed below;
- (iv) the pre-fault voltage magnitude at which the maximum fault currents were calculated;
- (v) the positive sequence X/R ratio at the instant of fault;
- (vi) the negative sequence resistance and reactance values of the **National Electricity**

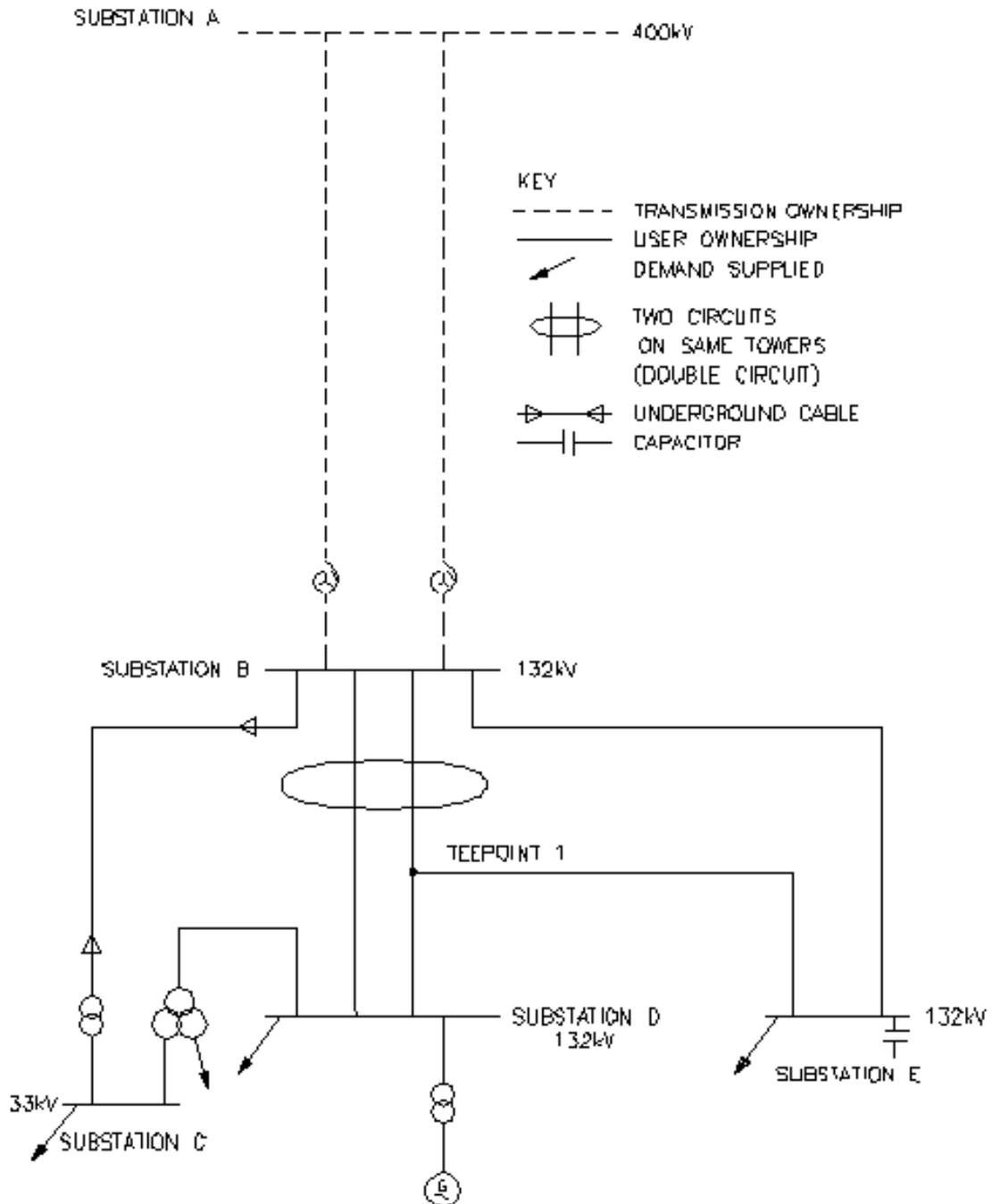
- Transmission System** seen from the (**Point of Connection** and in case of **OTSUA**, each **Interface Point** and **Connection Point**), if substantially different from the values of positive sequence resistance and reactance which would be derived from the data provided above;
- (vii) the initial positive sequence resistance and reactance values of the two (or more) sources and the linking impedance(s) derived from a fault study constituting the ( $\pi$ ) equivalent and evaluated without the **User** network and load and where appropriate without elements of the **National Electricity Transmission System** between the **User** network and agreed boundary nodes (and in case of **OTSUA**, each **Interface Point** and **Connection Point**);
  - (viii) the positive sequence resistance and reactance values of the two (or more) sources and the linking impedance(s) derived from a fault study, considering the short circuit current contributions after the subtransient fault current contribution has substantially decayed, constituting the ( $\pi$ ) equivalent and evaluated without the **User** network and load, and where appropriate without elements of the **National Electricity Transmission System** between the **User** network and agreed boundary nodes (and in case of **OTSUA**, each **Interface Point** and **Connection Point**);
  - (ix) the corresponding zero sequence impedance values of the ( $\pi$ ) equivalent produced for use in fault level analysis;
  - (x) the **Demand** and voltage at the boundary nodes and the positive sequence resistance and reactance values of the linking impedance(s) derived from a loadflow study considering **National Electricity Transmission System** peak **Demand** constituting the ( $\pi$ ) loadflow equivalent; and,
  - (xi) where the agreed boundary nodes are not at a **Connection Point** (and in case of **OTSUA**, **Interface Point** or **Connection Point**), the positive sequence and zero sequence impedances of all elements of the **National Electricity Transmission System** between the **User** network and agreed boundary nodes that are not included in the equivalent (and in case of **OTSUA**, each **Interface Point** and **Connection Point**).
- (b) To enable the model to be constructed, **NGET** will provide data based on the following conditions.
  - (c) The initial symmetrical three phase short circuit current and the transient period three phase short circuit current will normally be derived from the fixed impedance studies. The latter value should be taken as applying at times of 120ms and longer. Shorter values may be interpolated using a value for the subtransient time constant of 40ms. These fault currents will be obtained from a full **System** study based on load flow analysis that takes into account any existing flow across the point of connection being considered.
  - (d) Since the equivalent will be produced for the 400kV or 275kV and also in Scotland and **Offshore** 132kV parts of the **National Electricity Transmission System** **NGET** will provide the appropriate supergrid transformer data.
  - (e) The positive sequence X/R ratio and the zero sequence impedance value will correspond to the **NGET** source network only, that is with the section of network if any with which the equivalent is to be used excluded. These impedance values will be derived from the condition when all **Generating Units** are **Synchronised** to the **National Electricity Transmission System** or a **User's System** and will take account of active sources only including any contribution from the load to the fault current. The passive component of the load itself or other system shunt impedances should not be included.
  - (f) A **User** may at any time, in writing, specifically request for an equivalent to be prepared for an alternative **System** condition, for example where the **User's System** peak does not correspond to the **National Electricity Transmission System** peak, and **NGET** will, insofar as such request is reasonable, provide the information as soon as reasonably practicable following the request.

## APPENDIX B - SINGLE LINE DIAGRAMS

PC.B.1

The diagrams below show three examples of single line diagrams, showing the detail that should be incorporated in the diagram. The first example is for an **Network Operator** connection, the second for a **Generator** connection, the third for a **Power Park Module** electrically equivalent system.

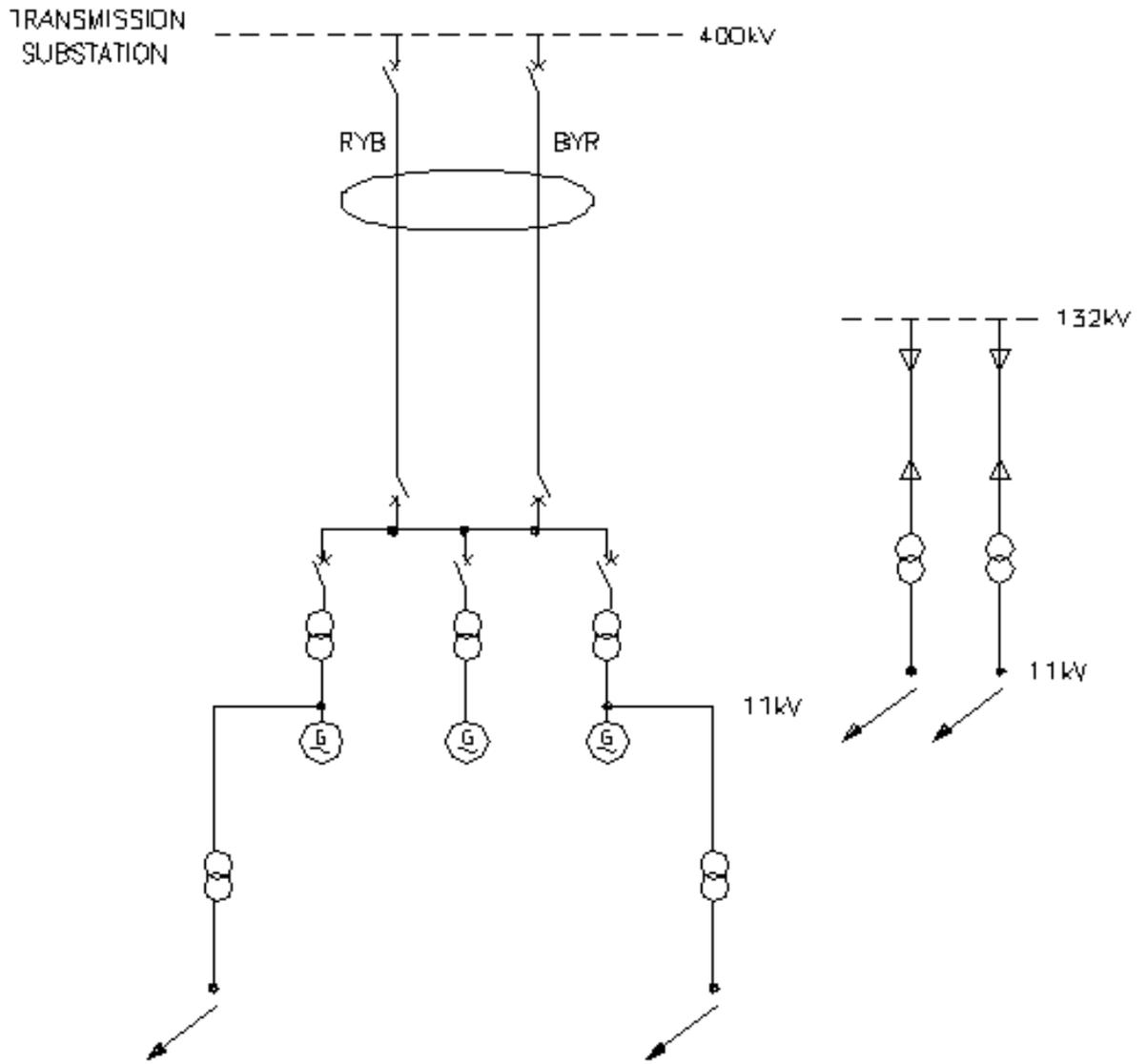
**Network Operator** Single Line Diagram



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REVISIONS ONLY

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### Generator Single Line Diagram



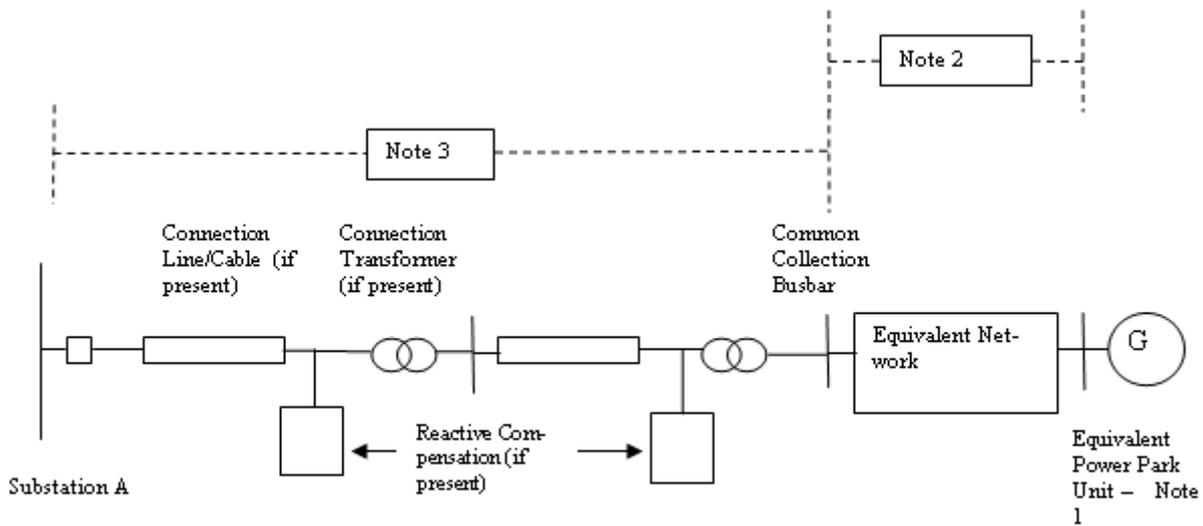
**KEY**

- TRANSMISSION OWNERSHIP
- USER OWNERSHIP
- ↙ DEMAND SUPPLIED
- ⊖ TWO CIRCUITS ON SAME TOWERS (DOUBLE CIRCUIT)
- ⚡ UNDERGROUND CABLE

THIS DRAWING IS NOT VALID UNLESS REFERENCED TO THE PROJECT DRAWING

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## Power Park Module Single Line Diagram



### Notes:

- (1) The electrically equivalent **Power Park Unit** consists of a number of actual **Power Park Units** of the same type ie. any equipment external to the **Power Park Unit** terminals is considered as part of the Equivalent Network. **Power Park Units** of different types shall be included in separate electrically equivalent **Power Park Units**. The total number of equivalent **Power Park Units** shall represent all of the actual **Power Park Units** in the **Power Park Module**.
- (2) Separate electrically equivalent networks are required for each different type of electrically equivalent **Power Park Unit**. The electrically equivalent network shall include all equipment between the **Power Park Unit** terminals and the **Common Collection Busbar**.
- (3) All **Plant** and **Apparatus** including the circuit breakers, transformers, lines, cables and reactive compensation plant between the **Common Collection Busbar** and Substation A shall be shown.

## APPENDIX C - TECHNICAL AND DESIGN CRITERIA

- PC.C.1 Planning and design of the **SPT** and **SHETL Transmission Systems** is based generally, but not totally, on criteria which evolved from joint consultation among various **Transmission Licensees** responsible for design of the **National Electricity Transmission System**.
- PC.C.2 The above criteria are set down within the standards, memoranda, recommendations and reports and are provided as a guide to system planning. It should be noted that each scheme for reinforcement or modification of the **Transmission System** is individually designed in the light of economic and technical factors associated with the particular system limitations under consideration.
- PC.C.3 The tables below identify the literature referred to above, together with the main topics considered within each document.

### PART 1 – SHETL's TECHNICAL AND DESIGN CRITERIA

ITEM No.	DOCUMENT	REFERENCE No.
1	National Electricity Transmission System Security and Quality of Supply Standard	Version [ ]
2	System Phasing	TPS 13/4
3	Not used	
4	Planning Limits for Voltage Fluctuations Caused by Industrial, Commercial and Domestic Equipment in the United Kingdom	ER P28
5	EHV or HV Supplies to Induction Furnaces  Voltage unbalance limits. Harmonic current limits.	ER P16 (Supported by ACE Report No.48)
6	Planning Levels for Harmonic Voltage Distortion and the Connection of Non-Linear Loads to Transmission Systems and Public Electricity Supply Systems in the United Kingdom  Harmonic distortion (waveform). Harmonic voltage distortion. Harmonic current distortion. Stage 1 limits. Stage 2 limits. Stage 3 Limits Addition of Harmonics Short Duration Harmonics Site Measurements	ER G5/4 (Supported by ACE Report No.73)
7	AC Traction Supplies to British Rail  Type of supply point to railway system. Estimation of traction loads. Nature of traction current. System disturbance estimation. Earthing arrangements.	ER P24

ITEM No.	DOCUMENT	REFERENCE No.
8	Operational Memoranda  Main System operating procedure.  Operational standards of security.  Voltage and reactive control on main system.  System warnings and procedures for instructed load reduction.  Continuous tape recording of system control telephone messages and instructions.  Emergency action in the event of an exceptionally serious breakdown of the main system.	(SOM)  SOM 1  SOM 3  SOM 4  SOM 7  SOM 10  SOM 15
9	Planning Limits for Voltage Unbalance in the United Kingdom.	ER P29

## PART 2 - SPT's TECHNICAL AND DESIGN CRITERIA

ITEM No.	DOCUMENT	REFERENCE No.
1	National Electricity Transmission System Security and Quality of Supply Standard	Version [ ]
2	System Phasing	TDM 13/10,002 Issue 4
3	Not used	
4	Planning Limits for Voltage Fluctuations Caused by Industrial, Commercial and Domestic Equipment in the United Kingdom	ER P28
5	EHV or HV Supplies to Induction Furnaces  Voltage Unbalance limits. Harmonic current limits.	ER P16 (Supported by ACE Report No.48)
6	Planning Levels for Harmonic Voltage Distortion and the Connection of Non-Linear Loads to Transmission Systems and Public Electricity Supply Systems in the United Kingdom  Harmonic distortion (waveform). Harmonic voltage distortion. Harmonic current distortion. Stage 1 limits. Stage 2 limits. Stage 3 Limits Addition of Harmonics Short Duration Harmonics Site Measurements	ER G5/4 (Supported by ACE Report No.73)
7	AC Traction Supplies to British Rail  Type of supply point to railway system. Estimation of traction loads. Nature of traction current. System disturbance estimation. Earthing arrangements.	ER P24



PC REFERENCE	DATA DESCRIPTION	UNITS	DATA CATEGORY
	Normal frequency deadband	±Hz	<b>DPD</b>
	Minimum frequency deadband	±Hz	<b>DPD</b>
	Maximum Output deadband	±MW	<b>DPD</b>
	Normal Output deadband	±MW	<b>DPD</b>
	Minimum Output deadband	±MW	<b>DPD</b>
	Frequency settings between which Unit Load Controller droop applies:		
	Maximum	Hz	<b>DPD</b>
	Normal	Hz	<b>DPD</b>
	Minimum	Hz	<b>DPD</b>
	Sustained response normally selected	Yes/No	<b>DPD</b>
PC.A.3.2.2 (f) (ii)	Performance Chart of a <b>Power Park Modules</b> at the connection point		<b>SPD</b>
PC.A.3.2.2 (b)	<b>Output Usable</b> (on a monthly basis)	MW	<b>SPD</b>
PC.A.3.2.2 (e) and (j)	<b>DC CONVERTER STATION DATA</b>		
	<b>ACTIVE POWER TRANSFER CAPABILITY (PC.A.3.2.2)</b>		
	Import MW available in excess of <b>Registered Import Capacity</b> .	MW	<b>SPD</b>
	Time duration for which MW in excess of <b>Registered Import Capacity</b> is available	Min	<b>SPD</b>
	Export MW available in excess of <b>Registered Capacity</b> .	MW	<b>SPD</b>
	Time duration for which MW in excess of <b>Registered Capacity</b> is available	Min	<b>SPD</b>
Part of PC.A.5.4.3.3	<b>LOADING PARAMETERS</b>		
	MW Export		
	Nominal loading rate	MW/s	<b>DPD</b>
	Maximum (emergency) loading rate	MW/s	<b>DPD</b>
	MW Import		
	Nominal loading rate	MW/s	<b>DPD</b>
	Maximum (emergency) loading rate	MW/s	<b>DPD</b>

## APPENDIX E - OFFSHORE TRANSMISSION SYSTEM AND OTSDUW PLANT AND APPARATUS TECHNICAL AND DESIGN CRITERIA

PC.E.1 In the absence of any relevant **Electrical Standards, Offshore Transmission Licensees and Generators** undertaking **OTSDUW** are required to ensure that all equipment used in the construction of their network is:

- (i) Fully compliant and suitably designed to any relevant **Technical Specification**;
- (ii) Suitable for use and operation in an **Offshore** environment, where such parts of the **Offshore Transmission System** and **OTSDUW Plant and Apparatus** are located in **Offshore Waters** and are not installed in an area that is protected from that **Offshore** environment, and
- (iii) Compatible with any relevant **Electrical Standards** or **Technical Specifications** at the **Offshore Grid Entry Point** and **Interface Point**.

PC.E.2 The table below identifies the technical and design criteria that will be used in the design and development of an **Offshore Transmission System** and **OTSDUW Plant and Apparatus**.

ITEM No.	DOCUMENT	REFERENCE No.
1	National Electricity Transmission System Security and Quality of Supply Standard	Version [ ]
2*	Planning Limits for Voltage Fluctuations Caused by Industrial, Commercial and Domestic Equipment in the United Kingdom	ER P28
3*	Planning Levels for Harmonic Voltage Distortion and the Connection of Non-Linear Loads to Transmission Systems and Public Electricity Supply Systems in the United Kingdom	ER G5/4
4*	Planning Limits for Voltage Unbalance in the United Kingdom	ER P29

\* Note:- Items 2, 3 and 4 above shall only apply at the **Interface Point**.

## APPENDIX F - OTSDUW DATA AND INFORMATION AND OTSDUW NETWORK DATA AND INFORMATION

- PC.F.1 Introduction
- PC.F.1.1 Appendix F specifies data requirements to be submitted to **NGET** by **Users** and **Users** by **NGET** in respect of **OTSDUW**.
- PC.F.1.2 Such **User** submissions shall be in accordance with the **OTSDUW Development and Data Timetable** in a **Construction Agreement**.
- PC.F.1.3 Such **NGET** submissions shall be issued with the offer of a **CUSC Contract** in the case of the data in Part 1 and otherwise in accordance with the **OTSDUW Development and Data Timetable** in a **Construction Agreement**.
- PC.F.2. OTSDUW Network Data and Information
- PC.F.2.1 With the offer of a **CUSC Contract** under the **OTSDUW Arrangements** **NGET** shall provide:
- (a) the site specific technical design and operational criteria for the **Connection Site**;
  - (b) the site specific technical design and operational criteria for the **Interface Point**, and
  - (c) details of **NGET's** preliminary identification and consideration of the options available for the **Interface Point** in the context of the **User's** application for connection or modification, the preliminary costs used by **NGET** in assessing such options and the **Offshore Works Assumptions** including the assumed **Interface Point** identified during these preliminary considerations.
- PC.F.2.2 In accordance with the **OTSDUW Development and Data Timetable** in a **Construction Agreement** **NGET** shall provide the following information and data to a **User**:
- (a) equivalent of the fault infeed or fault level ratings at the Interface Point (as identified in the **Offshore Works Assumptions**)
  - (b) notification of numbering and nomenclature of the **HV Apparatus** comprised in the **OTSDUW**;
    - (i) past or present physical properties, including both actual and designed physical properties, of **Plant** and **Apparatus** forming part of the **National Electricity Transmission System** at the Interface Point at which the **OTSUA** will be connected to the extent it is required for the design and construction of the **OTSDUW**, including but not limited to:
      - (ii) the voltage of any part of such **Plant** and **Apparatus**;
      - (iii) the electrical current flowing in or over such **Plant** and **Apparatus**;
      - (iv) the configuration of any part of such **Plant** and **Apparatus**
      - (v) the temperature of any part of such **Plant** and **Apparatus**;
      - (vi) the pressure of any fluid forming part of such **Plant** and **Apparatus**
      - (vii) the electromagnetic properties of such **Plant** and **Apparatus**; and
      - (viii) the technical specifications, settings or operation of any **Protection Systems** forming part of such **Plant** and **Apparatus**.
    - (c) information necessary to enable the **User** to harmonise the **OTSDUW** with construction works elsewhere on the **National Electricity Transmission System** that could affect the **OTSDUW**
    - (d) information related to the current or future configuration of any circuits of the **Onshore Transmission System** with which the **OTSUA** are to connect;

- (e) any changes which are planned on the **National Electricity Transmission System** in the current or following six **Financial Years** and which will materially affect the planning or development of the **OTSDUW**.

PC.F.2.3 At the **User's** reasonable request additional information and data in respect of the **National Electricity Transmission System** shall be provided.

PC.F.2.4 OTSDUW Data And Information

PC.F.2.4.1 In accordance with the **OTSDUW Development and Data Timetable** in a **Construction Agreement** the **User** shall provide to **NGET** the following information and data relating to the **OTSDUW Plant and Apparatus** in accordance with Appendix A of the **Planning Code**.

< END OF PLANNING CODE >

# DATA REGISTRATION CODE (DRC)

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DRC.1 INTRODUCTION

DRC.1.1 The **Data Registration Code** ("**DRC**") presents a unified listing of all data required by **NGET** from **Users** and by **Users** from **NGET**, from time to time under the **Grid Code**. The data which is specified in each section of the **Grid Code** is collated here in the **DRC**. Where there is any inconsistency in the data requirements under any particular section of the **Grid Code** and the **Data Registration Code** the provisions of the particular section of the **Grid Code** shall prevail.

DRC.1.2 The **DRC** identifies the section of the **Grid Code** under which each item of data is required.

DRC.1.3 The Code under which any item of data is required specifies procedures and timings for the supply of that data, for routine updating and for recording temporary or permanent changes to that data. All timetables for the provision of data are repeated in the **DRC**.

DRC.1.4 Various sections of the **Grid Code** also specify information which the **Users** will receive from **NGET**. This information is summarised in a single schedule in the **DRC** (Schedule 9).

DRC.1.5 The categorisation of data into **DPD I** and **DPD II** is indicated in the **DRC** below.

DRC.2 OBJECTIVE

The objective of the **DRC** is to:

DRC.2.1 List and collate all the data to be provided by each category of **User** to **NGET** under the **Grid Code**.

DRC.2.2 List all the data to be provided by **NGET** to each category of **User** under the **Grid Code**.

DRC.3 SCOPE

DRC.3.1 The **DRC** applies to **NGET** and to **Users**, which in this **DRC** means:-

- (a) **Generators** (including those undertaking **OTSDUW**);
- (b) **Network Operators**;
- (c) **DC Converter Station** owners;
- (d) **Suppliers**;
- (e) **Non-Embedded Customers** (including, for the avoidance of doubt, a **Pumped Storage Generator** in that capacity);
- (f) **Externally Interconnected System Operators**;
- (g) **Interconnector Users**; and
- (h) **BM Participants**.

DRC.4 DATA CATEGORIES AND STAGES IN REGISTRATION

DRC.4.1.1 Within the **DRC** each data item is allocated to one of the following three categories:

- (a) **Standard Planning Data (SPD)**
- (b) **Detailed Planning Data (DPD)**
- (c) **Operational Data**

- DRC.4.2      Standard Planning Data (SPD)
- DRC.4.2.1    The **Standard Planning Data** listed and collated in this **DRC** is that data listed in Part 1 of the Appendix to the **PC**.
- DRC.4.2.2    **Standard Planning Data** will be provided to **NGET** in accordance with PC.4.4 and PC.A.1.2.
- DRC.4.3      Detailed Planning Data (DPD)
- DRC.4.3.1    The **Detailed Planning Data** listed and collated in this **DRC** is categorised as **DPD I** and **DPD II** and is that data listed in Part 2 of the Appendix to the **PC**.
- DRC.4.3.2    **Detailed Planning Data** will be provided to **NGET** in accordance with PC.4.4, PC.4.5 and PC.A.1.2.
- DRC.4.4      Operational Data
- DRC.4.4.1    **Operational Data** is data which is required by the **Operating Codes** and the **Balancing Codes**. Within the **DRC**, **Operational Data** is sub-categorised according to the Code under which it is required, namely **OC1**, **OC2**, **BC1** or **BC2**.
- DRC.4.4.2    **Operational Data** is to be supplied in accordance with timetables set down in the relevant **Operating Codes** and **Balancing Codes** and repeated in tabular form in the schedules to the **DRC**.
- DRC.5        PROCEDURES AND RESPONSIBILITIES
- DRC.5.1      Responsibility For Submission And Updating Of Data
- In accordance with the provisions of the various sections of the **Grid Code**, each **User** must submit data as summarised in DRC.6 and listed and collated in the attached schedules.
- DRC.5.2      Methods Of Submitting Data
- DRC.5.2.1    Wherever possible the data schedules to the **DRC** are structured to serve as standard formats for data submission and such format must be used for the written submission of data to **NGET**.
- DRC.5.2.2    Data must be submitted to the **Transmission Control Centre** notified by **NGET** or to such other department or address as **NGET** may from time to time advise. The name of the person at the **User Site** who is submitting each schedule of data must be included.
- DRC.5.2.3    Where a computer data link exists between a **User** and **NGET**, data may be submitted via this link. **NGET** will, in this situation, provide computer files for completion by the **User** containing all the data in the corresponding **DRC** schedule.
- Data submitted can be in an electronic format using a proforma to be supplied by **NGET** or other format to be agreed annually in advance with **NGET**. In all cases the data must be complete and relate to, and relate only to, what is required by the relevant section of the **Grid Code**.
- DRC.5.2.4    Other modes of data transfer, such as magnetic tape, may be utilised if **NGET** gives its prior written consent.
- DRC.5.2.5    **Generators** and **DC Converter Station** owners submitting data for a **Generating Unit**, **DC Converter**, **Power Park Module** or **CCGT Module** before the issue of a **Final Operational Notification** should submit the **DRC** data schedules and compliance information required under the **CP** electronically using the **User Data File Structure** unless otherwise agreed with **NGET**.

- DRC.5.3 Changes To Users' Data
- DRC.5.3.1 Whenever a **User** becomes aware of a change to an item of data which is registered with **NGET** the **User** must notify **NGET** in accordance with each section of the Grid Code. The method and timing of the notification to **NGET** is set out in each section of the Grid Code.
- DRC.5.4 Data Not Supplied
- DRC.5.4.1 **Users** and **NGET** are obliged to supply data as set out in the individual sections of the **Grid Code** and repeated in the **DRC**. If a **User** fails to supply data when required by any section of the **Grid Code**, **NGET** will estimate such data if and when, in the **NGET's** view, it is necessary to do so. If **NGET** fails to supply data when required by any section of the **Grid Code**, the **User** to whom that data ought to have been supplied, will estimate such data if and when, in that **User's** view, it is necessary to do so. Such estimates will, in each case, be based upon data supplied previously for the same **Plant** or **Apparatus** or upon corresponding data for similar **Plant** or **Apparatus** or upon such other information as **NGET** or that **User**, as the case may be, deems appropriate.
- DRC.5.4.2 **NGET** will advise a **User** in writing of any estimated data it intends to use pursuant to DRC.5.4.1 relating directly to that **User's Plant** or **Apparatus** in the event of data not being supplied.
- DRC.5.4.3 A **User** will advise **NGET** in writing of any estimated data it intends to use pursuant to DRC.5.4.1 in the event of data not being supplied.
- DRC.5.5 Substituted Data
- DRC.5.5.1 In the case of PC.A.4 only, if the data supplied by a **User** does not in **NGET's** reasonable opinion reflect the equivalent data recorded by **NGET**, **NGET** may estimate such data if and when, in the view of **NGET**, it is necessary to do so. Such estimates will, in each case, be based upon data supplied previously for the same **Plant** or **Apparatus** or upon corresponding data for similar **Plant** or **Apparatus** or upon such other information as **NGET** deems appropriate.
- DRC.5.5.2 **NGET** will advise a **User** in writing of any estimated data it intends to use pursuant to DRC.5.5.1 relating directly to that **User's Plant** or **Apparatus** where it does not in **NGET's** reasonable opinion reflect the equivalent data recorded by **NGET**. Such estimated data will be used by **NGET** in place of the appropriate data submitted by the **User** pursuant to PC.A.4 and as such shall be deemed to accurately represent the **User's** submission until such time as the **User** provides data to **NGET's** reasonable satisfaction.
- DRC.6 DATA TO BE REGISTERED
- DRC.6.1 Schedules 1 to 19 attached cover the following data areas.
- DRC.6.1.1 Schedule 1 - Generating Unit (Or CCGT Module), Power Park Module (Including Power Park Unit) And DC Converter Technical Data.  
Comprising **Generating Unit** (and **CCGT Module**), **Power Park Module** (including **Power Park Unit**) and **DC Converter** fixed electrical parameters.
- DRC.6.1.2 Schedule 2 - Generation Planning Parameters  
Comprising the **Genset** parameters required for **Operational Planning** studies.
- DRC.6.1.3 Schedule 3 - Large Power Station Outage Programmes, Output Usable And Inflexibility Information.  
Comprising generation outage planning, **Output Usable** and inflexibility information at timescales down to the daily **BM Unit Data** submission.

- DRC.6.1.4 Schedule 4 - Large Power Station Droop And Response Data.  
Comprising data on governor **Droop** settings and **Primary, Secondary and High Frequency Response** data for **Large Power Stations**.
- DRC.6.1.5 Schedule 5 - User's System Data.  
Comprising electrical parameters relating to **Plant** and **Apparatus** connected to the **National Electricity Transmission System**.
- DRC.6.1.6 Schedule 6 - Users Outage Information.  
Comprising the information required by **NGET** for outages on the **Users System**, including outages at **Power Stations** other than outages of **Gensets**
- DRC.6.1.7 Schedule 7 - Load Characteristics.  
Comprising the estimated parameters of load groups in respect of, for example, harmonic content and response to frequency.
- DRC.6.1.8 Schedule 8 - BM Unit Data.
- DRC.6.1.9 Schedule 9 - Data Supplied By NGET To Users.
- DRC.6.1.10 Schedule 10 - Demand Profiles And Active Energy Data  
Comprising information relating to the **Network Operators'** and **Non-Embedded Customers'** total **Demand** and **Active Energy** taken from the **National Electricity Transmission System**
- DRC.6.1.11 Schedule 11 - Connection Point Data  
Comprising information relating to **Demand**, demand transfer capability and the **Small Power Station, Medium Power Station** and **Customer** generation connected to the **Connection Point**
- DRC.6.1.12 Schedule 12 - Demand Control Data  
Comprising information related to **Demand Control**
- DRC.6.1.13 Schedule 13 - Fault Infeed Data  
Comprising information relating to the short circuit contribution to the **National Electricity Transmission System** from **Users** other than **Generators** and **DC Converter Station** owners.
- DRC.6.1.14 Schedule 14 - Fault Infeed Data (Generators Including Unit And Station Transformers)  
Comprising information relating to the Short Circuit contribution to the **National Electricity Transmission System** from **Generators** and **DC Converter Station** owners.
- DRC.6.1.15 Schedule 15 – Mothballed Generating Unit, Mothballed Power Park Module, Mothballed DC Converters At A DC Converter Station And Alternative Fuel Data  
Comprising information relating to estimated return to service times for **Mothballed Generating Units, Mothballed Power Park Modules** and **Mothballed DC Converters at a DC Converter Station** and the capability of gas-fired **Generating Units** to operate using alternative fuels.
- DRC.6.1.16 Schedule 16 – Black Start Information  
Comprising information relating to **Black Start**.
- DRC.6.1.17 Schedule 17 – Access Period Schedule  
Comprising **Access Period** information for **Transmission Interface Circuits** within an **Access Group**.

DRC.6.1.18 Schedule 18 – Generators Undertaking OTSDUW Arrangements

Comprising electrical parameters relating to **OTSDUW Plant and Apparatus** between the **Offshore Grid Entry Point** and **Transmission Interface Point**.

DRC.6.1.19 Schedule 19 – User Data File Structure

Comprising information relating to the **User Data File Structure**.

DRC.6.2 The **Schedules** applicable to each class of **User** are as follows:

<u>User</u>	<u>Schedule</u>
<b>Generators with Large Power Stations</b>	1, 2, 3, 4, 9, 14, 15, 16, 19
<b>Generators with Medium Power Stations</b> (see notes 2, 3, 4)	1, 2 (part), 9, 14, 15, 19
<b>Generators with Small Power Stations</b> directly connected to the <b>National Electricity Transmission System</b>	1, 6, 14, 15, 19
<b>Generators</b> undertaking <b>OTSDUW</b> (see note 5)	18, 19
All <b>Users</b> connected directly to the <b>National Electricity Transmission System</b>	5, 6, 9
All <b>Users</b> connected directly to the <b>National Electricity Transmission System</b> other than <b>Generators</b>	10,11,13,17
All <b>Users</b> connected directly to the <b>National Electricity Transmission System</b> with <b>Demand</b>	7, 9
A <b>Pumped Storage Generator, Externally Interconnected System Operator</b> and <b>Interconnector Users</b>	12 (as marked)
All <b>Suppliers</b>	12
All <b>Network Operators</b>	12
All <b>BM Participants</b>	8
All <b>DC Converter Station</b> owners	1, 4, 9, 14, 15, 19

Notes:

- (1) **Network Operators** must provide data relating to **Small Power Stations** and/or **Customer Generating Plant Embedded** in their **Systems** when such data is requested by **NGET** pursuant to PC.A.3.1.4 or PC.A.5.1.4.
- (2) The data in schedules 1, 14 and 15 need not be supplied in relation to **Medium Power Stations** connected at a voltage level below the voltage level of the **Subtransmission System** except in connection with a **CUSC Contract** or unless specifically requested by **NGET**.
- (3) Each **Network Operator** within whose **System** an **Embedded Medium Power Station** not subject to a **Bilateral Agreement** or **Embedded DC Converter Station** not subject to a **Bilateral Agreement** is situated shall provide the data to **NGET** in respect of each such **Embedded Medium Power Station** or **Embedded DC Converter Station**.

- (4) In the case of Schedule 2, **Generators, DC Converter Station** owners or **Network Operators** in the case of **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** or **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**, would only be expected to submit data in relation to **Standard Planning Data** as required by the **Planning Code**.
- (5) In the case of **Generators** undertaking **OTSDUW**, the **Generator** will need to supply **User** data in accordance with the requirements of **Large** or **Small Power Stations** (as defined in DRC.6.2) up to the **Offshore Grid Entry Point**. In addition, the **User** will also need to submit **Offshore Transmission System** data in between the **Interface Point** and its **Connection Points** in accordance with the requirements of Schedule 18.

# SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE AND DC CONVERTER TECHNICAL DATA

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## ABBREVIATIONS:

**SPD = Standard Planning Data**

% on MVA = % on Rated MVA

% on 100 = % on 100 MVA

**DPD = Detailed Planning Data**

**RC = Registered Capacity**

**OC1, BC1, etc = Grid Code**  
for which data is required

**CUSC Contract = User** data which may be submitted to the **Relevant Transmission Licensees** by **NGET**, following the acceptance by a **User** of a **CUSC Contract**.

**CUSC App. Form = User** data which may be submitted to the **Relevant Transmission Licensees** by **NGET**, following an application by a **User** for a **CUSC Contract**.

## Note:

All parameters, where applicable, are to be measured at nominal **System Frequency**

+ these **SPD** items should only be given in the data supplied with the application for a **CUSC Contract**.

\* Asterisk items are not required for **Small Power Stations** and **Medium Power Stations**

Information is to be given on a **Unit** basis, unless otherwise stated. Where references to **CCGT Modules** are made, the columns "G1" etc should be amended to read "M1" etc, as appropriate

□ These data items may be submitted to the **Relevant Transmission Licensees** from **NGET** in respect of the **National Electricity Transmission System**. The data may be submitted to the **Relevant Transmission Licensees** in a summarised form e.g. network model; the data transferred will have been originally derived from data submitted by **Users** to **NGET**.

■ these data items may be submitted to the **Relevant Transmission Licensee** from **NGET** in respect to **Relevant Units** only. The data may be submitted to the **Relevant Transmission Licensee** in a summarised form e.g. network model; the data transferred will have been originally derived from data submitted by **Users** to **NGET**.

**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE  
AND DC CONVERTER TECHNICAL DATA**

POWER STATION NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

DATA DESCRIPTION	UNITS	DATA to RTL		DATA CAT.	GENERATING UNIT OR STATION DATA							
		CUSC Cont ract	CUSC App. Form		F.Yr. 0	F.Yr. 1	F.Yr. 2	F.Yr. 3	F.Yr. 4	F.Yr. 5	F.Yr. 6	
<p><u>GENERATING STATION DEMANDS:</u>  <b>Demand</b> associated with the <b>Power Station</b> supplied through the <b>National Electricity Transmission System</b> or the Generator's User System (<i>PC.A.5.2</i>)</p> <ul style="list-style-type: none"> <li>- The maximum <b>Demand</b> that could occur.</li> <li>- <b>Demand</b> at specified time of annual peak half hour of <b>National Electricity Transmission System Demand</b> at <b>Annual ACS Conditions</b>.</li> <li>- <b>Demand</b> at specified time of annual minimum half-hour of <b>National Electricity Transmission System Demand</b>.</li> </ul> <p>(Additional <b>Demand</b> supplied through the unit transformers to be provided below)</p> <p><u>INDIVIDUAL GENERATING UNIT (OR AS THE CASE MAY BE, CCGT MODULE) DATA</u></p> <p>Point of connection to the <b>National Electricity Transmission System</b> (or the <b>Total System</b> if embedded) of the <b>Generating Unit</b> (other than a <b>CCGT Unit</b>) or the <b>CCGT Module</b>, as the case may be in terms of geographical and electrical location and system voltage (<i>PC.A.3.4.1</i>)</p> <p>If the busbars at the <b>Connection Point</b> are normally run in separate sections identify the section to which the <b>Generating Unit</b> (other than a <b>CCGT Unit</b>) or <b>CCGT Module</b>, as the case may be is connected (<i>PC.A.3.1.5</i>)</p> <p>Type of <b>Unit</b> (steam, <b>Gas Turbine Combined Cycle Gas Turbine Unit</b>, tidal, wind, etc.) (<i>PC.A.3.2.2 (h)</i>)</p>	<p>MW MVA<sub>r</sub> MW MVA<sub>r</sub>  MW MVA<sub>r</sub></p> <p>Text</p> <p>Section Number</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>  <input type="checkbox"/> <input type="checkbox"/>  <input type="checkbox"/> <input type="checkbox"/>  <input type="checkbox"/></p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>  <input type="checkbox"/> <input type="checkbox"/>  <input type="checkbox"/> <input type="checkbox"/>  <input type="checkbox"/></p>	<p><b>DPD I</b> <b>DPD I</b> <b>DPD II</b> <b>DPD II</b>  <b>DPD II</b> <b>DPD II</b></p> <p><b>SPD</b></p> <p><b>SPD</b></p>								
					G1	G2	G3	G4	G5	G6	STN	

**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE  
AND DC CONVERTER TECHNICAL DATA**

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<u>INDIVIDUAL GENERATING UNIT (OR AS THE CASE MAY BE, CCGT MODULE) DATA</u>				G1	G2	G3	G4	G5	G6	STN
<p>A list of the <b>CCGT Units</b> within a <b>CCGT Module</b>, identifying each <b>CCGT Unit</b>, and the <b>CCGT Module</b> of which it forms part, unambiguously. In the case of a <b>Range CCGT Module</b>, details of the possible configurations should also be submitted. (PC.A.3.2.2 (g))</p>	□	■	<b>SPD</b>							

**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK  
MODULE AND DC CONVERTER TECHNICAL DATA**

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DATA DESCRIPTION	UNITS	DATA to RTL		DATA CAT.	GENERATING UNIT (OR CCGT MODULE, AS THE CASE MAY BE)							
		CUSC Cont ract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN	
Rated MVA (PC.A.3.3.1)	MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+								
Rated MW (PC.A.3.3.1)	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+								
Rated terminal voltage (PC.A.5.3.2.(a) & PC.A.5.4.2 (b))	kV	<input type="checkbox"/>		DPD								
*Performance Chart at <b>Onshore Synchronous Generating Unit</b> stator terminals (PC.A.3.2.2(f)(i))				SPD	(see OC2 for specification)							
* Performance Chart of the <b>Offshore Synchronous Generating Unit</b> at the <b>Offshore Grid Entry Point</b> (PC.A.3.2.2(f)(ii))												
* <b>Output Usable</b> (on a monthly basis) (PC.A.3.2.2(b))	MW			SPD	(except in relation to <b>CCGT Modules</b> when required on a unit basis under the <b>Grid Code</b> , this data item may be supplied under Schedule 3)							
Turbo-Generator inertia constant (for synchronous machines) (PC.A.5.3.2(a))	MW secs /MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+								
Short circuit ratio (synchronous machines) (PC.A.5.3.2(a))		<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+								
Normal auxiliary load supplied by the <b>Generating Unit</b> at rated MW output (PC.A.5.2.1)	MW MVAr	<input type="checkbox"/>		DPD II								
Rated field current at rated MW and MVAr output and at rated terminal voltage (PC.A.5.3.2 (a))	A	<input type="checkbox"/>		DPD II								
Field current open circuit saturation curve (as derived from appropriate manufacturers' test certificates): (PC.A.5.3.2 (a))												
120% rated terminal volts	A	<input type="checkbox"/>		DPD II								
110% rated terminal volts	A	<input type="checkbox"/>		DPD II								
100% rated terminal volts	A	<input type="checkbox"/>		DPD II								
90% rated terminal volts	A	<input type="checkbox"/>		DPD II								
80% rated terminal volts	A	<input type="checkbox"/>		DPD II								
70% rated terminal volts	A	<input type="checkbox"/>		DPD II								
60% rated terminal volts	A	<input type="checkbox"/>		DPD II								
50% rated terminal volts	A	<input type="checkbox"/>		DPD II								
<b>IMPEDANCES:</b> (Unsaturated)												
Direct axis synchronous reactance (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I								
Direct axis transient reactance (PC.A.3.3.1(a)& PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+								
Direct axis sub-transient reactance (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I								
Quad axis synch reactance (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I								
Quad axis sub-transient reactance (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I								
Stator leakage reactance (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I								
Armature winding direct current resistance. (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I								
In Scotland, negative sequence resistance (PC.A.2.5.6 (a) (iv))	% on MVA	<input type="checkbox"/>		DPD I								
Note:-	the above data item relating to armature winding direct-current resistance need only be provided by <b>Generators</b> in relation to <b>Generating Units</b> commissioned after 1st March 1996 and in cases where, for whatever reason, the <b>Generator</b> is aware of the value of the data item.											

**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE  
AND DC CONVERTER TECHNICAL DATA**

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DATA DESCRIPTION	UNITS	DATA to		DATA CAT.	GENERATING UNIT OR STATION DATA						
		CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN
<b>TIME CONSTANTS</b>											
<i>(Short-circuit and Unsaturated)</i>											
Direct axis transient time constant <i>(PC.A.5.3.2(a))</i>	S	<input type="checkbox"/>		DPD I							
Direct axis sub-transient time constant <i>(PC.A.5.3.2(a))</i>	S	<input type="checkbox"/>		DPD I							
Quadrature axis sub-transient time constant <i>(PC.A.5.3.2(a))</i>	S	<input type="checkbox"/>		DPD I							
Stator time constant <i>(PC.A.5.3.2(a))</i>	S	<input type="checkbox"/>		DPD I							
<b>MECHANICAL PARAMETERS</b>											
<i>(PC.A.5.3.2(a))</i>											
The number of turbine generator masses		<input type="checkbox"/>		DPD II							
Diagram showing the Inertia and parameters for each turbine generator mass for the complete drive train	Kgm <sup>2</sup>	<input type="checkbox"/>		DPD II							
Diagram showing Stiffness constants and parameters between each turbine generator mass for the complete drive train	Nm/rad	<input type="checkbox"/>		DPD II							
Number of poles		<input type="checkbox"/>		DPD II							
Relative power applied to different parts of the turbine	%	<input type="checkbox"/>		DPD II							
Torsional mode frequencies	Hz	<input type="checkbox"/>		DPD II							
Modal damping decrement factors for the different mechanical modes		<input type="checkbox"/>		DPD II							
<b>GENERATING UNIT STEP-UP TRANSFORMER</b>											
Rated MVA <i>(PC.A.3.3.1 &amp; PC.A.5.3.2)</i>	MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+							
Voltage Ratio <i>(PC.A.5.3.2)</i>	-	<input type="checkbox"/>		DPD I							
Positive sequence reactance: <i>(PC.A.5.3.2)</i>											
Max tap	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+							
Min tap	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+							
Nominal tap	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+							
Positive sequence resistance: <i>(PC.A.5.3.2)</i>											
Max tap	% on MVA	<input type="checkbox"/>		DPD II							
Min tap	% on MVA	<input type="checkbox"/>		DPD II							
Nominal tap	% on MVA	<input type="checkbox"/>		DPD II							
Zero phase sequence reactance <i>(PC.A.5.3.2)</i>	% on MVA	<input type="checkbox"/>		DPD II							
Tap change range <i>(PC.A.5.3.2)</i>	+% / -%	<input type="checkbox"/>		DPD II							
Tap change step size <i>(PC.A.5.3.2)</i>	%	<input type="checkbox"/>		DPD II							
Tap changer type: on-load or off-circuit <i>(PC.A.5.3.2)</i>	On/Off	<input type="checkbox"/>		DPD II							

# SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE AND DC CONVERTER TECHNICAL DATA

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DATA DESCRIPTION	UNITS	DATA to <b>RTL</b>		DATA CAT.	GENERATING UNIT OR STATION DATA						
		CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN
<u>EXCITATION:</u>											
<u>Note:</u> The data items requested under Option 1 below may continue to be provided by <b>Generators</b> in relation to <b>Generating Units</b> on the <b>System</b> at 9 January 1995 (in this paragraph, the "relevant date") or they may provide the new data items set out under Option 2. <b>Generators</b> must supply the data as set out under Option 2 (and not those under Option 1) for <b>Generating Unit</b> excitation control systems commissioned after the relevant date, those <b>Generating Unit</b> excitation control systems recommissioned for any reason such as refurbishment after the relevant date and <b>Generating Unit</b> excitation control systems where, as a result of testing or other process, the <b>Generator</b> is aware of the data items listed under Option 2 in relation to that <b>Generating Unit</b> .											
<b>Option 1</b>											
DC gain of <b>Excitation Loop</b> (PC.A.5.3.2(c))			<input type="checkbox"/>	<b>DPD II</b>							
Max field voltage (PC.A.5.3.2(c))	V		<input type="checkbox"/>	<b>DPD II</b>							
Min field voltage (PC.A.5.3.2(c))	V		<input type="checkbox"/>	<b>DPD II</b>							
Rated field voltage (PC.A.5.3.2(c))	V		<input type="checkbox"/>	<b>DPD II</b>							
Max rate of change of field volts: (PC.A.5.3.2(c))											
Rising	V/Sec		<input type="checkbox"/>	<b>DPD II</b>							
Falling	V/Sec		<input type="checkbox"/>	<b>DPD II</b>							
Details of <b>Excitation Loop</b> (PC.A.5.3.2(c)) Described in block diagram form showing transfer functions of individual elements	Diagram		<input type="checkbox"/>	<b>DPD II</b>	(please attach)						
Dynamic characteristics of over- excitation limiter (PC.A.5.3.2(c))			<input type="checkbox"/>	<b>DPD II</b>							
Dynamic characteristics of under-excitation limiter (PC.A.5.3.2(c))			<input type="checkbox"/>	<b>DPD II</b>							
<b>Option 2</b>											
<b>Exciter</b> category, e.g. <b>Rotating Exciter</b> , or <b>Static Exciter</b> etc (PC.A.5.3.2(c))	Text		<input type="checkbox"/>	■ <b>SPD</b>							
<b>Excitation System Nominal Response</b> (PC.A.5.3.2(c))	Sec <sup>-1</sup>		<input type="checkbox"/>	<b>DPD II</b>							
$V_E$											
<b>Rated Field Voltage</b> (PC.A.5.3.2(c)) $U_{fN}$	V		<input type="checkbox"/>	<b>DPD II</b>							
<b>No-load Field Voltage</b> (PC.A.5.3.2(c)) $U_{f0}$	V		<input type="checkbox"/>	<b>DPD II</b>							
<b>Excitation System On-Load</b> (PC.A.5.3.2(c))			<input type="checkbox"/>								
<b>Positive Ceiling Voltage</b> $U_{pL+}$	V		<input type="checkbox"/>	<b>DPD II</b>							
<b>Excitation System No-Load</b> (PC.A.5.3.2(c))			<input type="checkbox"/>								
<b>Positive Ceiling Voltage</b> $U_{p0+}$	V		<input type="checkbox"/>	<b>DPD II</b>							
<b>Excitation System No-Load</b> (PC.A.5.3.2(c))			<input type="checkbox"/>								
<b>Negative Ceiling Voltage</b> $U_{p0-}$	V		<input type="checkbox"/>	<b>DPD II</b>							
<b>Power System Stabiliser (PSS) fitted</b> (PC.A.3.4.2)	Yes/No		<input type="checkbox"/>	■ <b>SPD</b>							
Details of <b>Excitation System</b> (PC.A.5.3.2(c)) (including <b>PSS</b> if fitted) described in block diagram form showing transfer functions of individual elements.	Diagram		<input type="checkbox"/>	<b>DPD II</b>							
Details of <b>Over-excitation Limiter</b> (PC.A.5.3.2(c)) described in block diagram form showing transfer functions of individual elements.	Diagram		<input type="checkbox"/>	<b>DPD II</b>							
Details of <b>Under-excitation Limiter</b> (PC.A.5.3.2(c)) described in block diagram form showing transfer functions of individual elements.	Diagram		<input type="checkbox"/>	<b>DPD II</b>							





**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE  
AND DC CONVERTER TECHNICAL DATA**

DATA DESCRIPTION	UNITS	DATA to		DATA CAT.	GENERATING UNIT OR STATION DATA								
		RTL			G1	G2	G3	G4	G5	G6	STN		
		CUSC Contract	CUSC App. Form										
<b>Gas Turbine Units</b>													
<i>(PC.A.5.3.2(d) – Option 2(iii))</i>													
Inlet Guide Vane Time Constant	sec	<input type="checkbox"/>		DPD II									
Inlet Guide Vane Opening Limits	%	<input type="checkbox"/>		DPD II									
Inlet Guide Vane Opening Rate Limits	%/sec	<input type="checkbox"/>		DPD II									
Inlet Guide Vane Closing Rate Limits	%/sec	<input type="checkbox"/>		DPD II									
<i>(PC.A.5.3.2(d) – Option 2(iii))</i>													
Fuel Valve Time Constant	sec	<input type="checkbox"/>		DPD II									
Fuel Valve Opening Limits	%	<input type="checkbox"/>		DPD II									
Fuel Valve Opening Rate Limits	%/sec	<input type="checkbox"/>		DPD II									
Fuel Valve Closing Rate Limits	%/sec	<input type="checkbox"/>		DPD II									
<i>(PC.A.5.3.2(d) – Option 2(iii))</i>													
Waste Heat Recovery Boiler Time Constant													
<b>Hydro Generating Units</b>													
<i>(PC.A.5.3.2(d) – Option 2(iv))</i>													
Guide Vane Actuator Time Constant	sec	<input type="checkbox"/>		DPD II									
Guide Vane Opening Limits	%	<input type="checkbox"/>		DPD II									
Guide Vane Opening Rate Limits	%/sec	<input type="checkbox"/>		DPD II									
Guide Vane Closing Rate Limits	%/sec	<input type="checkbox"/>		DPD II									
Water Time Constant	sec	<input type="checkbox"/>		DPD II									
End of Option 2													
<b>UNIT CONTROL OPTIONS*</b>													
<i>(PC.A.5.3.2(e))</i>													
Maximum droop	%	<input type="checkbox"/>		DPD II									
Normal droop	%	<input type="checkbox"/>		DPD II									
Minimum droop	%	<input type="checkbox"/>		DPD II									
Maximum frequency deadband	±Hz			DPD II									
Normal frequency deadband	±Hz			DPD II									
Minimum frequency deadband	±Hz			DPD II									
Maximum Output deadband	±MW			DPD II									
Normal Output deadband	±MW			DPD II									
Minimum Output deadband	±MW			DPD II									
Frequency settings between which Unit Load Controller droop applies:													
Maximum	Hz			DPD II									
Normal	Hz			DPD II									
Minimum	Hz			DPD II									
Sustained response normally selected	Yes/No			DPD II									

**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE  
AND DC CONVERTER TECHNICAL DATA**

DATA DESCRIPTION	UNITS	DATA to RTL		DATA CAT.	POWER PARK UNIT (OR POWER PARK MODULE, AS THE CASE MAY BE)							
		CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN	
<b>Power Park Module Rated MVA</b> <i>(PC.A.3.3.1(a))</i>	MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD+</b>								
<b>Power Park Module Rated MW</b> <i>(PC.A.3.3.1(a))</i>	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD+</b>								
*Performance Chart of a <b>Power Park Module</b> at the connection point <i>(PC.A.3.2.2(f)(ii))</i>				<b>SPD</b>	(see <b>OC2</b> for specification)							
* <b>Output Usable</b> (on a monthly basis) <i>(PC.A.3.2.2(b))</i>	MW			<b>SPD</b>	(except in relation to <b>CCGT Modules</b> when required on a unit basis under the <b>Grid Code</b> , this data item may be supplied under Schedule 3)							
Number & Type of <b>Power Park Units</b> within each <b>Power Park Module</b> <i>(PC.A.3.2.2(k))</i>		<input type="checkbox"/>		<b>SPD</b>								
Number & Type of <b>Offshore Power Park Units</b> within each <b>Offshore Power Park String</b> and the number of <b>Offshore Power Park Strings</b> and connection point within each <b>Offshore Power Park Module</b> <i>(PC.A.3.2.2.(k))</i>				<b>SPD</b>								
In the case where an appropriate <b>Manufacturer's Data &amp; Performance Report</b> is registered with <b>NGET</b> then subject to <b>NGET's</b> agreement, the report reference may be given as an alternative to completion of the following sections of this Schedule 1 to the end of page 11 with the exception of the sections marked thus # below.	Reference the <b>Manufacturer's Data &amp; Performance Report</b>			<b>SPD</b>								
<b>Power Park Unit Model</b> - A validated mathematical model in accordance with PC.5.4.2 (a)	Transfer function block diagram and algebraic equations, simulation and measured test results	<input type="checkbox"/>		<b>DPD II</b>								

# SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE AND DC CONVERTER TECHNICAL DATA

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DATA DESCRIPTION	UNITS	DATA to		DATA CAT.	POWER PARK UNIT (OR POWER PARK MODULE, AS THE CASE MAY BE)								
		CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN		
<b>Power Park Unit Data</b> (where applicable)													
Rated MVA (PC.A.3.3.1(e))	MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Rated MW (PC.A.3.3.1(e))	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Rated terminal voltage (PC.A.3.3.1(e))	V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Site minimum air density (PC.A.5.4.2(b))	kg/m <sup>3</sup>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DPD									
				II									
Site maximum air density	kg/m <sup>3</sup>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DPD									
				II									
Site average air density	kg/m <sup>3</sup>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DPD									
				II									
Year for which air density data is submitted		<input type="checkbox"/>	<input checked="" type="checkbox"/>	DPD									
				II									
Number of pole pairs		<input type="checkbox"/>	<input checked="" type="checkbox"/>	DPD									
				II									
Blade swept area	m <sup>2</sup>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DPD									
				II									
Gear Box Ratio		<input type="checkbox"/>	<input checked="" type="checkbox"/>	DPD									
				II									
Stator Resistance (PC.A.5.4.2(b))	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Stator Reactance (PC.A.3.3.1(e))	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Magnetising Reactance (PC.A.3.3.1(e))	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Rotor Resistance (at starting). (PC.A.5.4.2(b))	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DPD									
				II									
Rotor Resistance (at rated running) (PC.A.3.3.1(e))	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Rotor Reactance (at starting). (PC.A.5.4.2(b))	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DPD									
				II									
Rotor Reactance (at rated running) (PC.A.3.3.1(e))	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD									
Equivalent inertia constant of the first mass (e.g. wind turbine rotor and blades) at minimum speed (PC.A.5.4.2(b))	MW secs /MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Equivalent inertia constant of the first mass (e.g. wind turbine rotor and blades) at synchronous speed (PC.A.5.4.2(b))	MW secs /MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Equivalent inertia constant of the first mass (e.g. wind turbine rotor and blades) at rated speed (PC.A.5.4.2(b))	MW secs /MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Equivalent inertia constant of the second mass (e.g. generator rotor) at minimum speed (PC.A.5.4.2(b))	MW secs /MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Equivalent inertia constant of the second mass (e.g. generator rotor) at synchronous speed (PC.A.5.4.2(b))	MW secs /MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Equivalent inertia constant of the second mass (e.g. generator rotor) at rated speed (PC.A.5.4.2(b))	MW secs /MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									
Equivalent shaft stiffness between the two masses (PC.A.5.4.2(b))	Nm / electrical radian	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+									

**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE  
AND DC CONVERTER TECHNICAL DATA**

DATA DESCRIPTION	UNITS	DATA to RTL		DATA CAT.	POWER PARK UNIT (OR POWER PARK MODULE, AS THE CASE MAY BE)						
		CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN
Minimum generator rotor speed (Doubly Fed Induction Generators) (PC.A.3.3.1(e))	RPM	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD+</b>							
Maximum generator rotor speed (Doubly Fed Induction Generators) (PC.A.3.3.1(e))	RPM	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD+</b>							
The optimum generator rotor speed versus wind speed (PC.A.5.4.2(b))	tabular format	<input type="checkbox"/>		<b>DPD II</b>							
Power Converter Rating (Doubly Fed Induction Generators) (PC.A.5.4.2(b))	MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>DPD II</b>							
The rotor power coefficient ( $C_p$ ) versus tip speed ratio ( $\lambda$ ) curves for a range of blade angles (where applicable) (PC.A.5.4.2(b))	Diagram + tabular format	<input type="checkbox"/>		<b>DPD II</b>							
# The electrical power output versus generator rotor speed for a range of wind speeds over the entire operating range of the <b>Power Park Unit</b> . (PC.A.5.4.2(b))	Diagram + tabular format	<input type="checkbox"/>		<b>DPD II</b>							
The blade angle versus wind speed curve (PC.A.5.4.2(b))	Diagram + tabular format	<input type="checkbox"/>		<b>DPD II</b>							
The electrical power output versus wind speed over the entire operating range of the <b>Power Park Unit</b> . (PC.A.5.4.2(b))	Diagram + tabular format	<input type="checkbox"/>		<b>DPD II</b>							
Transfer function block diagram, parameters and description of the operation of the power electronic converter including fault ride through capability (where applicable). (PC.A.5.4.2(b))	Diagram	<input type="checkbox"/>		<b>DPD II</b>							
For a <b>Power Park Unit</b> consisting of a synchronous machine in combination with a back to back <b>DC Converter</b> , or for a <b>Power Park Unit</b> not driven by a wind turbine, the data to be supplied shall be agreed with <b>NGET</b> in accordance with PC.A.7. (PC.A.5.4.2(b))		<input type="checkbox"/>									

# SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE AND DC CONVERTER TECHNICAL DATA

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DATA DESCRIPTION	UNITS	DATA to RTL		DATA CAT.	POWER PARK UNIT (OR POWER PARK MODULE, AS THE CASE MAY BE)							
		CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN	
<p>Torque / Speed and blade angle control systems and parameters (PC.A.5.4.2(c))</p> <p>For the <b>Power Park Unit</b>, details of the torque / speed controller and blade angle controller in the case of a wind turbine and power limitation functions (where applicable) described in block diagram form showing transfer functions and parameters of individual elements</p>	Diagram	<input type="checkbox"/>		<b>DPD II</b>								
<p># Voltage/Reactive Power/Power Factor control system parameters (PC.A.5.4.2(d))</p> <p># For the <b>Power Park Unit</b> and <b>Power Park Module</b> details of <b>Voltage/Reactive Power/Power Factor</b> controller (and <b>PSS</b> if fitted) described in block diagram form including parameters showing transfer functions of individual elements.</p>	Diagram	<input type="checkbox"/>		<b>DPD II</b>								
<p># <b>Frequency</b> control system parameters (PC.A.5.4.2(e))</p> <p># For the <b>Power Park Unit</b> and <b>Power Park Module</b> details of the <b>Frequency</b> controller described in block diagram form showing transfer functions and parameters of individual elements.</p>	Diagram	<input type="checkbox"/>		<b>DPD II</b>								
<p>As an alternative to PC.A.5.4.2 (a), (b), (c), (d), (e) and (f), is the submission of a single complete model that consists of the full information required under PC.A.5.4.2 (a), (b), (c), (d) (e) and (f) provided that all the information required under PC.A.5.4.2 (a), (b), (c), (d), (e) and (f) individually is clearly identifiable. (PC.A.5.4.2(g))</p>	Diagram	<input type="checkbox"/>		<b>DPD II</b>								
<p># Harmonic Assessment Information (PC.A.5.4.2(h)) (as defined in IEC 61400-21 (2001)) for each <b>Power Park Unit</b>:-</p>												
# Flicker coefficient for continuous operation		<input type="checkbox"/>		<b>DPD I</b>								
# Flicker step factor		<input type="checkbox"/>		<b>DPD I</b>								
# Number of switching operations in a 10 minute window		<input type="checkbox"/>		<b>DPD I</b>								
# Number of switching operations in a 2 hour window		<input type="checkbox"/>		<b>DPD I</b>								
# Voltage change factor		<input type="checkbox"/>		<b>DPD I</b>								
# Current Injection at each harmonic for each <b>Power Park Unit</b> and for each <b>Power Park Module</b>	Tabular format	<input type="checkbox"/>		<b>DPD I</b>								

**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE  
AND DC CONVERTER TECHNICAL DATA  
PAGE 14 OF 19**

DC CONVERTER STATION TECHNICAL DATA

DC CONVERTER STATION NAME \_\_\_\_\_

DATE: \_\_\_\_\_

Data Description	Units	DATA to RTL		Data Category	DC Converter Station Data
		CUSC Contract	CUSC App. Form		
<i>(PC.A.4)</i>					
<b>DC CONVERTER STATION DEMANDS:</b>					
<b>Demand</b> supplied through <b>Station Transformers</b> associated with the <b>DC Converter Station [PC.A.4.1]</b>					
- <b>Demand</b> with all <b>DC Converters</b> operating at <b>Rated MW</b> import.	MW MVA <sub>r</sub>	<input type="checkbox"/>	<input type="checkbox"/>	<b>DPD II</b> <b>DPD II</b>	
- <b>Demand</b> with all <b>DC Converters</b> operating at <b>Rated MW</b> export.	MW MVA <sub>r</sub>	<input type="checkbox"/>	<input type="checkbox"/>	<b>DPD II</b> <b>DPD II</b>	
Additional <b>Demand</b> associated with the <b>DC Converter Station</b> supplied through the <b>National Electricity Transmission System. [PC.A.4.1]</b>					
- The maximum <b>Demand</b> that could occur.	MW MVA <sub>r</sub>	<input type="checkbox"/>	<input type="checkbox"/>	<b>DPD II</b> <b>DPD II</b>	
- <b>Demand</b> at specified time of annual peak half hour of <b>NGET Demand</b> at <b>Annual ACS Conditions</b> .	MW MVA <sub>r</sub>	<input type="checkbox"/>	<input type="checkbox"/>	<b>DPD II</b> <b>DPD II</b>	
- <b>Demand</b> at specified time of annual minimum half-hour of <b>NGET Demand</b> .	MW MVA <sub>r</sub>	<input type="checkbox"/>	<input type="checkbox"/>	<b>DPD II</b> <b>DPD II</b>	
<b>DC CONVERTER STATION DATA</b>					
Number of poles, i.e. number of <b>DC Converters</b>	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD+</b>	
Pole arrangement (e.g. monopole or bipole)	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD+</b>	
Details of each viable operating configuration					
Configuration 1	Diagram	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD+</b>	
Configuration 2	Diagram	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Configuration 3	Diagram	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Configuration 4	Diagram	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Configuration 5	Diagram	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Configuration 6	Diagram	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Remote ac connection arrangement	Diagram	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>	

**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE  
AND DC CONVERTER TECHNICAL DATA**

Data Description	Units	DATA to		Data Category	Operating Configuration						
		RTL			1	2	3	4	5	6	
		CUSC Contract	CUSC App. Form								
<b>DC CONVERTER STATION DATA</b> (PC.A.3.3.1d)											
<b>DC Converter Type</b> (e.g. current or Voltage source)	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>							
	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>							
Point of connection to the <b>NGET Transmission System</b> (or the <b>Total System</b> if <b>Embedded</b> ) of the <b>DC Converter Station</b> configuration in terms of geographical and electrical location and system voltage	Section Number	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>							
If the busbars at the <b>Connection Point</b> are normally run in separate sections identify the section to which the <b>DC Converter Station</b> configuration is connected	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD+</b>							
	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD+</b>							
<b>Rated MW import per pole [PC.A.3.3.1]</b>											
<b>Rated MW export per pole [PC.A.3.3.1]</b>											
<b>ACTIVE POWER TRANSFER CAPABILITY</b> (PC.A.3.2.2)											
<b>Registered Capacity</b>	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>							
<b>Registered Import Capacity</b>	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>							
<b>Minimum Generation</b>	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>							
<b>Minimum Import Capacity</b>	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>							
Import MW available in excess of <b>Registered Import Capacity</b> .	MW			<b>SPD</b>							
Time duration for which MW in excess of <b>Registered Import Capacity</b> is available	Min			<b>SPD</b>							
Export MW available in excess of <b>Registered Capacity</b> .	MW			<b>SPD</b>							
Time duration for which MW in excess of <b>Registered Capacity</b> is available	Min			<b>SPD</b>							

**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE  
AND DC CONVERTER TECHNICAL DATA**

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Data Description	Units	DATA to		Data Category	Operating Configuration						
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6	
<b>DC CONVERTER TRANSFORMER</b> <b>[PC.A.5.4.3.1</b>											
Rated MVA	MVA	<input type="checkbox"/>		<b>DPD II</b>							
Winding arrangement	kV	<input type="checkbox"/>		<b>DPD II</b>							
Nominal primary voltage	kV	<input type="checkbox"/>		<b>DPD II</b>							
Nominal secondary (converter-side) voltage(s)		<input type="checkbox"/>		<b>DPD II</b>							
Positive sequence reactance	% on	<input type="checkbox"/>		<b>DPD II</b>							
Maximum tap	MVA	<input type="checkbox"/>		<b>DPD II</b>							
Nominal tap	% on										
Minimum tap	MVA										
Positive sequence resistance	% on	<input type="checkbox"/>		<b>DPD II</b>							
Maximum tap	MVA	<input type="checkbox"/>		<b>DPD II</b>							
Nominal tap	% on	<input type="checkbox"/>		<b>DPD II</b>							
Minimum tap	MVA	<input type="checkbox"/>		<b>DPD II</b>							
Zero phase sequence reactance	% on	<input type="checkbox"/>		<b>DPD II</b>							
Tap change range	MVA	<input type="checkbox"/>		<b>DPD II</b>							
Number of steps	% on										
	MVA										
	% on										
	MVA										
	% on										
	MVA										
	+% / -%										

**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK  
MODULE AND DC CONVERTER TECHNICAL DATA**

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Data Description	Units	DATA to RTL		Data Category	Operating configuration					
		CUSC Contra ct	CUSC App. Form		1	2	3	4	5	6
<p><b>DC NETWORK [PC.A.5.4.3.1 (c)]</b></p> <p>Rated DC voltage per pole Rated DC current per pole</p> <p>Details of the <b>DC Network</b> described in diagram form including resistance, inductance and capacitance of all DC cables and/or DC lines. Details of any line reactors (including line reactor resistance), line capacitors, DC filters, earthing electrodes and other conductors that form part of the <b>DC Network</b> should be shown.</p>	<p>kV A</p> <p>Diagram</p>	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>		<p><b>DPD II</b> <b>DPD II</b></p> <p><b>DPD II</b></p>						
<p><b>DC CONVERTER STATION AC HARMONIC FILTER AND REACTIVE COMPENSATION EQUIPMENT [PC.A.5.4.3.1 (d)]</b></p> <p>For all switched reactive compensation equipment</p> <p>Total number of AC filter banks Diagram of filter connections Text Type of equipment (e.g. fixed or variable) Capacitive rating; or Inductive rating; or Operating range</p> <p><b>Reactive Power</b> capability as a function of various MW transfer levels</p>	<p>Diagram</p> <p>Text</p> <p>Diagram</p> <p>Text</p> <p>MVAr</p> <p>MVAr</p> <p>MVAr</p> <p>Table</p>	<p><input type="checkbox"/></p>	<p>■</p> <p>■</p> <p>■</p> <p>■</p>	<p><b>DPD II</b></p>						

# SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE AND DC CONVERTER TECHNICAL DATA

Data Description	Units	DATA to		Data Category	Operating configuration					
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6
<b>CONTROL SYSTEMS [PC.A.5.4.3.2]</b>										
Static $V_{DC} - P_{DC}$ (DC voltage – DC power) or Static $V_{DC} - I_{DC}$ (DC voltage – DC current) characteristic (as appropriate) when operating as –Rectifier –Inverter	Diagram Diagram	<input type="checkbox"/>		<b>DPD II</b> <b>DPD II</b>						
Details of rectifier mode control system, in block diagram form together with parameters showing transfer functions of individual elements.	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Details of inverter mode control system, in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Details of converter transformer tap changer control system in block diagram form showing transfer functions of individual elements including parameters. (Only required for <b>DC Converters</b> connected to the <b>National Electricity Transmission System.</b> )	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Details of AC filter and reactive compensation equipment control systems in block diagram form showing transfer functions of individual elements including parameters. (Only required for <b>DC Converters</b> connected to the <b>National Electricity Transmission System.</b> )	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Details of any frequency and/or load control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Details of any large or small signal modulating controls, such as power oscillation damping controls or sub-synchronous oscillation damping controls, that have not been submitted as part of the above control system data.	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Transfer block diagram representation of the reactive power control at converter ends for a voltage source converter.										

**SCHEDULE 1 - GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE  
AND DC CONVERTER TECHNICAL DATA**

PAGE 19 OF 19

Data Description	Units	DATA to		Data Category	Operating configuration						
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6	
<b>LOADING PARAMETERS [PC.A.5.4.3.3]</b>											
MW Export											
Nominal loading rate	MW/s			<b>DPD I</b>							
Maximum (emergency) loading rate	MW/s			<b>DPD I</b>							
MW Import											
Nominal loading rate	MW/s			<b>DPD I</b>							
Maximum (emergency) loading rate	MW/s			<b>DPD I</b>							
Maximum recovery time, to 90% of pre-fault loading, following an AC system fault or severe voltage depression.	s	□		<b>DPD II</b>							
Maximum recovery time, to 90% of pre-fault loading, following a transient DC Network fault.	s	□		<b>DPD II</b>							

**NOTE:** Users are referred to Schedules 5 & 14 which set down data required for all **Users** directly connected to the **National Electricity Transmission System**, including **Power Stations**. **Generators** undertaking **OTSDUW Arrangements** and are utilising an **OTSDUW DC Converter** are referred to Schedule 18.

## SCHEDULE 2 - GENERATION PLANNING PARAMETERS

PAGE 1 OF 3

This schedule contains the **Genset Generation Planning Parameters** required by **NGET** to facilitate studies in **Operational Planning** timescales.

For a **Generating Unit** (other than a **Power Park Unit**) at a **Large Power Station** the information is to be submitted on a unit basis and for a **CCGT Module** or **Power Park Module** at a **Large Power Station** the information is to be submitted on a module basis, unless otherwise stated.

Where references to **CCGT Modules** or **Power Park Modules** at a **Large Power Station** are made, the columns "G1" etc should be amended to read "M1" etc, as appropriate.

**Power Station:** \_\_\_\_\_

### Generation Planning Parameters

DATA DESCRIPTION	UNITS	DATA to RTL		DATA CAT.	GENSET OR STATION DATA							
		CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN	
<b>OUTPUT CAPABILITY</b>												
<i>(PC.A.3.2.2)</i>												
<b>Registered Capacity</b> on a station and unit basis (on a station and module basis in the case of a <b>CCGT Module</b> or <b>Power Park Module</b> at a <b>Large Power Station</b> )	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>								
<b>Minimum Generation</b> (on a module basis in the case of a <b>CCGT Module</b> or <b>Power Park Module</b> at a <b>Large Power Station</b> )	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>								
MW available from <b>Generating Units</b> or <b>Power Park Modules</b> in excess of <b>Registered Capacity</b>	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>								
<b>REGIME UNAVAILABILITY</b>												
These data blocks are provided to allow fixed periods of unavailability to be registered.												
<b>Expected Running Regime.</b> Is <b>Power Station</b> normally available for full output 24 hours per day, 7 days per week? If No please provide details of unavailability below.		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>								
<i>(PC.A.3.2.2.)</i>												
Earliest <b>Synchronising</b> time: <i>OC2.4.2.1(a)</i>												
Monday	hr/min	<input checked="" type="checkbox"/>		<b>OC2</b>								-
Tuesday – Friday	hr/min	<input checked="" type="checkbox"/>		<b>OC2</b>								-
Saturday – Sunday	hr/min	<input checked="" type="checkbox"/>		<b>OC2</b>								-
Latest <b>De-Synchronising</b> time: <i>OC2.4.2.1(a)</i>												
Monday – Thursday	hr/min	<input checked="" type="checkbox"/>		<b>OC2</b>								-
Friday	hr/min	<input checked="" type="checkbox"/>		<b>OC2</b>								-
Saturday – Sunday	hr/min	<input checked="" type="checkbox"/>		<b>OC2</b>								-
<b>SYNCHRONISING PARAMETERS</b>												
<i>OC2.4.2.1(a)</i>												
Notice to Deviate from Zero (NDZ) after 48 hour <b>Shutdown</b>	Mins	<input checked="" type="checkbox"/>		<b>OC2</b>								
Station <b>Synchronising</b> Intervals (SI) after 48 hour <b>Shutdown</b>	Mins	<input checked="" type="checkbox"/>			-	-	-	-	-	-	-	
<b>Synchronising</b> Group (if applicable)	1 to 4	<input checked="" type="checkbox"/>		<b>OC2</b>								-

## SCHEDULE 2 - GENERATION PLANNING PARAMETERS

PAGE 2 OF 3

DATA DESCRIPTION	UNITS	DATA to RTL		DATA CAT.	GENSET OR STATION DATA							
		CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN	
<b>Synchronising Generation (SYG) after 48 hour Shutdown</b> <i>PC.A.5.3.2(f) &amp; OC2.4.2.1(a)</i>	MW	■		<b>DPD II &amp; OC2</b>								-
<b>De-Synchronising Intervals (Single value)</b> <i>OC2.4.2.1(a)</i>	Mins	■		<b>OC2</b>	-	-	-	-	-	-		
<b><u>RUNNING AND SHUTDOWN PERIOD LIMITATIONS:</u></b>												
Minimum Non Zero time (MNZT) after 48 hour <b>Shutdown</b> <i>OC2.4.2.1(a)</i>	Mins	■		<b>OC2</b>								
Minimum Zero time (MZT) <i>OC2.4.2.1(a)</i>	Mins			<b>OC2</b>								
<b>Existing AGR Plant Flexibility Limit (Existing AGR Plant only)</b>	No.			<b>OC2</b>								
80% Reactor Thermal Power (expressed as Gross-Net MW) (Existing AGR Plant only)	MW			<b>OC2</b>								
<b>Frequency Sensitive AGR Unit Limit (Frequency Sensitive AGR Units only)</b>	No.			<b>OC2</b>								
<b><u>RUN-UP PARAMETERS</u></b> <i>PC.A.5.3.2(f) &amp; OC2.4.2.1(a)</i>												
<b>Run-up rates (RUR) after 48 hour Shutdown:</b> (See note 2 page 3) MW Level 1 (MWL1) MW Level 2 (MWL2)					(Note that for DPD only a single value of run-up rate from Synch Gen to Registered Capacity is required)							
RUR from Synch. Gen to MWL1	MW/Mins	■		<b>OC2</b>								
RUR from MWL1 to MWL2	MW/Mins	■		<b>OC2</b>								
RUR from MWL2 to RC	MW/Mins	■		<b>OC2</b>								
<b><u>Run-Down Rates (RDR):</u></b> (Note that for DPD only a single value of run-down rate from Registered Capacity to de-synch is required)												
MWL2 RDR from RC to MWL2	MW MW/Min	■ ■		<b>OC2 DPD II OC2</b>								
MWL1 RDR from MWL2 to MWL1	MW MW/Min	■ ■		<b>OC2 OC2</b>								
RDR from MWL1 to de-synch	MW/Min	■		<b>OC2</b>								

## SCHEDULE 2 - GENERATION PLANNING PARAMETERS

PAGE 3 OF 3

DATA DESCRIPTION	UNITS	DATA to		DATA CAT.	GENSET OR STATION DATA						
		CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN
<b>REGULATION PARAMETERS</b>											
<i>OC2.4.2.1(a)</i> Regulating Range	MW	■		<b>DPD II</b>							
<b>Load</b> rejection capability while still <b>Synchronised</b> and able to supply <b>Load</b> .	MW	■		<b>DPD II</b>							
<b><u>GAS TURBINE LOADING PARAMETERS:</u></b>											
<i>OC2.4.2.1(a)</i> Fast loading	MW/Min	■		<b>OC2</b>							
Slow loading	MW/Min	■		<b>OC2</b>							
<b><u>CCGT MODULE PLANNING MATRIX</u></b>											
<b>POWER PARK MODULE PLANNING MATRIX</b>											
<b>Power Park Module Active Power Output/ Intermittent Power Source Curve (eg MW output / Wind speed)</b>				<b>OC2</b>	(please attach)						

**NOTES:**

- (1) To allow for different groups of **Gensets** within a **Power Station** (eg. **Gensets** with the same operator) each **Genset** may be allocated to one of up to four **Synchronising Groups**. Within each such **Synchronising Group** the single synchronising interval will apply but between **Synchronising Groups** a zero synchronising interval will be assumed.
- (2) The run-up of a **Genset** from synchronising block load to **Registered Capacity** is represented as a three stage characteristic in which the run-up rate changes at two intermediate loads, MWL1 and MWL2. The values MWL1 & MWL2 can be different for each **Genset**.

## SCHEDULE 3 - LARGE POWER STATION OUTAGE PROGRAMMES, OUTPUT USABLE AND INFLEXIBILITY INFORMATION

PAGE 1 OF 3

(Also outline information on contracts involving **External Interconnections**)

For a **Generating Unit** at a **Large Power Station** the information is to be submitted on a unit basis and for a **CCGT Module** or **Power Park Module** at a **Large Power Station** the information is to be submitted on a module basis, unless otherwise stated.

DATA DESCRIPTION		UNITS	TIME COVERED	UPDATE TIME	DATA CAT.	DATA to RTL
<b>Power Station</b> name:..... <b>Generating Unit</b> (or <b>CCGT Module</b> or <b>Power Park Module</b> at a <b>Large Power Station</b> ) number:.... <b>Registered Capacity</b> :.....						
<b>Large Power Station OUTAGE PROGRAMME</b>	<b>Large Power Station OUTPUT USABLE</b>					
PLANNING FOR YEARS 3 - 7 AHEAD (OC2.4.1.2.1(a)(i), (e) & (j))						
	Monthly average OU	MW	F. yrs 5 - 7	Week 24	SPD	CUSC Contract CUSC App. Form
Provisional outage programme comprising:			C. yrs 3 - 5	Week 2	OC2	
duration		weeks	"	"	"	■
preferred start		date	"	"	"	■
earliest start		date	"	"	"	■
latest finish		date	"	"	"	■
	Weekly OU	MW	"	"	"	■
(NGET response as detailed in OC2			C. yrs 3 - 5	Week12)		■
(Users' response to NGET suggested changes or potential outages)			C. yrs 3 - 5	Week14)		■
Updated provisional outage programme comprising:			C. yrs 3 - 5	Week 25	OC2	
duration		weeks	"	"	"	■
preferred start		date	"	"	"	■
earliest start		date	"	"	"	■
latest finish		date	"	"	"	■
	Updated weekly OU	MW	"	"	"	■
(NGET response as detailed in OC2 for			C. yrs 3 - 5	Week28)		
(Users' response to NGET suggested changes or update of potential outages)			C. yrs 3 - 5	Week31)		■
(NGET further suggested revisions etc. (as detailed in OC2 for			C. yrs 3 - 5	Week42)		■
Agreement of final <b>Generation Outage Programme</b>			C. yrs 3 - 5	Week 45	OC2	■
PLANNING FOR YEARS 1 - 2 AHEAD (OC2.4.1.2.2(a) & OC2.4.1.2.2(i))						
Update of previously agreed <b>Final Generation Outage Programme</b>			C. yrs 1 - 2	Week 10	OC2	
	Weekly OU	MW	"	"		■

## SCHEDULE 3 - LARGE POWER STATION OUTAGE PROGRAMMES, OUTPUT USABLE AND INFLEXIBILITY INFORMATION

PAGE 2 OF 3

DATA DESCRIPTION	UNITS	TIME COVERED	UPDATE TIME	DATA CAT	DATA to RTL
(NGET response as detailed in <b>OC2</b> for (Users' response to NGET suggested changes or update of potential outages)		C. yrs 1 – 2	Week 12)		<input type="checkbox"/>
		C. yrs 1 – 2	Week 14)		<input type="checkbox"/>
Revised weekly OU		C. yrs 1 – 2	Week 34	OC2	<input type="checkbox"/>
(NGET response as detailed in <b>OC2</b> for (Users' response to NGET suggested changes or update of potential outages)		C. yrs 1 – 2	Week 39)		<input type="checkbox"/>
		C. yrs 1 – 2	Week 46)		<input type="checkbox"/>
Agreement of final <b>Generation Outage Programme</b>		C. yrs 1 – 2	Week 48	OC2	<input type="checkbox"/>
<u>PLANNING FOR YEAR 0</u>					
Updated Final <b>Generation Outage Programme</b>			C. yr 0 Week 2 ahead to year end	1600 Weds.	OC2
OU at weekly peak	MW		"	"	"
(NGET response as detailed in <b>OC2</b> for (			C. yrs 0	1600 )	
(			Weeks 2 to 52	Friday )	
(			ahead	)	
(NGET response as detailed in <b>OC2</b> for (			Weeks 2 - 7	1600 )	
(			ahead	Thurs )	
Forecast return to services (Planned Outage or breakdown)	date		days 2 to 14 ahead	0900 daily	OC2
OU (all hours)	MW		"	"	OC2
(NGET response as detailed in <b>OC2</b> for (			days 2 to 14 ahead	1600 )	
(			ahead	daily )	
<u>INFLEXIBILITY</u>					
Genset inflexibility	Min MW (Weekly)		Weeks 2 - 8 ahead	1600 Tues	OC2
(NGET response on <b>Negative Reserve Active (Power Margin</b>			"	1200 )	
				Friday )	
Genset inflexibility	Min MW (daily)		days 2 -14 ahead	0900 daily	OC2
(NGET response on <b>Negative Reserve Active (Power Margin</b>			"	1600 )	
				daily )	

**SCHEDULE 3 - LARGE POWER STATION OUTAGE PROGRAMMES, OUTPUT  
USABLE AND INFLEXIBILITY INFORMATION  
PAGE 3 OF 3**

DATA DESCRIPTION	UNITS	TIME COVERED	UPDATE TIME	DATA CAT	DATA to RTL	
<u>OUTPUT PROFILES</u>						
					CUSC Contract	CUSC App. Form
In the case of <b>Large Power Stations</b> whose output may be expected to vary in a random manner (eg. wind power) or to some other pattern (eg. Tidal) sufficient information is required to enable an understanding of the possible profile	MW	F. yrs 1 - 7	Week 24	<b>SPD</b>		

Notes: 1. The week numbers quoted in the Update Time column refer to standard weeks in the current year.

**GOVERNOR DROOP AND RESPONSE** (PC.A.5.5 ■ CUSC Contract)

The Data in this Schedule 4 is to be supplied by **Generators** with respect to all **Large Power Stations** and by **DC Converter Station** owners (where agreed), whether directly connected or **Embedded**

DATA DESCRIPTION	NORMAL VALUE	MW	DATA CAT	DROOP%			RESPONSE CAPABILITY		
				Unit 1	Unit 2	Unit 3	Primary	Secondary	High Frequency
MLP1	<b>Designed Minimum Operating Level</b> (for a <b>CCGT Module</b> or <b>Power Park Module</b> , on a modular basis assuming all units are <b>Synchronised</b> )								
MLP2	<b>Minimum Generation</b> (for a <b>CCGT Module</b> or <b>Power Park Module</b> , on a modular basis assuming all units are <b>Synchronised</b> )								
MLP3	70% of <b>Registered Capacity</b>								
MLP4	80% of <b>Registered Capacity</b>								
MLP5	95% of <b>Registered Capacity</b>								
MLP6	<b>Registered Capacity</b>								

Notes:

1. The data provided in this Schedule 4 is not intended to constrain any **Ancillary Services Agreement**.
2. **Registered Capacity** should be identical to that provided in Schedule 2.
3. The Governor Droop should be provided for each **Generating Unit**(excluding **Power Park Units**), **Power Park Module** or **DC Converter**. The Response Capability should be provided for each **Genset** or **DC Converter**.
4. **Primary**, **Secondary** and **High Frequency Response** are defined in CC.A.3.2 and are based on a frequency ramp of 0.5Hz over 10 seconds. **Primary Response** is the minimum value of response between 10s and 30s after the frequency ramp starts, **Secondary Response** between 30s and 30 minutes, and **High Frequency Response** is the minimum value after 10s on an indefinite basis.
5. For plants which have not yet **Synchronised**, the data values of MLP1 to MLP6 should be as described above. For plants which have already **Synchronised**, the values of MLP1 to MLP6 can take any value between **Designed Operating Minimum Level** and **Registered Capacity**. If MLP1 is not provided at the **Designed Minimum Operating Level**, the value of the **Designed Minimum Operating Level** should be separately stated.
6. For the avoidance of doubt **Transmission DC Converters** and **OTSDUW DC Converters** must be capable of providing a continuous signal indicating the real time frequency measured at the **Transmission Interface Point** to the **Offshore Grid Entry Point** (as detailed in CC.6.3.7(vii) and CC.6.3.7(viii) to enable **Offshore Generating Units**, **Offshore Power Park Modules** and/or **Offshore DC Converters** to satisfy the frequency response requirements of CC.6.3.7.

## SCHEDULE 5 - USERS SYSTEM DATA

PAGE 1 OF 10

The data in this Schedule 5 is required from **Users** who are connected to the **National Electricity Transmission System** via a **Connection Point** (or who are seeking such a connection). **Generators** undertaking **OTSDUW** should use **DRC** Schedule 18 although they should still supply data under Schedule 5 in relation to their **User's System** up to the **Offshore Grid Entry Point**.

DATA DESCRIPTION	UNITS	DATA to RTL		DATA CATEGORY
		CUSC Contract	CUSC App. Form	
<p><b>USERS SYSTEM LAYOUT (PC.A.2.2)</b></p> <p>A <b>Single Line Diagram</b> showing all or part of the <b>User's System</b> is required. This diagram shall include:-</p> <p>(a) all parts of the <b>User's System</b>, whether existing or proposed, operating at <b>Supergrid Voltage</b>, and in Scotland and <b>Offshore</b>, also all parts of the <b>User System</b> operating at 132kV,</p> <p>(b) all parts of the <b>User's System</b> operating at a voltage of 50kV, and in Scotland and <b>Offshore</b> greater than 30kV, or higher which can interconnect <b>Connection Points</b>, or split bus-bars at a single <b>Connection Point</b>,</p> <p>(c) all parts of the <b>User's System</b> between <b>Embedded Medium Power Stations</b> or <b>Large Power Stations</b> or <b>Offshore Transmission Systems</b> connected to the <b>User's Subtransmission System</b> and the relevant <b>Connection Point</b> or <b>Interface Point</b>,</p> <p>(d) all parts of the <b>User's System</b> at a <b>Transmission Site</b>.</p> <p>The <b>Single Line Diagram</b> may also include additional details of the <b>User's Subtransmission System</b>, and the transformers connecting the <b>User's Subtransmission System</b> to a lower voltage. With <b>NGET's</b> agreement, it may also include details of the <b>User's System</b> at a voltage below the voltage of the <b>Subtransmission System</b>.</p> <p>This <b>Single Line Diagram</b> shall depict the arrangement(s) of all of the existing and proposed load current carrying <b>Apparatus</b> relating to both existing and proposed <b>Connection Points</b>, showing electrical circuitry (ie. overhead lines, underground cables, power transformers and similar equipment), operating voltages. In addition, for equipment operating at a <b>Supergrid Voltage</b>, and in Scotland and <b>Offshore</b> also at 132kV, circuit breakers and phasing arrangements shall be shown.</p>		■	■	<b>SPD</b>

## SCHEDULE 5 - USERS SYSTEM DATA

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DATA DESCRIPTION	UNITS	DATA EXCH		DATA CATEGORY
		CUSC Contract	CUSC App. Form	
<b>REACTIVE COMPENSATION (PC.A.2.4)</b>				
For independently switched reactive compensation equipment not owned by a <b>Transmission Licensee</b> connected to the <b>User's System</b> at 132kV and above, and also in Scotland and <b>Offshore</b> , connected at 33kV and above, other than power factor correction equipment associated with a customers <b>Plant</b> or <b>Apparatus</b> :				
Type of equipment (eg. fixed or variable)	Text	■	■	<b>SPD</b>
Capacitive rating; or	MVar	■	■	<b>SPD</b>
Inductive rating; or	MVar	■	■	<b>SPD</b>
Operating range	MVar	■	■	<b>SPD</b>
Details of automatic control logic to enable operating characteristics to be determined	text and/or diagrams	■	■	<b>SPD</b>
Point of connection to <b>User's System</b> (electrical location and system voltage)	Text	■	■	<b>SPD</b>
<b>SUBSTATION INFRASTRUCTURE (PC.A.2.2.6(b))</b>				
For the infrastructure associated with any <b>User's</b> equipment at a Substation owned by a <b>Transmission Licensee</b> or operated or managed by <b>NGET</b> :-				
Rated 3-phase rms short-circuit withstand current	kA	■	■	<b>SPD</b>
Rated 1-phase rms short-circuit withstand current	kA	■	■	<b>SPD</b>
Rated Duration of short-circuit withstand	s	■	■	<b>SPD</b>
Rated rms continuous current	A	■	■	<b>SPD</b>

## SCHEDULE 5 - USERS SYSTEM DATA

PAGE 3 OF 10

DATA DESCRIPTION		UNITS	DATA EXCH		DATA CATEGORY
LUMPED SUSCEPTANCES <i>(PC.A.2.3)</i>			CUSC Contract	CUSC App. Form	
Equivalent Lumped Susceptance required for all parts of the <b>User's Subtransmission System</b> which are not included in the <b>Single Line Diagram</b> .			■	■	
This should not include:			■	■	
(a)	independently switched reactive compensation equipment identified above.		■	■	
(b)	any susceptance of the <b>User's System</b> inherent in the <b>Demand (Reactive Power)</b> data provided in Schedule 1 ( <b>Generator Data</b> ) or Schedule 11 ( <b>Connection Point data</b> ).		■	■	
Equivalent lumped shunt susceptance at nominal <b>Frequency</b> .		% on 100 MVA	■	■	<b>SPD</b>

**USER'S SYSTEM DATA**

Circuit Parameters (PC.A.2.2.4) (■ CUSC Contract & ■ CUSC Application Form)

The data below is all **Standard Planning Data**. Details are to be given for all circuits shown on the **Single Line Diagram**

Years Valid	Node 1	Node 2	Rated Voltage kV	Operating Voltage kV	Positive Phase Sequence % on 100 MVA			Zero Phase Sequence (self) % on 100 MVA			Zero Phase Sequence (mutual) % on 100 MVA			
					R	X	B	R	X	B	R	X	B	

Notes

1. Data should be supplied for the current, and each of the seven succeeding Financial Years. This should be done by showing for which years the data is valid in the first column of the Table.

## USERS SYSTEM DATA

Transformer Data (PC.A.2.2.5) (■ CUSC Contract & ■ CUSC Application Form)

The data below is all **Standard Planning Data**, and details should be shown below of all transformers shown on the **Single Line Diagram**. Details of Winding Arrangement, Tap Changer and earthing details are only required for transformers connecting the **User's** higher voltage system with its **Primary Voltage System**.

Years valid	Name of Node or Connection Point	Transformer	Rating MVA	Voltage Ratio		Positive Phase Sequence Reactance % on Rating			Positive Phase Sequence Resistance % on Rating			Zero Sequence Reactance % on Rating	Winding Arr.	Tap Changer			Earthing Details (delete as app.) *	
				HV	LV	Max. Tap	Min. Tap	Nom. Tap	Max. Tap	Min. Tap	Nom. Tap			range +% to -%	step size %	type (delete)		
																	ON/OFF	Direct/Res/Rea
																	ON/OFF	Direct/Res/Rea
																	ON/OFF	Direct/Res/Rea
																	ON/OFF	Direct/Res/Rea
																	ON/OFF	Direct/Res/Rea
																	ON/OFF	Direct/Res/Rea

\*If Resistance or Reactance please give impedance value

### Notes

1. Data should be supplied for the current, and each of the seven succeeding Financial Years. This should be done by showing for which years the data is valid in the first column of the Table
2. For a transformer with two secondary windings, the positive and zero phase sequence leakage impedances between the HV and LV1, HV and LV2, and LV1 and LV2 windings are required.

**USER'S SYSTEM DATA**

Switchgear Data (PC.A.2.2.6(a)) (■ CUSC Contract & CUSC Application Form ■)

The data below is all **Standard Planning Data**, and should be provided for all switchgear (ie. circuit breakers, load disconnectors and disconnectors) operating at a **Supergrid Voltage**, and also in Scotland and **Offshore**, operating at 132kV. In addition, data should be provided for all circuit breakers irrespective of voltage located at a **Connection Site** which is owned by a **Transmission Licensee** or operated or managed by **NGET**.

Years Valid	Connect-ion Point	Switch No.	Rated Voltage kV rms	Operating Voltage kV rms	Rated short-circuit breaking current		Rated short-circuit peak making current		Rated rms continuous current (A)	DC time constant at testing of asymmetric al breaking ability(s)
					3 Phase kA rms	1 Phase kA rms	3 Phase kA peak	1 Phase kA peak		

Notes

1. Rated Voltage should be as defined by IEC 694.
2. Data should be supplied for the current, and each of the seven succeeding Financial Years. This should be done by showing for which years the data is valid in the first column of the Table

## SCHEDULE 5 - USERS SYSTEM DATA

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DATA DESCRIPTION	UNITS	DATA to RTL		DATA CATEGORY
		CUSC Contract	CUSC App. Form	
<p><b>PROTECTION SYSTEMS</b> (PC.A.6.3)</p> <p>The following information relates only to <b>Protection</b> equipment which can trip or inter-trip or close any <b>Connection Point</b> circuit breaker or any <b>Transmission</b> circuit breaker. The information need only be supplied once, in accordance with the timing requirements set out in PC.A.1.4 (b) and need not be supplied on a routine annual basis thereafter, although <b>NGET</b> should be notified if any of the information changes.</p> <p>(a) A full description, including estimated settings, for all relays and Protection systems installed or to be installed on the <b>User's System</b>;</p> <p>(b) A full description of any auto-reclose facilities installed or to be installed on the <b>User's System</b>, including type and time delays;</p> <p>(c) A full description, including estimated settings, for all relays and <b>Protection</b> systems installed or to be installed on the <b>Power Park Module</b> or <b>Generating Unit's</b> generator transformer, unit transformer, station transformer and their associated connections;</p> <p>(d) For <b>Generating Units</b> (other than <b>Power Park Units</b>) having a circuit breaker at the generator terminal voltage clearance times for electrical faults within the <b>Generating Unit</b> zone must be declared.</p> <p>(e) Fault Clearance Times: Most probable fault clearance time for electrical faults on any part of the <b>Users System</b> directly connected to the <b>National Electricity Transmission System</b>.</p>				
	mSec	▪		DPD II
		▪		DPD II
		▪		DPD II
		▪		DPD II
		▪		DPD II

DATA DESCRIPTION	UNITS	DATA to RTL		DATA CATEGORY
		CUSC Contract	CUSC App. Form	
<p><b>POWER PARK MODULE/UNIT PROTECTION SYSTEMS</b></p> <p>Details of settings for the <b>Power Park Module/Unit</b> protection relays (to include): (PC.A.5.4.2(f))</p> <p>(a) Under frequency,</p> <p>(b) Over Frequency,</p> <p>(c) Under Voltage, Over Voltage,</p> <p>(d) Rotor Over current</p> <p>(e) Stator Over current,.</p> <p>(f) High Wind Speed Shut Down Level</p> <p>(g) Rotor Underspeed</p> <p>(h) Rotor Overspeed</p>				
		▪		DPD II
		▪		DPD II
		▪		DPD II
		▪		DPD II
		▪		DPD II
		▪		DPD II
		▪		DPD II
		▪		DPD II

## SCHEDULE 5 - USERS SYSTEM DATA

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#### Information for Transient Overvoltage Assessment (DPD I) (PC.A.6.2 ■ CUSC Contract)

The information listed below may be requested by **NGET** from each **User** with respect to any **Connection Site** between that **User** and the **National Electricity Transmission System**. The impact of any third party **Embedded** within the **Users System** should be reflected.

- (a) Busbar layout plan(s), including dimensions and geometry showing positioning of any current and voltage transformers, through bushings, support insulators, disconnectors, circuit breakers, surge arresters, etc. Electrical parameters of any associated current and voltage transformers, stray capacitances of wall bushings and support insulators, and grading capacitances of circuit breakers;
- (b) Electrical parameters and physical construction details of lines and cables connected at that busbar. Electrical parameters of all plant e.g., transformers (including neutral earthing impedance or zig-zag transformers if any), series reactors and shunt compensation equipment connected at that busbar (or to the tertiary of a transformer) or by lines or cables to that busbar;
- (c) Basic insulation levels (BIL) of all **Apparatus** connected directly, by lines or by cables to the busbar;
- (d) Characteristics of overvoltage **Protection** devices at the busbar and at the termination points of all lines, and all cables connected to the busbar;
- (e) Fault levels at the lower voltage terminals of each transformer connected directly or indirectly to the **National Electricity Transmission System** without intermediate transformation;
- (f) The following data is required on all transformers operating at **Supergrid Voltage** throughout **Great Britain** and, in Scotland and **Offshore**, also at 132kV: three or five limb cores or single phase units to be specified, and operating peak flux density at nominal voltage.
- (g) An indication of which items of equipment may be out of service simultaneously during **Planned Outage** conditions.

#### Harmonic Studies (DPD I) (PC.A.6.4 ■ CUSC Contract)

The information given below, both current and forecast, where not already supplied in this Schedule 5 may be requested by **NGET** from each **User** if it is necessary for **NGET** to evaluate the production/magnification of harmonic distortion on the **National Electricity Transmission System** and **User's** systems. The impact of any third party **Embedded** within the **User's System** should be reflected:

- (a) Overhead lines and underground cable circuits of the **User's Subtransmission System** must be differentiated and the following data provided separately for each type:
  - Positive phase sequence resistance
  - Positive phase sequence reactance
  - Positive phase sequence susceptance
- (b) for all transformers connecting the **User's Subtransmission System** to a lower voltage:
  - Rated MVA
  - Voltage Ratio
  - Positive phase sequence resistance
  - Positive phase sequence reactance

## SCHEDULE 5 - USERS SYSTEM DATA

### PAGE 9 OF 10

- (c) at the lower voltage points of those connecting transformers:

Equivalent positive phase sequence susceptance

Connection voltage and MVA<sub>r</sub> rating of any capacitor bank and component design parameters if configured as a filter

Equivalent positive phase sequence interconnection impedance with other lower voltage points

The minimum and maximum **Demand** (both MW and MVA<sub>r</sub>) that could occur

Harmonic current injection sources in Amps at the Connection voltage points

Details of traction loads, eg connection phase pairs, continuous variation with time, etc.

- (d) an indication of which items of equipment may be out of service simultaneously during **Planned Outage** conditions

#### Voltage Assessment Studies (DPD I) (PC.A.6.5 ■ CUSC Contract)

The information listed below, where not already supplied in this Schedule 5, may be requested by **NGET** from each **User** with respect to any **Connection Site** if it is necessary for **NGET** to undertake detailed voltage assessment studies (eg to examine potential voltage instability, voltage control co-ordination or to calculate voltage step changes). The impact of any third party **Embedded** within the **Users System** should be reflected:

- (a) For all circuits of the **User's Subtransmission System**:

Positive Phase Sequence Reactance

Positive Phase Sequence Resistance

Positive Phase Sequence Susceptance

MVA<sub>r</sub> rating of any reactive compensation equipment

- (b) for all transformers connecting the **User's Subtransmission System** to a lower voltage:

Rated MVA

Voltage Ratio

Positive phase sequence resistance

Positive Phase sequence reactance

Tap-changer range

Number of tap steps

Tap-changer type: on-load or off-circuit

AVC/tap-changer time delay to first tap movement

AVC/tap-changer inter-tap time delay

## SCHEDULE 5 - USERS SYSTEM DATA

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- (c) at the lower voltage points of those connecting transformers:-

Equivalent positive phase sequence susceptance

MVA<sub>r</sub> rating of any reactive compensation equipment

Equivalent positive phase sequence interconnection impedance with other lower voltage points

The maximum **Demand** (both MW and MVA<sub>r</sub>) that could occur

Estimate of voltage insensitive (constant power) load content in % of total load at both winter peak and 75% off-peak load conditions

### Short Circuit Analyses:(DPD I) (PC.A.6.6 ■ CUSC Contract)

The information listed below, both current and forecast, and where not already supplied under this Schedule 5, may be requested by **NGET** from each **User** with respect to any **Connection Site** where prospective short-circuit currents on equipment owned by a **Transmission Licensee** or operated or managed by **NGET** are close to the equipment rating. The impact of any third party **Embedded** within the **User's System** should be reflected:-

- (a) For all circuits of the **User's Subtransmission System**:

Positive phase sequence resistance

Positive phase sequence reactance

Positive phase sequence susceptance

Zero phase sequence resistance (both self and mutuals)

Zero phase sequence reactance (both self and mutuals)

Zero phase sequence susceptance (both self and mutuals)

- (b) for all transformers connecting the **User's Subtransmission System** to a lower voltage:

Rated MVA

Voltage Ratio

Positive phase sequence resistance (at max, min and nominal tap)

Positive Phase sequence reactance (at max, min and nominal tap)

Zero phase sequence reactance (at nominal tap)

Tap changer range

Earthing method: direct, resistance or reactance

Impedance if not directly earthed

- (c) at the lower voltage points of those connecting transformers:-

The maximum **Demand** (in MW and MVA<sub>r</sub>) that could occur

Short-circuit infeed data in accordance with PC.A.2.5.6(a) unless the **User's** lower voltage network runs in parallel with the **Subtransmission System**, when to prevent double counting in each node infeed data, a  $\pi$  equivalent comprising the data items of PC.A.2.5.6(a) for each node together with the positive phase sequence interconnection impedance between the nodes shall be submitted.

## SCHEDULE 6 - USERS OUTAGE INFORMATION

PAGE 1 OF 1

DATA DESCRIPTION	UNITS	DATA to RTL	TIMESCALE COVERED	UPDATE TIME	DATA CAT.		
<p>Details are required from <b>Network Operators</b> of proposed outages in their <b>User Systems</b> and from <b>Generators</b> with respect to their outages, which may affect the performance of the <b>Total System</b> (eg. at a <b>Connection Point</b> or constraining <b>Embedded Large Power Stations</b> or constraints to the <b>Maximum Import Capacity</b> or <b>Maximum Export Capacity</b> at an <b>Interface Point</b>) (OC2.4.1.3.2(a) &amp; (b))</p> <p>(NGET advises <b>Network Operators</b> of <b>National Electricity Transmission System</b> outages affecting their <b>Systems</b>)</p> <p><b>Network Operator</b> informs <b>NGET</b> if unhappy with proposed outages)</p> <p>(NGET draws up revised <b>National Electricity Transmission System</b> ( outage plan advises <b>Users</b> of operational effects)</p> <p><b>Generators</b> and <b>Non-Embedded Customers</b> provide Details of <b>Apparatus</b> owned by them (other than <b>Gensets</b>) at each <b>Grid Supply Point</b> (OC2.4.1.3.3)</p> <p>(NGET advises <b>Network Operators</b> of outages affecting their <b>Systems</b>) (OC2.4.1.3.3)</p> <p><b>Network Operator</b> details of relevant outages affecting the <b>Total System</b> (OC2.4.1.3.3)</p> <p>Details of:-  <b>Maximum Import Capacity</b> for each <b>Interface Point</b>  <b>Maximum Export Capacity</b> for each <b>Interface Point</b>  Changes to previously declared values of the <b>Interface Point Target Voltage/Power Factor</b> (OC2.4.1.3.3(c)).</p> <p>(NGET informs <b>Users</b> of aspects that may affect their <b>Systems</b>) (OC2.4.1.3.3)</p> <p><b>Users</b> inform <b>NGET</b> if unhappy with aspects as notified (OC2.4.1.3.3)</p> <p>(NGET issues final <b>National Electricity Transmission System</b> ( outage plan with advice of operational) (OC2.4.1.3.3) ( effects on <b>Users System</b>)</p> <p><b>Generator, Network Operator</b> and <b>Non-Embedded Customers</b> to inform <b>NGET</b> of changes to outages previously requested</p> <p>Details of load transfer capability of 12MW or more between <b>Grid Supply Points</b> in England and Wales and 10MW or more between <b>Grid Supply Points</b> in Scotland.</p> <p>Details of:-  <b>Maximum Import Capacity</b> for each <b>Interface Point</b>  <b>Maximum Export Capacity</b> for each <b>Interface Point</b>  Changes to previously declared values of the <b>Interface Point Target Voltage/Power Factor</b></p>		<table border="0"> <tr> <td style="vertical-align: top;">CUSC Contract</td> <td style="vertical-align: top;">CUSC App. Form</td> </tr> </table>	CUSC Contract	CUSC App. Form			
	CUSC Contract	CUSC App. Form					
	■		Years 2-5	Week 8 ( <b>Network Operator</b> etc) Week 13 (Generators)	OC2		
			Years 2-5	Week 28)	OC2		
	■		"	Week 30	OC2		
			"	Week 34)			
	■		Year 1	Week 13	OC2		
			Year 1	Week 28)			
	■		Year 1	Week 32	OC2		
		MVA / MW MVA / MW V (unless power factor control	Year 1	Week 32	OC2		
			Year 1	Week 34)			
	■		Year 1	Week 36	OC2		
	■		Year 1	Week 49	OC2		
		Week 8 ahead to year end	As occurring	OC2			
		Within Yr 0	As <b>NGET</b> request	OC2			
	MVA / MW MVA / MW V (unless power factor control	Within Yr 0	As occurring	OC2			

**Note:** **Users** should refer to **OC2** for full details of the procedure summarised above and for the information which **NGET** will provide on the **Programming Phase**.

## SCHEDULE 7 - LOAD CHARACTERISTICS AT GRID SUPPLY POINTS

PAGE 1 OF 1

All data in this schedule 7 is categorised as **Standard Planning Data (SPD)** and is required for existing and agreed future connections. This data is only required to be updated when requested by **NGET**.

DATA DESCRIPTION	UNITS	DATA to		DATA FOR FUTURE YEARS							
		RTL		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	
<p><b>FOR ALL TYPES OF DEMAND FOR EACH GRID SUPPLY POINT</b></p> <p>The following information is required infrequently and should only be supplied, wherever possible, when requested by <b>NGET</b> (PC.A.4.7)</p> <p>Details of individual loads which have Characteristics significantly different from the typical range of domestic or commercial and industrial load supplied: (PC.A.4.7(a))</p> <p>Sensitivity of demand to fluctuations in voltage And frequency on <b>National Electricity Transmission System</b> at time of peak <b>Connection Point Demand (Active Power)</b> (PC.A.4.7(b))</p> <p>Voltage Sensitivity (PC.A.4.7(b))</p> <p><b>Frequency Sensitivity</b> (PC.A.4.7(b))</p> <p><b>Reactive Power</b> sensitivity should relate to the <b>Power Factor</b> information given in Schedule 11 (or for <b>Generators</b>, Schedule 1) and note 6 on Schedule 11 relating to <b>Reactive Power</b> therefore applies: (PC.A.4.7(b))</p> <p>Phase unbalance imposed on the <b>National Electricity Transmission System</b> (PC.A.4.7(d))</p> <p>- maximum - average</p> <p>Maximum Harmonic Content imposed on <b>National Electricity Transmission System</b> (PC.A.4.7(e))</p> <p>Details of any loads which may cause <b>Demand</b> Fluctuations greater than those permitted under Engineering Recommendation P28, Stage 1 at the <b>Point of Common Coupling</b> including <b>Flicker Severity (Short Term)</b> and <b>Flicker Severity (Long Term)</b> (PC.A.4.7(f))</p>		<p>CUSC Contract</p> <p>CUSC App. Form</p>									
		<input type="checkbox"/>									
		<input type="checkbox"/>		(Please Attach)							
		<input type="checkbox"/>									
	MW/kV MVar/kV	<input type="checkbox"/>									
	MW/Hz MVar/Hz	<input type="checkbox"/>									
		<input type="checkbox"/>									
	%	<input type="checkbox"/>									
	%	<input type="checkbox"/>									
	%	<input type="checkbox"/>									
		<input type="checkbox"/>									

## SCHEDULE 8 - DATA SUPPLIED BY BM PARTICIPANTS

PAGE 1 OF 1

CODE	DESCRIPTION
BC1	<b>Physical Notifications</b>
BC1	<b>Quiescent Physical Notifications</b>
BC1 & BC2	<b>Export and Import Limits</b>
BC1	<b>Bid-Offer Data</b>
BC1	<b>Dynamic Parameters</b> (Day Ahead)
BC2	<b>Dynamic Parameters</b> (For use in <b>Balancing Mechanism</b> )
BC1 & BC2	<b>Other Relevant Data</b>
BC1	<b>Joint BM Unit Data</b>

- No information collated under this Schedule will be transferred to the **Relevant Transmission Licensees**

## SCHEDULE 9 - DATA SUPPLIED BY NGET TO USERS

PAGE 1 OF 1

(Example of data to be supplied)

CODE	DESCRIPTION
CC	Operation Diagram
CC	Site Responsibility Schedules
PC	Day of the peak <b>National Electricity Transmission System Demand</b> Day of the minimum <b>National Electricity Transmission System Demand</b>
OC2	<b>Surpluses</b> and OU requirements for each <b>Generator</b> over varying timescales  Equivalent networks to <b>Users</b> for <b>Outage Planning</b>  <b>Negative Reserve Active Power Margins</b> (when necessary)  <b>Operating Reserve</b> information
BC1	<b>Demand Estimates, Indicated Margin and Indicated Imbalance</b> , indicative <b>Synchronising</b> and <b>Desynchronising</b> times of <b>Embedded Power Stations</b> to <b>Network Operators</b> , special actions.
BC2	<b>Bid-Offer Acceptances, Ancillary Services</b> instructions to relevant <b>Users</b> , <b>Emergency Instructions</b>
BC3	Location, amount, and <b>Low Frequency Relay</b> settings of any <b>Low Frequency Relay</b> initiated <b>Demand</b> reduction for <b>Demand</b> which is <b>Embedded</b> .

- No information collated under this Schedule will be transferred to the **Relevant Transmission Licensees**

### DATA TO BE SUPPLIED BY NGET TO USERS

### PURSUANT TO THE TRANSMISSION LICENCE

1. The **Transmission Licence** requires **NGET** to publish annually the **Seven Year Statement** which is designed to provide **Users** and potential Users with information to enable them to identify opportunities for continued and further use of the **National Electricity Transmission System**.

When a **User** is considering a development at a specific site, certain additional information may be required in relation to that site which is of such a level of detail that it is inappropriate to include it in the **Seven Year Statement**. In these circumstances the **User** may contact **NGET** who will be pleased to arrange a discussion and the provision of such additional information relevant to the site under consideration as the **User** may reasonably require.

2. The **Transmission Licence** also requires **NGET** to offer terms for an agreement for connection to and use of the **National Electricity Transmission System** and further information will be given by **NGET** to the potential **User** in the course of the discussions of the terms of such an agreement.

# SCHEDULE 10 - DEMAND PROFILES AND ACTIVE ENERGY DATA

## PAGE 1 OF 2

The following information is required from each **Network Operator** and from each **Non-Embedded Customer**. The data should be provided in calendar week 24 each year (although **Network Operators** may delay the submission until calendar week 28).

DATA DESCRIPTION	F. Yr. 0	F. Yr. 1	F. Yr. 2	F. Yr. 3	F. Yr. 4	F. Yr. 5	F. Yr. 6	F. Yr. 7	UPDATE TIME	DATA CAT
<u>Demand Profiles</u>	<i>(PC.A.4.2) (■ – CUSC Contract &amp; ■ CUSC Application Form)</i>									
<b>Total User's system profile</b> (please delete as applicable)	Day of <b>User's</b> annual Maximum demand at <b>Annual ACS Conditions</b> (MW) Day of annual peak of <b>National Electricity Transmission System Demand at Annual ACS Conditions</b> (MW) Day of annual minimum <b>National Electricity Transmission System Demand</b> at average conditions (MW)									
0000 : 0030									Wk.24	<b>SPD</b>
0030 : 0100									:	
0100 : 0130									:	
0130 : 0200									:	:
0200 : 0230									:	:
0230 : 0300									:	:
0300 : 0330									:	:
0330 : 0400									:	:
0400 : 0430									:	:
0430 : 0500									:	:
0500 : 0530									:	:
0530 : 0600									:	:
0600 : 0630									:	:
0630 : 0700									:	:
0700 : 0730									:	:
0730 : 0800									:	:
0800 : 0830									:	:
0830 : 0900									:	:
0900 : 0930									:	:
0930 : 1000									:	:
1000 : 1030									:	:
1030 : 1100									:	:
1100 : 1130									:	:
1130 : 1200									:	:
1200 : 1230									:	:
1230 : 1300									:	:
1300 : 1330									:	:
1330 : 1400									:	:
1400 : 1430									:	:
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1530 : 1600									:	:
1600 : 1630									:	:
1630 : 1700									:	:
1700 : 1730									:	:
1730 : 1800									:	:
1800 : 1830									:	:
1830 : 1900									:	:
1900 : 1930									:	:
1930 : 2000									:	:
2000 : 2030									:	:
2030 : 2100									:	:
2100 : 2130									:	:
2130 : 2200									:	:
2200 : 2230									:	:
2230 : 2300									:	:
2300 : 2330									:	:
2330 : 0000									:	:

## SCHEDULE 10 - DEMAND PROFILES AND ACTIVE ENERGY DATA

PAGE 2 OF 2

DATA DESCRIPTION	Out-turn		F.Yr. 0	Update Time	Data Cat	DATA to RTL	
	Actual	Weather Corrected.				CUSC Contract	CUSC App. Form
<p>(PC.A.4.3)</p> <p><b>Active Energy Data</b></p> <p>Total annual <b>Active Energy</b> requirements under average conditions of each <b>Network Operator</b> and each <b>Non-Embedded Customer</b> in the following categories of <b>Customer Tariff</b>:-</p> <p style="padding-left: 40px;">LV1 LV2 LV3 EHV HV Traction Lighting User System Losses</p> <p><b>Active Energy from Embedded Small Power Stations and Embedded Medium Power Stations</b></p>				Week 24	<b>SPD</b>	<ul style="list-style-type: none"> <li>■</li> </ul>	<ul style="list-style-type: none"> <li>■</li> </ul>

NOTES:

1. 'F. yr.' means '**Financial Year**'

2. **Demand and Active Energy Data (General)**

**Demand** and **Active Energy** data should relate to the point of connection to the **National Electricity Transmission System** and should be net of the output (as reasonably considered appropriate by the **User**) of all **Embedded Small Power Stations, Medium Power Stations** and **Customer Generating Plant**. Auxiliary demand of **Embedded Power Stations** should be included in the demand data submitted by the **User** at the **Connection Point**. **Users** should refer to the **PC** for a full definition of the **Demand** to be included.

3. **Demand** profiles and **Active Energy** data should be for the total **System** of the **Network Operator**, including all **Connection Points**, and for each **Non-Embedded Customer**. **Demand Profiles** should give the numerical maximum demand that in the **User's** opinion could reasonably be imposed on the **National Electricity Transmission System**.

4. In addition the demand profile is to be supplied for such days as **NET** may specify, but such a request is not to be made more than once per calendar year.

## SCHEDULE 11 - CONNECTION POINT DATA

PAGE 1 OF 3

The following information is required from each **Network Operator** and from each **Non-Embedded Customer**. The data should be provided in calendar week 24 each year (although **Network Operators** may delay the submission until calendar week 28).

**Connection Point:**

<b>Connection Point Demand</b> at the time of - (select each one in turn) (Provide data for each Access Period associated with the Connection Point)	a) maximum <b>Demand</b> b) peak <b>National Electricity Transmission System Demand</b> ( <i>specified by NGET</i> ) c) minimum <b>National Electricity Transmission System Demand</b> ( <i>specified by NGET</i> ) d) maximum <b>Demand</b> during <b>Access Period</b> e) specified by either <b>NGET</b> or a <b>User</b>
Name of <b>Transmission Interface Circuit</b> out of service during <b>Access Period</b> ( <i>if reqd</i> ).	<b>PC.A.4.1.4.2</b>

DATA DESCRIPTION ( <i>CUSC Contract □ &amp; CUSC Application Form ■</i> )	Outturn	Outturn Weather Corrected	F.Yr	F.Yr	F.Yr.	F.Yr.	F.Yr.	F.Yr.	F.Yr	F.Yr	F.Yr	DATA CAT
			1	2	3	4	5	6	7	8		
Date of a), b), c), d) or e) as denoted above.												<b>PC.A.4.3.3</b>
Time of a), b), c), d) or e) as denoted above.												<b>PC.A.4.3.3</b>
<b>Connection Point Demand</b> (MW)												<b>PC.A.4.3.1</b>
<b>Connection Point Demand</b> (MVA <sub>r</sub> )												<b>PC.A.4.3.1</b>
Deduction made at <b>Connection Point</b> for <b>Small Power Stations, Medium Power Stations</b> and <b>Customer Generating Plant</b> (MW)												<b>PC.A.4.3.2(a)</b>
Reference to valid <b>Single Line Diagram</b>												<b>PC.A.4.3.5</b>
Reference to node and branch data.												<b>PC.A.2.2</b>

*Note: The following data block can be repeated for each post fault network revision that may impact on the Transmission System.*

Reference to post-fault revision of <b>Single Line Diagram</b>												<b>PC.A.4.5</b>
Reference to post-fault revision of the node and branch data associated with the <b>Single Line Diagram</b>												<b>PC.A.4.5</b>
Reference to the description of the actions and timescales involved in effecting the post-fault actions (e.g. auto-switching, manual, teleswitching, overload protection operation etc)												<b>PC.A.4.5</b>

<b>Access Group:</b>		
----------------------	--	--

*Note: The following data block to be repeated for each Connection Point with the Access Group.*

Name of associated <b>Connection Point</b> within the same <b>Access Group</b> :		<b>PC.A.4.3.1</b>
<b>Demand</b> at associated <b>Connection Point</b> (MW)		<b>PC.A.4.3.1</b>
<b>Demand</b> at associated <b>Connection Point</b> (MVA <sub>r</sub> )		<b>PC.A.4.3.1</b>
Deduction made at associated <b>Connection Point</b> for <b>Small Power Stations, Medium Power Stations</b> and <b>Customer Generating Plant</b> (MW)		<b>PC.A.4.3.2(a)</b>

## SCHEDULE 11 - CONNECTION POINT DATA

PAGE 2 OF 3

Embedded Generation Data											
Connection Point:											
DATA DESCRIPTION	Outturn	Outturn Weather Corrected	F.Yr 1	F.Yr 2	F.Yr 3	F.Yr 4	F.Yr 5	F.Yr 6	F.Yr 7	F.Yr 8	DATA CAT
<b>Small Power Station, Medium Power Station and Customer Generation Summary</b>	For each <b>Connection Point</b> where there are <b>Embedded Small Power Stations, Medium Power Stations</b> or <b>Customer Generating Stations</b> the following information is required:										
No. of <b>Small Power Stations, Medium Power Stations</b> or <b>Customer Power Stations</b>											PC.A.3.1.4(a)
Number of <b>Generating Units</b> within these stations											PC.A.3.1.4(a)
Summated Capacity of all these <b>Generating Units</b>											PC.A.3.1.4(a)
Where the <b>Network Operator's System</b> places a constraint on the capacity of an <b>Embedded Large Power Station</b>											
<b>Station Name</b>											PC.A.3.2.2(c)
<b>Generating Unit</b>											PC.A.3.2.2(c)
<b>System Constrained Capacity</b>											PC.A.3.2.2(c)(i)
<b>Reactive Despatch Network Restriction</b>											PC.A.3.2.2(c)(ii)

Where the <b>Network Operator's System</b> places a constraint on the capacity of an <b>Offshore Transmission System</b> at an <b>Interface Point</b>											
<b>Offshore Transmission System Name</b>											PC.A.3.2.2(c)
<b>Interface Point Name</b>											PC.A.3.2.2(c)
<b>Maximum Export Capacity</b>											PC.A.3.2.2(c)
<b>Maximum Import Capacity</b>											PC.A.3.2.2(c)



## SCHEDULE 11 - CONNECTION POINT DATA

PAGE 3 OF 3

### NOTES:

1. 'F.Yr.' means '**Financial Year**'. F.Yr. 1 refers to the current financial year.
2. All **Demand** data should be net of the output (as reasonably considered appropriate by the **User**) of all **Embedded Small Power Stations, Medium Power Stations and Customer Generating Plant**. Generation and / or Auxiliary demand of **Embedded Large Power Stations** should not be included in the demand data submitted by the **User**. **Users** should refer to the **PC** for a full definition of the **Demand** to be included.
3. Peak **Demand** should relate to each **Connection Point** individually and should give the maximum demand that in the **User's** opinion could reasonably be imposed on the **National Electricity Transmission System**. **Users** may submit the **Demand** data at each node on the **Single Line Diagram** instead of at a **Connection Point** as long as the **User** reasonably believes such data relates to the peak (or minimum) at the **Connection Point**.

In deriving **Demand** any deduction made by the **User** (as detailed in note 2 above) to allow for **Embedded Small Power Stations, Medium Power Stations and Customer Generating Plant** is to be specifically stated as indicated on the Schedule.

4. **NGET** may at its discretion require details of any **Embedded Small Power Stations** or **Embedded Medium Power Stations** whose output can be expected to vary in a random manner (eg. wind power) or according to some other pattern (eg. tidal power)
5. Where more than 95% of the total **Demand** at a **Connection Point** is taken by synchronous motors, values of the **Power Factor** at maximum and minimum continuous excitation may be given instead. **Power Factor** data should allow for series reactive losses on the **User's System** but exclude reactive compensation network susceptance specified separately in Schedule 5.
6. Where a **Reactive Despatch Network Restriction** is in place which requires the generator to maintain a target voltage set point this should be stated as an alternative to the size of the **Reactive Despatch Network Restriction**.

## SCHEDULE 12 - DEMAND CONTROL

PAGE 1 OF 2

The following information is required from each **Network Operator** and where indicated with an asterisk from **Externally Interconnected System Operators** and/or **Interconnector Users** and a **Pumped Storage Generator**. Where indicated with a double asterisk, the information is only required from **Suppliers**.

DATA DESCRIPTION	UNITS		UPDATE TIME	
<b><u>Demand Control</u></b>				
<b>Demand</b> met or to be relieved by <b>Demand Control</b> (averaging at the <b>Demand Control Notification Level</b> or more over a half hour) at each <b>Connection Point</b> .				
<b>Demand Control</b> at time of <b>National Electricity Transmission System</b> weekly peak demand				
Amount	MW	)F.yrs 0 to 5	Week 24	<b>OC1</b>
Duration	Min	)		
For each half hour	MW	Wks 2-8 ahead	1000 Mon	<b>OC1</b>
For each half hour	MW	Days 2-12 ahead	1200 Wed	<b>OC1</b>
For each half hour	MW	Previous calendar day	0600 daily	<b>OC1</b>
<b><u>**Customer Demand Management</u></b> (at the <b>Customer Demand Management Notification Level</b> or more at the <b>Connection Point</b> )				
For each half hour	MW	Any time in Control Phase		<b>OC1</b>
For each half hour	MW	Remainder of period	When changes occur to previous plan	<b>OC1</b>
For each half hour	MW	Previous calendar day	0600 daily	<b>OC1</b>
<b>**In Scotland, Load Management Blocks</b>				
For each block of 5MW or more, for each half hour	MW	For the next day	11:00	<b>OC1</b>

## SCHEDULE 12 - DEMAND CONTROL

PAGE 1 OF 2

DATA DESCRIPTION	UNITS	TIME COVERED	UPDATE TIME	DATA CAT.
<b>*Demand Control or Pump</b>				
<u>Tripping Offered as Reserve</u>				
Magnitude of <b>Demand</b> or pumping load which is tripped	MW	Year ahead from week 24	Week 24	<b>DPD I</b>
<b>System Frequency</b> at which tripping is initiated	Hz	"	"	"
Time duration of <b>System Frequency</b> below trip setting for tripping to be initiated	S	"	"	"
Time delay from trip initiation to Tripping	S	"	"	"
<u>Emergency Manual Load Disconnection</u>				
Method of achieving load disconnection	Text	Year ahead from week 24	Annual in week 24	OC6
<b>Annual ACS Peak Demand (Active Power) at Connection Point</b> (requested under Schedule 11 - repeated here for reference)	MW	"	"	"
Cumulative percentage of <b>Connection Point Demand (Active Power)</b> which can be disconnected by the following times from an instruction from <b>NET</b>				
5 mins	%	"	"	"
10 mins	%	"	"	"
15 mins	%	"	"	"
20 mins	%	"	"	"
25 mins	%	"	"	"
30 mins	%	"	"	"

Notes:

1. **Network Operators** may delay the submission until calendar week 28.
2. No information collated under this Schedule will be transferred to the **Relevant Transmission Licensees** (or **Generators** undertaking **OTSDUW**).

# SCHEDULE 12A - AUTOMATIC LOW FREQUENCY DEMAND DISCONNECTION

PAGE 1 OF 1

Time Covered: Year ahead from week 24  
 Update Time: Annual in week 24

Data Category: OC6

Grid Supply Point	GSP Demand MW	Low Frequency Demand Disconnection Blocks MW									Residual demand MW
		1 48.8Hz	2 48.75Hz	3 48.7Hz	4 48.6Hz	5 48.5Hz	6 48.4Hz	7 48.2Hz	8 48.0Hz	9 47.8Hz	
GSP1											
GSP2											
GSP3											
Total demand disconnected MW											
per block %											
Total demand disconnection		MW ( % of aggregate demand of MW)									

Note: All demand refers to that at the time of forecast **National Electricity Transmission System** peak demand.

Network Operators may delay the submission until calendar week 28

No information collated under this schedule will be transferred to the **Relevant Transmission Licensees** (or **Generators** undertaking **OTSDUW**).

## SCHEDULE 13 - FAULT INFEED DATA

PAGE 1 OF 2

The data in this Schedule 13 is all **Standard Planning Data**, and is required from all **Users** other than **Generators** who are connected to the **National Electricity Transmission System** via a **Connection Point** (or who are seeking such a connection). A data submission is to be made each year in Week 24 (although **Network Operators** may delay the submission until Week 28). A separate submission is required for each node included in the **Single Line Diagram** provided in Schedule 5.

DATA DESCRIPTION	UNITS	F.Yr.	DATA to									
		0	1	2	3	4	5	6	7	RTL		
<b>SHORT CIRCUIT INFEED TO THE NATIONAL ELECTRICITY TRANSMISSION SYSTEM FROM USERS SYSTEM AT A CONNECTION POINT</b> <i>(PC.A.2.5)</i>											CUSC Contract	CUSC App. Form
Name of node or <b>Connection Point</b>											□	■
Symmetrical three phase short-circuit current infeed												
- at instant of fault	kA										□	■
- after subtransient fault current contribution has substantially decayed	Ka										□	■
Zero sequence source impedances as seen from the <b>Point of Connection</b> or node on the <b>Single Line Diagram</b> (as appropriate) consistent with the maximum infeed above:												
- Resistance	% on 100										□	■
- Reactance	% on 100										□	■
Positive sequence X/R ratio at instance of fault											□	■
Pre-Fault voltage magnitude at which the maximum fault currents were calculated	p.u.										□	■

## SCHEDULE 13 - FAULT INFEED DATA

PAGE 2 OF 2

DATA DESCRIPTION	UNITS	F.Yr 0	F.Yr. 1	F.Yr. 2	F.Yr. 3	F.Yr. 4	F.Yr. 5	F.Yr. 6	F.Yr. 7	DATA to RTL	
<b><u>SHORT CIRCUIT INFEED TO THE NATIONAL ELECTRICITY TRANSMISSION SYSTEM FROM USERS SYSTEM AT A CONNECTION POINT</u></b>										CUSC Contract	CUSC App. Form
Negative sequence impedances of <b>User's System</b> as seen from the <b>Point of Connection</b> or node on the <b>Single Line Diagram</b> (as appropriate). If no data is given, it will be assumed that they are equal to the positive sequence values.											
- Resistance	% on 100									<input type="checkbox"/>	<input checked="" type="checkbox"/>
- Reactance	% on 100									<input type="checkbox"/>	<input checked="" type="checkbox"/>

## SCHEDULE 14 - FAULT INFEED DATA (GENERATORS INCLUDING UNIT TRANSFORMERS AND STATION TRANSFORMERS)

PAGE 1 OF 5

The data in this Schedule 14 is all **Standard Planning Data**, and is to be provided by **Generators**, with respect to all directly connected **Power Stations**, all **Embedded Large Power Stations** and all **Embedded Medium Power Stations** connected to the **Subtransmission System**. A data submission is to be made each year in Week 24.

### Fault infeeds via Unit Transformers

A submission should be made for each **Generating Unit** with an associated **Unit Transformer**. Where there is more than one **Unit Transformer** associated with a **Generating Unit**, a value for the total infeed through all **Unit Transformers** should be provided. The infeed through the **Unit Transformer(s)** should include contributions from all motors normally connected to the **Unit Board**, together with any generation (eg **Auxiliary Gas Turbines**) which would normally be connected to the **Unit Board**, and should be expressed as a fault current at the **Generating Unit** terminals for a fault at that location.

DATA DESCRIPTION	UNITS	F.Yr.	DATA to RTL								
		0	1	2	3	4	5	6	7	CUSC Contract	CUSC App. Form
<i>(PC.A.2.5)</i>										<input type="checkbox"/>	<input type="checkbox"/>
Name of <b>Power Station</b>										<input type="checkbox"/>	<input type="checkbox"/>
Number of <b>Unit Transformer</b>										<input type="checkbox"/>	<input type="checkbox"/>
Symmetrical three phase short-circuit current infeed through the <b>Unit Transformers(s)</b> for a fault at the <b>Generating Unit</b> terminals											
- at instant of fault	kA									<input type="checkbox"/>	<input type="checkbox"/>
- after subtransient fault current contribution has substantially decayed	kA									<input type="checkbox"/>	<input type="checkbox"/>
Positive sequence X/R ratio at instance of fault										<input type="checkbox"/>	<input type="checkbox"/>
Subtransient time constant (if significantly different from 40ms)	ms									<input type="checkbox"/>	<input type="checkbox"/>
Pre-fault voltage at fault point (if different from 1.0 p.u.)										<input type="checkbox"/>	<input type="checkbox"/>
The following data items need only be supplied if the <b>Generating Unit</b> Step-up Transformer can supply zero sequence current from the <b>Generating Unit</b> side to the <b>National Electricity Transmission System</b>											
Zero sequence source impedances as seen from the <b>Generating Unit</b> terminals consistent with the maximum infeed above:											
- Resistance	% on 100									<input type="checkbox"/>	<input type="checkbox"/>
- Reactance	% on 100									<input type="checkbox"/>	<input type="checkbox"/>

## SCHEDULE 14 - FAULT INFEEED DATA (GENERATORS INCLUDING UNIT TRANSFORMERS AND STATION TRANSFORMERS)

PAGE 2 OF 5

### Fault infeeds via Station Transformers

A submission is required for each **Station Transformer** directly connected to the **National Electricity Transmission System**. The submission should represent normal operating conditions when the maximum number of **Gensets** are **Synchronised** to the **System**, and should include the fault current from all motors normally connected to the **Station Board**, together with any Generation (eg **Auxiliary Gas Turbines**) which would normally be connected to the **Station Board**. The fault infeed should be expressed as a fault current at the hv terminals of the **Station Transformer** for a fault at that location.

If the submission for normal operating conditions does not represent the worst case, then a separate submission representing the maximum fault infeed that could occur in practice should be made.

DATA DESCRIPTION	UNITS	F.Yr.	DATA to									
		0	1	2	3	4	5	6	7	RTL		
<i>(PC.A.2.5)</i>										CUSC Contract	CUSC App. Form	
Name of <b>Power Station</b>											<input type="checkbox"/>	<input checked="" type="checkbox"/>
Number of <b>Station Transformer</b>											<input type="checkbox"/>	<input checked="" type="checkbox"/>
Symmetrical three phase short-circuit current infeed for a fault at the <b>Connection Point</b>												
- at instant of fault	kA										<input type="checkbox"/>	<input checked="" type="checkbox"/>
- after subtransient fault current contribution has substantially decayed	kA										<input type="checkbox"/>	<input checked="" type="checkbox"/>
Positive sequence X/R ratio At instance of fault											<input type="checkbox"/>	<input checked="" type="checkbox"/>
Subtransient time constant (if significantly different from 40ms)	mS										<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pre-fault voltage (if different from 1.0 p.u.) at fault point (See note 1)											<input type="checkbox"/>	<input checked="" type="checkbox"/>
Zero sequence source Impedances as seen from the <b>Point of Connection</b> Consistent with the maximum Infeed above:												
- Resistance	% on 100										<input type="checkbox"/>	<input checked="" type="checkbox"/>
- Reactance	% on 100										<input type="checkbox"/>	<input checked="" type="checkbox"/>

Note 1. The pre-fault voltage provided above should represent the voltage within the range 0.95 to 1.05 that gives the highest fault current

Note 2. % on 100 is an abbreviation for % on 100 MVA

## SCHEDULE 14 - FAULT INFEED DATA (GENERATORS INCLUDING UNIT TRANSFORMERS AND STATION TRANSFORMERS)

PAGE 3 OF 5

### Fault infeeds from Power Park Modules

A submission is required for the whole **Power Park Module** and for each **Power Park Unit** type or equivalent. The submission shall represent operating conditions that result in the maximum fault infeed. The fault current from all motors normally connected to the **Power Park Unit's** electrical system shall be included. The fault infeed shall be expressed as a fault current at the terminals of the **Power Park Unit**, or the **Common Collection Busbar** if an equivalent **Single Line Diagram** and associated data as described in PC.A.2.2.2 is provided, and the **Grid Entry Point**, or **User System Entry Point** if **Embedded**, for a fault at the **Grid Entry Point**, or **User System Entry Point** if **Embedded**.

Should actual data in respect of fault infeeds be unavailable at the time of the application for a **CUSC Contract** or **Embedded Development Agreement**, a limited subset of the data, representing the maximum fault infeed that may result from all of the plant types being considered, shall be submitted. This data will, as a minimum, represent the root mean square of the positive, negative and zero sequence components of the fault current for both single phase and three phase solid faults at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**) at the time of fault application and 50ms following fault application. Actual data in respect of fault infeeds shall be submitted to **NGET** as soon as it is available, in line with PC.A.1.2

DATA DESCRIPTION	UNITS	F.Yr.	DATA to									
		<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	RTL		
(PC.A.2.5)										CUSC Contract	CUSC App. Form	
Name of <b>Power Station</b>											<input type="checkbox"/>	<input checked="" type="checkbox"/>
Name of <b>Power Park Module</b>											<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Power Park Unit</b> type											<input type="checkbox"/>	<input checked="" type="checkbox"/>
A submission shall be provided for the contribution of the entire <b>Power Park Module</b> and each type of <b>Power Park Unit</b> or equivalent to the positive, negative and zero sequence components of the short circuit current at the <b>Power Park Unit</b> terminals, or <b>Common Collection Busbar</b> , and <b>Grid Entry Point</b> or <b>User System Entry Point</b> if <b>Embedded</b> for												
(i) a solid symmetrical three phase short circuit											<input type="checkbox"/>	<input checked="" type="checkbox"/>
(ii) a solid single phase to earth short circuit											<input type="checkbox"/>	<input checked="" type="checkbox"/>
(iii) a solid phase to phase short circuit											<input type="checkbox"/>	<input checked="" type="checkbox"/>
(iv) a solid two phase to earth short circuit											<input type="checkbox"/>	<input checked="" type="checkbox"/>
at the <b>Grid Entry Point</b> or <b>User System Entry Point</b> if <b>Embedded</b> .											<input type="checkbox"/>	<input checked="" type="checkbox"/>
If protective controls are used and active for the above conditions, a submission shall be provided in the limiting case where the protective control is not active. This case may require application of a non-solid fault, resulting in a retained voltage at the fault point.											<input type="checkbox"/>	<input checked="" type="checkbox"/>

**SCHEDULE 14 - FAULT INFEED DATA (GENERATORS INCLUDING UNIT TRANSFORMERS AND STATION TRANSFORMERS)**

PAGE 4 OF 5

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>F.Yr.</u> <u>0</u>	<u>F.Yr.</u> <u>1</u>	<u>F.Yr.</u> <u>2</u>	<u>F.Yr.</u> <u>3</u>	<u>F.Yr.</u> <u>4</u>	<u>F.Yr.</u> <u>5</u>	<u>F.Yr.</u> <u>6</u>	<u>F.Yr.</u> <u>7</u>	<u>DATA to RTL</u>	<u>DATA DESCRIPTION</u>
										CUSC Contract	CUSC App. Form
- A continuous time trace and table showing the root mean square of the positive, negative and zero sequence components of the fault current from the time of fault inception to 140ms after fault inception at 10ms intervals	Graphical and tabular  kA versus s									<input type="checkbox"/>	■
- A continuous time trace and table showing the positive, negative and zero sequence components of retained voltage at the terminals or <b>Common Collection Busbar</b> , if appropriate	p.u. versus s									<input type="checkbox"/>	■
- A continuous time trace and table showing the root mean square of the positive, negative and zero sequence components of retained voltage at the fault point, if appropriate	p.u. versus s									<input type="checkbox"/>	■

**SCHEDULE 14 - FAULT INFEEED DATA (GENERATORS INCLUDING UNIT TRANSFORMERS AND STATION TRANSFORMERS)**

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>F.Yr.</u> <u>0</u>	<u>F.Yr.</u> <u>1</u>	<u>F.Yr.</u> <u>2</u>	<u>F.Yr.</u> <u>3</u>	<u>F.Yr.</u> <u>4</u>	<u>F.Yr.</u> <u>5</u>	<u>F.Yr.</u> <u>6</u>	<u>F.Yr.</u> <u>7</u>	<u>DATA to RTL</u>	<u>DATA DESCRIPTION</u>
										CUSC Contract	CUSC App. Form
<p>For <b>Power Park Units</b> that utilise a protective control, such as a crowbar circuit,</p> <ul style="list-style-type: none"> <li>- additional rotor resistance applied to the <b>Power Park Unit</b> under a fault situation</li> <li>- additional rotor reactance applied to the <b>Power Park Unit</b> under a fault situation.</li> </ul> <p>Positive sequence X/R ratio of the equivalent at time of fault at the <b>Common Collection Busbar</b></p> <p>Minimum zero sequence impedance of the equivalent at a <b>Common Collection Busbar</b></p> <p><b>Active Power</b> generated pre-fault</p> <p>Number of <b>Power Park Units</b> in equivalent generator</p> <p>Power Factor (lead or lag)</p> <p>Pre-fault voltage (if different from 1.0 p.u.) at fault point (See note 1)</p> <p>Items of reactive compensation switched in pre-fault</p>	<p>% on MVA</p> <p>% on MVA</p> <p>MW</p> <p>p.u.</p>										<p>■</p> <p>■</p> <p>■</p> <p>■</p> <p>■</p> <p>■</p> <p>■</p> <p>■</p> <p>■</p>

Note 1. The pre-fault voltage provided above should represent the voltage within the range 0.95 to 1.05 that gives the highest fault current

**MOTHBALLED GENERATING UNIT MOTHBALLED POWER PARK MODULE OR MOTHBALLED DC CONVERTER AT A DC CONVERTER STATION AND ALTERNATIVE FUEL DATA**

The following data items must be supplied with respect to each **Mothballed Generating Unit Mothballed Power Park Module** or **Mothballed DC Converter** at a **DC Converter station**

**Power Station** \_\_\_\_\_ **Generating Unit, Power Park Module or DC Converter Name** (e.g. Unit 1)

DATA DESCRIPTION	UNITS	DATA CAT	GENERATING UNIT DATA						
			<1 month	1-2 months	2-3 months	3-6 months	6-12 months	>12 months	Total MW being returned
MW output that can be returned to service	MW	DPD II							

**Notes**

1. The time periods identified in the above table represent the estimated time it would take to return the **Mothballed Generating Unit, Mothballed Power Park Module** or **Mothballed DC Converter** at a **DC Converter Station** to service once a decision to return has been made.
2. Where a **Mothballed Generating Unit, Mothballed Power Park Module** or **Mothballed DC Converter** at a **DC Converter Station** can be physically returned in stages covering more than one of the time periods identified in the above table then information should be provided for each applicable time period.
3. The estimated notice to physically return MW output to service should be determined in accordance with **Good Industry Practice** assuming normal working arrangements and normal plant procurement lead times.
4. The MW output values in each time period should be incremental MW values, e.g. if 150MW could be returned in 2 – 3 months and an additional 50MW in 3 – 6 months then the values in the columns should be Nil, Nil, 150, 50, Nil, Nil, 200 respectively.
5. Significant factors which may prevent the **Mothballed Generating Unit, Mothballed Power Park Module** or **Mothballed DC Converter** at a **DC Converter Station** achieving the estimated values provided in this table, excluding factors relating to **Transmission Entry Capacity**, should be appended separately.

ALTERNATIVE FUEL INFORMATION

The following data items for alternative fuels need only be supplied with respect to each **Generating Unit** whose primary fuel is gas.

**Power Station** \_\_\_\_\_ **Generating Unit Name** (e.g. Unit 1) \_\_\_\_\_

DATA DESCRIPTION	UNITS	DATA CAT	GENERATING UNIT DATA			
			1	2	3	4
Alternative Fuel Type (*please specify)	Text	DPD II	Oil distillate	Other gas*	Other*	Other*
CHANGEOVER TO ALTERNATIVE FUEL						
For off-line changeover:						
Time to carry out off-line fuel changeover	Minutes	DPD II				
Maximum output following off-line changeover	MW	DPD II				
For on-line changeover:						
Time to carry out on-line fuel changeover	Minutes	DPD II				
Maximum output during on-line fuel changeover	MW	DPD II				
Maximum output following on-line changeover	MW	DPD II				
Maximum operating time at full load assuming:						
Typical stock levels	Hours	DPD II				
Maximum possible stock levels	Hours	DPD II				
Maximum rate of replacement of depleted stocks of alternative fuels on the basis of <b>Good Industry Practice</b>	MWh(electrical) /day	DPD II				
Is changeover to alternative fuel used in normal operating arrangements?	Text	DPD II				
Number of successful changeovers carried out in the last <b>NGET Financial Year</b> (** delete as appropriate)	Text	DPD II	0 / 1-5 / 6-10 / 11-20 / >20 **	0 / 1-5 / 6-10 / 11-20 / >20 **	0 / 1-5 / 6-10 / 11-20 / >20 **	0 / 1-5 / 6-10 / 11-20 / >20 **

DATA DESCRIPTION	UNITS	DATA CAT	GENERATING UNIT DATA			
			1	2	3	4
CHANGEOVER BACK TO MAIN FUEL For off-line changeover: Time to carry out off-line fuel changeover For on-line changeover: Time to carry out on-line fuel changeover Maximum output during on-line fuel changeover	 Minutes  Minutes  MW					

**Notes**

1. Where a **Generating Unit** has the facilities installed to generate using more than one alternative fuel type details of each alternative fuel should be given.
2. Significant factors and their effects which may prevent the use of alternative fuels achieving the estimated values provided in this table (e.g. emissions limits, distilled water stocks etc.) should be appended separately.

- No information collated under this Schedule will be transferred to the **Relevant Transmission Licensees**

<b>BLACK START INFORMATION</b>		
The following data/text items are required from each <b>Generator</b> for each <b>BM Unit</b> at a <b>Large Power Station</b> as detailed in PC.A.5.7. Data is not required for <b>Generating Units</b> that are contracted to provide <b>Black Start Capability</b> , <b>Power Park Modules</b> or <b>Generating Units</b> that have an <b>Intermittent Power Source</b> . The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from <b>NGET</b> during a <b>Black Start</b> .		
Data Description (PC.A.5.7) (■ CUSC Contract)	Units	Data Category
Assuming all <b>BM Units</b> were running immediately prior to the <b>Total Shutdown</b> or <b>Partial Shutdown</b> and in the event of loss of all external power supplies, provide the following information:		
a) Expected time for the first and subsequent <b>BM Units</b> to be <b>Synchronised</b> , from the restoration of external power supplies, assuming external power supplies are not available for up to 24hrs	Tabular or Graphical	DPD II
b) Describe any likely issues that would have a significant impact on a <b>BM Unit's</b> time to be <b>Synchronised</b> arising as a direct consequence of the inherent design or operational practice of the <b>Power Station</b> and/or <b>BM Unit</b> , e.g. limited barring facilities, time from a <b>Total Shutdown</b> or <b>Partial Shutdown</b> at which batteries would be discharged.	Text	DPD II
<b>Block Loading Capability:</b>		
c) Provide estimated <b>Block Loading Capability</b> from 0MW to <b>Registered Capacity</b> of each <b>BM Unit</b> based on the unit being 'hot' (run prior to shutdown) and also 'cold' (not run for 48hrs or more prior to the shutdown). The <b>Block Loading Capability</b> should be valid for a frequency deviation of 49.5Hz – 50.5Hz. The data should identify any required 'hold' points.	Tabular or Graphical	DPD II

**SCHEDULE 17 - ACCESS PERIOD DATA**

PAGE 1 OF 1

(PC.A.4 - CUSC Contract ■)

Submissions by **Users** using this Schedule 17 shall commence in 2011 and shall then continue in each year thereafter

<b>Access Group</b>	
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<b>Asset Identifier</b>	<b>Start Week</b>	<b>End Week</b>	<b>Maintenance Year (1, 2 or 3)</b>	<b>Duration</b>	<b>Potential Concurrent Outage (Y/N)</b>

<b>Comments</b>

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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The data in this Schedule 18 is required from **Generators** who are undertaking **OTSDUW** and connecting to a **Transmission Interface Point**.

DATA DESCRIPTION	UNITS	DATA to		DATA CAT.	GENERATING UNIT OR STATION DATA						
		RTL CUSC Cont ract	CUSC App. Form		F.Yr0	F.Yr1	F.Yr2	F.Yr3	F.Yr4	F.Yr5	F.Yr 6
<b>INDIVIDUAL OTSDUW DATA</b>											
<b>Interface Point Capacity</b> (PC.A.3.2.2 (a))	MW MVA <sub>r</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Performance Chart at the <b>Transmission Interface Point</b> for <b>OTSDUW Plant and Apparatus</b> (PC.A.3.2.2(f)(iv))		<input type="checkbox"/>	<input checked="" type="checkbox"/>								
<b>OTSDUW DEMANDS</b>											
<b>Demand</b> associated with the <b>OTSDUW Plant and Apparatus</b> (excluding OTSDUW DC Converters – see Note 1)) supplied at each <b>Interface Point</b> . The <b>User</b> should also provide the <b>Demand</b> supplied to each <b>Connection Point</b> on the <b>OTSDUW Plant and Apparatus</b> . (PC.A.5.2.5)											
- The maximum <b>Demand</b> that could occur.	MW MVA <sub>r</sub>	<input type="checkbox"/>		<b>DPD I</b>							
- <b>Demand</b> at specified time of annual peak half hour of <b>National Electricity Transmission System Demand at Annual ACS Conditions</b> .	MW MVA <sub>r</sub>	<input type="checkbox"/>		<b>DPD I</b> <b>DPD II</b>							
- <b>Demand</b> at specified time of annual minimum half-hour of <b>National Electricity Transmission System Demand</b> .	MW MVA <sub>r</sub>	<input type="checkbox"/>		<b>DPD II</b> <b>DPD II</b>							
(Note 1 – <b>Demand</b> required from <b>OTSDUW DC Converters</b> should be supplied under page 2 of Schedule 18).											

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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### OTSDUW USERS SYSTEM DATA

DATA DESCRIPTION	UNITS	DATA to RTL		DATA CATEGORY
		CUSC Contract	CUSC App. Form	
<b>OFFSHORE TRANSMISSION SYSTEM LAYOUT</b> <i>(PC.A.2.2.1, PC.A.2.2.2 and P.C.A.2.2.3)</i>				
A <b>Single Line Diagram</b> showing connectivity of all of the <b>Offshore Transmission System</b> including all <b>Plant and Apparatus</b> between the <b>Interface Point</b> and all Connection <b>Points</b> is required.		■	■	SPD
This <b>Single Line Diagram</b> shall depict the arrangement(s) of all of the existing and proposed load current carrying <b>Apparatus</b> relating to both existing and proposed <b>Interface Points</b> and <b>Connection Points</b> , showing electrical circuitry (ie. overhead lines, underground cables (including subsea cables), power transformers and similar equipment), operating voltages, circuit breakers and phasing arrangements		■	■	SPD
<b>Operational Diagrams</b> of all substations within the <b>OTSDUW Plant and Apparatus</b>		■	■	SPD
<b>SUBSTATION INFRASTRUCTURE</b> <i>(PC.A.2.2.6)</i>				
For the infrastructure associated with any <b>OTSDUW Plant and Apparatus</b>				
Rated 3-phase rms short-circuit withstand current	kA	■	■	SPD
Rated 1-phase rms short-circuit withstand current	kA	■	■	SPD
Rated Duration of short-circuit withstand	s	■	■	SPD
Rated rms continuous current	A	■	■	SPD
<b>LUMPED SUSCEPTANCES</b> <i>(PC.A.2.3)</i>				
Equivalent Lumped Susceptance required for all parts of the User's Subtransmission System (including OTSDUW Plant and Apparatus) which are not included in the Single Line Diagram.				
This should not include:				
(a)	independently switched reactive compensation equipment identified above.	■	■	
(b)	any susceptance of the <b>OTSDUW Plant and Apparatus</b> inherent in the <b>Demand (Reactive Power)</b> data provided on Page 1 and 2 of this Schedule 14.	■	■	
Equivalent lumped shunt susceptance at nominal <b>Frequency</b> .	% on 100 MVA	■	■	

**OFFSHORE TRANSMISSION SYSTEM DATA**

Branch Data (PC.A.2.2.4)

Node 1	Node 2	Rated Voltage (kV)	Operating Voltage (kV)	Circuit	PPS PARAMETERS			ZPS PARAMETERS			Maximum Continuous Ratings			Length (km)
					R1 %100 MVA	X1 %100 MVA	B 1 %100 MVA	R0 %100 MVA	X0 %100M VA	B0 %100M VA	Winter (MVA)	Sprng Autumn (MVA)	Summer (MVA)	

Notes

1. For information equivalent STC Reference: STCP12-1m Part 3 – 2.1 Branch Data
2. In the case where an overhead line exists within the OTSDUW Plant and Apparatus the Mutual inductances should also be provided.

**OFFSHORE TRANSMISSION SYSTEM DATA**

2 Winding Transformer Data (PC.A.2.2.5)

The data below is **Standard Planning Data**, and details should be shown below of all transformers shown on the **Single Line Diagram**

HV Node	HV (kV)	LV Node	LV (kV)	Rating (MVA)	Trans-former	Positive Phase Sequence Reactance % on 100MVA			Positive Phase Sequence Resistance % on 100 MVA			Tap Changer			Winding Arr.	Earthing Method (Direct /Res /Reac)	Earthing Impedance method
						Max Tap	Min Tap	Nom Tap	Max Tap	Min Tap	Nom Tap	Range +% to -%	Step size %	type			

Notes

1 For information the corresponding STC Reference is STCP12-1: Part 3 – 2.4 Transformers



**OFFSHORE TRANSMISSION SYSTEM DATA**

Circuit Breaker Data (PC.A.2.2.6(a))

The data below is all **Standard Planning Data**, and should be provided for all **OTSUA** switchgear (ie. circuit breakers, load disconnectors and disconnectors)

Circuit Breaker Data								Assumed Operating Times			3 Phase				1 Phase					
Location	Name	Rated Voltage	Operating Voltage	Make	Model	Type	Year Commissioned	Circuit Breaker (mS)	Minimum Protection & Trip Relay (mS)	Total Time (mS)	Continuous Rating (A)	Fault Rating (RMS Symmetrical) (3 phase) (MVA)	Fault Break Rating (RMS Symmetrical) (3 phase) (kA)	Fault Break Rating (Peak Asymmetrical) (3 phase) (kA)	Fault Make Rating (Peak Asymmetrical) (3 phase) (kA)	Fault Rating (RMS Symmetrical) (1 phase) (MVA)	Fault Break Rating (RMS Symmetrical) (1 phase) (kA)	Fault Break Rating (Peak Asymmetrical) (1 phase) (kA)	Fault Make Rating (Peak Asymmetrical) (1 phase) (kA)	DC time constant at testing of asymmetrical breaking ability (s)

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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### OFFSHORE TRANSMISSION SYSTEM DATA

#### REACTIVE COMPENSATION EQUIPMENT (PC.A.2.4(e))

Item	Node	kV	Device No.	Rating (MVar)	P Loss (kW)	Tap range	Connection Arrangement

Notes:

1. For information STC Reference: STCP12-1: Part 3 - 2.5 Reactive Compensation Equipment
2. Data relating to continuously variable reactive compensation equipment (such as statcoms or SVCs) should be entered on the SVC Modelling table.
3. For the avoidance of doubt this includes any AC Reactive Compensation equipment included within the OTSDUW DC Converter other than harmonic filter data which is to be entered in the harmonic filter data table.

<i>PC.A.2.4.1(e)</i>	A mathematical representation in block diagram format to model the control of any dynamic compensation plant. The model should be suitable for RMS dynamic stability type studies in which the time constants used should not be less than 10ms.
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**OFFSHORE TRANSMISSION SYSTEM DATA**

REACTIVE COMPENSATION - SVC Modelling Data (PC.A.2.4.1(e)(iii))

HV Node	LV Node	Control Node	Norminal Voltage (kV)	Target Voltage (kV)	Max MVar at HV	Min MVar at HV	Slope %	Voltage Dependant Q Limit	Normal Running Mode	R1 PPS_R	X1 PPS_X	R0 ZPS_R	X0 ZPS_X	Transf. Winding Type	Connection (Direct/Tertiary)

Notes:

- 1.For information the equivalent STC Reference is: STCP12-1: Part 3 - 2.7 SVC Modelling Data



## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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#### Information for Transient Overvoltage Assessment (DPD I) (PC.A.6.2 ■ CUSC Contract)

The information listed below may be requested by **NGET** from each **User** undertaking **OTSDUW** with respect to any **Interface Point** or **Connection Point** to enable NGET to assess transient overvoltage on the **National Electricity Transmission System**.

- (a) Busbar layout plan(s), including dimensions and geometry showing positioning of any current and voltage transformers, through bushings, support insulators, disconnectors, circuit breakers, surge arresters, etc. Electrical parameters of any associated current and voltage transformers, stray capacitances of wall bushings and support insulators, and grading capacitances of circuit breakers;
- (b) Electrical parameters and physical construction details of lines and cables connected at that busbar. Electrical parameters of all plant e.g., transformers (including neutral earthing impedance or zig-zag transformers if any), series reactors and shunt compensation equipment connected at that busbar (or to the tertiary of a transformer) or by lines or cables to that busbar;
- (c) Basic insulation levels (BIL) of all **Apparatus** connected directly, by lines or by cables to the busbar;
- (d) Characteristics of overvoltage **Protection** devices at the busbar and at the termination points of all lines, and all cables connected to the busbar;
- (e) Fault levels at the lower voltage terminals of each transformer connected to each **Interface Point** or **Connection Point** without intermediate transformation;
- (f) The following data is required on all transformers within the **OTSDUW Plant and Apparatus**.
- (g) An indication of which items of equipment may be out of service simultaneously during **Planned Outage** conditions.

#### Harmonic Studies (DPD I) (PC.A.6.4 ■ CUSC Contract)

The information given below, both current and forecast, where not already supplied in this Schedule 14 may be requested by **NGET** from each **User** if it is necessary for **NGET** to evaluate the production/magnification of harmonic distortion on **National Electricity Transmission System**. The impact of any third party **Embedded** within the **User's System** should be reflected:-

- (a) Overhead lines and underground cable circuits (including subsea cables) of the **User's OTSDUW Plant and Apparatus** must be differentiated and the following data provided separately for each type:-
  - Positive phase sequence resistance
  - Positive phase sequence reactance
  - Positive phase sequence susceptance
- (b) for all transformers connecting the **OTSDUW Plant and Apparatus** to a lower voltage:-
  - Rated MVA
  - Voltage Ratio
  - Positive phase sequence resistance
  - Positive phase sequence reactance

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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- (c) at the lower voltage points of those connecting transformers:-

Equivalent positive phase sequence susceptance  
Connection voltage and MVAR rating of any capacitor bank and component design parameters if configured as a filter

Equivalent positive phase sequence interconnection impedance with other lower voltage points  
The minimum and maximum **Demand** (both MW and MVAR) that could occur  
Harmonic current injection sources in Amps at the Connection Points and Interface Points

- (d) an indication of which items of equipment may be out of service simultaneously during **Planned Outage** conditions

### Voltage Assessment Studies (DPD I) (PC.A.6.5 ■ CUSC Contract)

The information listed below, where not already supplied in this Schedule 14, may be requested by **NGET** from each **User** undertaking **OTSDUW** with respect to any **Connection Point** or **Interface Point** if it is necessary for **NGET** to undertake detailed voltage assessment studies (eg to examine potential voltage instability, voltage control co-ordination or to calculate voltage step changes on the **National Electricity Transmission System**).

- (a) For all circuits of the **User's OTSDUW Plant and Apparatus**:-

Positive Phase Sequence Reactance  
Positive Phase Sequence Resistance  
Positive Phase Sequence Susceptance  
MVAR rating of any reactive compensation equipment

- (b) for all transformers connecting the **User's OTSDUW Plant and Apparatus** to a lower voltage:-

Rated MVA  
Voltage Ratio  
Positive phase sequence resistance  
Positive Phase sequence reactance  
Tap-changer range  
Number of tap steps  
Tap-changer type: on-load or off-circuit  
AVC/tap-changer time delay to first tap movement  
AVC/tap-changer inter-tap time delay

- (c) at the lower voltage points of those connecting transformers

Equivalent positive phase sequence susceptance  
MVAR rating of any reactive compensation equipment  
Equivalent positive phase sequence interconnection impedance with other lower voltage points  
The maximum **Demand** (both MW and MVAR) that could occur  
Estimate of voltage insensitive (constant power) load content in % of total load at both winter peak and 75% off-peak load conditions

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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Short Circuit Analyses:(DPD I) (PC.A.6.6 ■ CUSC Contract)

The information listed below, both current and forecast, and where not already supplied under this Schedule 14, may be requested by **NGET** from each **User** undertaking **OTSDUW** with respect to any **Connection Point or Interface Point** where prospective short-circuit currents on equipment owned by a **Transmission Licensee** or operated or managed by **NGET** are close to the equipment rating.

(a) For all circuits of the **User's OTSDUW Plant and Apparatus**:-

- Positive phase sequence resistance
- Positive phase sequence reactance
- Positive phase sequence susceptance
- Zero phase sequence resistance (both self and mutuals)
- Zero phase sequence reactance (both self and mutuals)
- Zero phase sequence susceptance (both self and mutuals)

(b) for all transformers connecting the **User's OTSDUW Plant and Apparatus** to a lower voltage:-

- Rated MVA
- Voltage Ratio
- Positive phase sequence resistance (at max, min and nominal tap)
- Positive Phase sequence reactance (at max, min and nominal tap)
- Zero phase sequence reactance (at nominal tap)
- Tap changer range
- Earthing method: direct, resistance or reactance
- Impedance if not directly earthed

(c) at the lower voltage points of those connecting transformers:-

The maximum **Demand** (in MW and MVA<sub>r</sub>) that could occur Short-circuit infeed data in accordance with PC.A.2.5.6(a) unless the **User's OTSDUW Plant and Apparatus** runs in parallel with the **Subtransmission System**, when to prevent double counting in each node infeed data, a  $\pi$  equivalent comprising the data items of PC.A.2.5.6(a) for each node together with the positive phase sequence interconnection impedance between the nodes shall be submitted.

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

Fault infeed data to be submitted by OTSDUW Plant and Apparatus providing a fault infeed (including OTSDUW DC Converters) (PC.A.2.5.5)

A submission is required for **OTSDUW Plant and Apparatus** (including **OTSDUW DC Converters** at each **Transmission Interface Point** and **Connection Point**. The submission shall represent operating conditions that result in the maximum fault infeed. The fault current from all auxiliaries of the **OTSDUW Plant and Apparatus** at the **Transmission Interface Point** and **Connection Point** shall be included. The fault infeed shall be expressed as a fault current at the **Transmission Interface Point** and also at each **Connection Point**.

Should actual data in respect of fault infeeds be unavailable at the time of the application for a **CUSC Contract** or **Embedded Development Agreement**, a limited subset of the data, representing the maximum fault infeed that may result from the **OTSDUW Plant and Apparatus**, shall be submitted. This data will, as a minimum, represent the root mean square of the positive, negative and zero sequence components of the fault current for both single phase and three phase solid faults at each **Connection Point** and **Interface Point** at the time of fault application and 50ms following fault application. Actual data in respect of fault infeeds shall be submitted to **NGET** as soon as it is available, in line with PC.A.1.2.

DATA DESCRIPTION	UNITS	F.Yr.	DATA to RTL								
		0	1	2	3	4	5	6	7	CUSC Contract	CUSC App. Form
(PC.A.2.5)											
Name of <b>OTSDUW Plant and Apparatus</b>											
<b>OTSDUW DC Converter</b> type (ie voltage or current source)											
<p>A submission shall be provided for the contribution of each <b>OTSDUW Plant and Apparatus</b> to the positive, negative and zero sequence components of the short circuit current at the <b>Interface Point</b> and each <b>Connection Point</b> for</p> <p>(i) a solid symmetrical three phase short circuit</p> <p>(ii) a solid single phase to earth short circuit</p> <p>(iii) a solid phase to phase short circuit</p> <p>(iv) a solid two phase to earth short circuit</p> <p>If protective controls are used and active for the above conditions, a submission shall be provided in the limiting case where the protective control is not active. This case may require application of a non-solid fault, resulting in a retained voltage at the fault point.</p>										<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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DATA DESCRIPTION	UNITS	F.	DATA to									
		Yr.	RTL									
		0	1	2	3	4	5	6	7	CUSC Contract	CUSC App. Form	
- A continuous time trace and table showing the root mean square of the positive, negative and zero sequence components of the fault current from the time of fault inception to 140ms after fault inception at 10ms intervals	Graphical and tabular  kA versus s										<input type="checkbox"/>	<input checked="" type="checkbox"/>
- A continuous time trace and table showing the positive, negative and zero sequence components of retained voltage at the <b>Interface Point</b> and each <b>Connection Point</b> , if appropriate	p.u. versus s										<input type="checkbox"/>	<input checked="" type="checkbox"/>
- A continuous time trace and table showing the root mean square of the positive, negative and zero sequence components of retained voltage at the fault point, if appropriate	p.u. versus s										<input type="checkbox"/>	<input checked="" type="checkbox"/>
Positive sequence X/R ratio of the equivalent at time of fault at the <b>Interface Point</b> and each <b>Connection Point</b>											<input type="checkbox"/>	<input checked="" type="checkbox"/>
Minimum zero sequence impedance of the equivalent at the <b>Interface Point</b> and each <b>Connection Point</b>											<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Active Power</b> transfer at the Interface Point and each Connection Point pre-fault	MW										<input type="checkbox"/>	<input checked="" type="checkbox"/>
Power Factor (lead or lag)											<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pre-fault voltage (if different from 1.0 p.u.) at fault point (See note 1)	p.u.										<input type="checkbox"/>	<input checked="" type="checkbox"/>
Items of reactive compensation switched in pre-fault											<input type="checkbox"/>	<input checked="" type="checkbox"/>

Note 1. The pre-fault voltage provided above should represent the voltage within the range 0.95 to 1.05 that gives the highest fault current

# SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

Thermal Ratings Data (PC.A.2.2.4)

<b>Voltage</b>
132kV

**CIRCUIT RATING SCHEDULE**

<b>Offshore TO Name</b>	Issue Date

**CIRCUIT Name from Site A – Site B**

OVERALL CCT RATINGS		Winter				Spring/Autumn				Summer			
		%Nom	Limit	Amps	MVA	%Nom	Limit	Amps	MVA	%Nom	Limit	Amps	MVA
Pre-Fault Continuous		84%	Line	485	111	84%	Line	450	103	84%	Line	390	89
Post-Fault Continuous		100%	Line	580	132	100%	Line	540	123	100%	Line	465	106
Prefault load exceeds line prefault continuous rating	6hr	95%	Line	580	132	95%	Line	540	123	95%	Line	465	106
	20m		Line	580	132		Line	540	123		Line	465	106
	10m	mva	Line	580	132	mva	Line	540	123	mva	Line	465	106
	5m	125	Line	580	132	116	Line	540	123	100	Line	465	106
	3m		Line	580	132		Line	540	123		Line	465	106
Short Term Overloads	6hr	90%	Line	580	132	90%	Line	540	123	90%	Line	465	106
	20m		Line	580	132		Line	540	123		Line	465	106
	10m	mva	Line	580	132	mva	Line	540	123	mva	Line	465	106
	5m	118	Line	580	132	110	Line	540	123	95	Line	465	106
	3m		Line	580	132		Line	540	123		Line	465	106
Limiting Item and permitted overload values for different times and pre-fault loads	6hr	84%	Line	580	132	84%	Line	540	123	84%	Line	465	106
	20m		Line	590	135		Line	545	125		Line	470	108
	10m	mva	Line	630	144	mva	Line	580	133	mva	Line	495	113
	5m	110	Line	710	163	103	Line	655	149	89	Line	555	126
	3m		Line	810	185		Line	740	170		Line	625	143
	6hr	75%	Line	580	132	75%	Line	540	123	75%	Line	465	106
	20m		Line	595	136		Line	555	126		Line	475	109
	10m	mva	Line	650	149	mva	Line	600	137	mva	Line	510	116
	5m	99	Line	760	173	92	Line	695	159	79	Line	585	134
	3m		Line	885	203		Line	810	185		Line	685	156
6hr	60%	Line	580	132	60%	Line	540	123	60%	Line	465	106	
20m		Line	605	138		Line	560	128		Line	480	110	
10m	mva	Line	675	155	mva	Line	620	142	mva	Line	530	121	
5m	79	Line	820	187	73	Line	750	172	63	Line	635	145	
3m		Line	985	226		Line	900	206		Line	755	173	
6hr	30%	Line	580	132	30%	Line	540	123	30%	Line	465	106	
20m		Line	615	141		Line	570	130		Line	490	112	
10m	mva	Line	710	163	mva	Line	655	150	mva	Line	555	127	
5m	39	Line	895	205	36	Line	820	187	31	Line	690	158	
3m		Line	1110	255		Line	1010	230		Line	845	193	

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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6hr												
20m												
10m												
5m												
3m												
6hr												
20m												
10m												
5m												
3m												

Notes or Restrictions Detailed
--------------------------------------

- Notes: 1. For information the equivalent STC Reference: STCP12-1: Part 3 - 2.6 Thermal Ratings  
 2. The values shown in the above table is example data.

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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### **Protection Policy** (*PC.A.6.3*)

To include details of the protection policy

### **Protection Schedules**(*PC.A.6.3*)

Data schedules for the protection systems associated with each primary plant item including:

Protection, Intertrip Signalling & operating times

Intertripping and protection unstabilisation initiation

Synchronising facilities

Delayed Auto Reclose sequence schedules

### **Automatic Switching Scheme Schedules** (*PC.A.2.2.7*)

A diagram of the scheme and an explanation of how the system will operate and what plant will be affected by the scheme's operation.

**SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA**  
**PAGE 18 OF 24**

**GENERATOR INTERTRIP SCHEMES** (PC.A.2.2.7(b))

Substation: \_\_\_\_\_

Details of Generator Intertrip Schemes:

A diagram of the scheme and an explanation of how the system will operate and what plant will be effected by the schemes operation.

**DEMAND INTERTRIP SCHEMES** (PC.A.2.2.7(b))

Substation: \_\_\_\_\_

Details of Demand Intertrip Schemes:

A diagram of the scheme and an explanation of how the system will operate and what plant will be effected by the schemes operation

# SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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*Specific Operating Requirements (CC.5.2.1)*

## SUBSTATION OPERATIONAL GUIDE

**Substation:** \_\_\_\_\_

### Location Details:

Postal Address:	Telephone Nos.	Map Ref.
<b>National Grid Interface</b>		
<b>Generator Interface</b>		

- 1. Substation Type:**
- 2. Voltage Control:** *(short description of voltage control system. To include mention of modes ie Voltage, manual etc. Plus control step increments ie 0.5%-0.33kV?)*
- 3. Energisation Switching Information:** *(The standard energisation switching process from dead.)*
- 4. Intertrip Systems:**
- 5. Reactive Plant Outage:** *(A short explanation of any system re-configurations required to facilitate the outage of any reactive plant which form part of the OTSDUW Plant and Apparatus equipment. Also any generation restrictions required).*
- 6. Harmonic Filter Outage:** *(An explanation as to any OTSDUW Plant and Apparatus reconfigurations required to facilitate the outage and maintain the system within specified Harmonic limits, also any generation restrictions required).*

# SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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## OTSDUW DC CONVERTER TECHNICAL DATA

OTSDUW DC CONVERTER NAME \_\_\_\_\_

DATE: \_\_\_\_\_

Data Description	Units	DATA to RTL		Data Category	DC Converter Station Data
		CUSC Contract	CUSC App. Form		
(PC.A.4 and PC.A.5.2.5)					
<p><b>OTSDUW DC CONVERTER (CONVERTER DEMANDS):</b></p> <p><b>Demand</b> supplied through <b>Station Transformers</b> associated with the <b>OTSDUW DC Converter</b> at each <b>Interface Point</b> and each <b>Offshore Connection Point Grid Entry Point [PC.A.4.1]</b></p> <p>- <b>Demand</b> with all <b>OTSDUW DC Converters</b> operating at <b>Interface Point Capacity</b> .</p> <p>- <b>Demand</b> with all <b>OTSDUW DC Converters</b> operating at maximum <b>Interface Point</b> flow from the <b>Interface Point</b> to each <b>Offshore Grid Entry Point</b> .</p> <p>- The maximum <b>Demand</b> that could occur.</p> <p>- <b>Demand</b> at specified time of annual peak half hour of <b>NGET Demand</b> at <b>Annual ACS Conditions</b>.</p> <p>- <b>Demand</b> at specified time of annual minimum half-hour of <b>NGET Demand</b>.</p>	<p>MW MVA<sub>r</sub></p> <p>MW MVA<sub>r</sub></p> <p>MW MVA<sub>r</sub></p> <p>MW MVA<sub>r</sub></p> <p>MW MVA<sub>r</sub></p>	<p><input type="checkbox"/></p>	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	<p><b>DPD II</b> <b>DPD II</b></p> <p><b>DPD II</b> <b>DPD II</b></p> <p><b>DPD II</b> <b>DPD II</b></p> <p><b>DPD II</b> <b>DPD II</b></p> <p><b>DPD II</b></p>	
<b>OTSDUW DC CONVERTER DATA</b>	Text	<input type="checkbox"/>	■	<b>SPD+</b>	
Number of poles, i.e. number of <b>OTSDUW DC Converters</b>	Text	<input type="checkbox"/>	■	<b>SPD+</b>	
Pole arrangement (e.g. monopole or bipole)	Diagram	<input type="checkbox"/>			
Return path arrangement					
Details of each viable operating configuration	Diagram	<input type="checkbox"/>	■	<b>SPD+</b>	
Configuration 1	Diagram	<input type="checkbox"/>	■		
Configuration 2	Diagram	<input type="checkbox"/>	■		
Configuration 3	Diagram	<input type="checkbox"/>	■		
Configuration 4	Diagram	<input type="checkbox"/>	■		
Configuration 5	Diagram	<input type="checkbox"/>	■		
Configuration 6	Diagram	<input type="checkbox"/>	■		

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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Data Description	Units	DATA to RTL		Data Category	Operating Configuration					
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6
<b>OTSDUW DC CONVERTER DATA</b> <i>(PC.A.3.3.1(d))</i>										
<b>OTSDUW DC Converter</b> Type (e.g. current or Voltage source)	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>						
If the busbars at the <b>Interface Point</b> or <b>Connection Point</b> are normally run in separate sections identify the section to which the <b>OTSDUW DC Converter</b> configuration is connected	Section Number	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD</b>						
<b>Rated MW</b> import per pole (PC.A.3.3.1)	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD+</b>						
<b>Rated MW</b> export per pole (PC.A.3.3.1)	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>SPD+</b>						
<b>ACTIVE POWER TRANSFER CAPABILITY</b> <i>(PC.A.3.2.2)</i>										
<b>Interface Point Capacity</b>	MW MVA <sub>r</sub>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<b>SPD</b> <b>SPD</b>						
<b>OTSDUW DC CONVERTER TRANSFORMER</b> <i>(PC.A.5.4.3.1)</i>										
Rated MVA	MVA	<input type="checkbox"/>		<b>DPD II</b>						
Winding arrangement										
Nominal primary voltage	kV	<input type="checkbox"/>		<b>DPD II</b>						
Nominal secondary (converter-side) voltage(s)	kV	<input type="checkbox"/>		<b>DPD II</b>						
Positive sequence reactance										
Maximum tap	% on	<input type="checkbox"/>		<b>DPD II</b>						
Nominal tap	MVA	<input type="checkbox"/>		<b>DPD II</b>						
Minimum tap	% on			<b>DPD II</b>						
Positive sequence resistance										
Maximum tap	% on	<input type="checkbox"/>		<b>DPD II</b>						
Nominal tap	MVA	<input type="checkbox"/>		<b>DPD II</b>						
Minimum tap	% on	<input type="checkbox"/>		<b>DPD II</b>						
Zero phase sequence reactance	% on	<input type="checkbox"/>		<b>DPD II</b>						
Tap change range	MVA	<input type="checkbox"/>		<b>DPD II</b>						
Number of steps	% on	<input type="checkbox"/>		<b>DPD II</b>						
	MVA			<b>DPD II</b>						
	% on									
	MVA									
	% on									
	MVA									
	+% / -%									

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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Data Description	Units	DATA to RTL		Data Category	Operating configuration						
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6	
<p><b>OTSDUW DC CONVERTER NETWORK DATA</b> (PC.A.5.4.3.1 (c))</p> <p>Rated DC voltage per pole Rated DC current per pole</p> <p>Details of the <b>OTSDUW DC Network</b> described in diagram form including resistance, inductance and capacitance of all DC cables and/or DC lines. Details of any line reactors (including line reactor resistance), line capacitors, DC filters, earthing electrodes and other conductors that form part of the <b>OTSDUW DC Network</b> should be shown.</p>	<p>kV A</p> <p>Diagram</p>	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>		<p><b>DPD II</b> <b>DPD II</b></p> <p><b>DPD II</b></p>							

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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Data Description	Units	DATA to <b>RTL</b>		Data Category	Operating configuration					
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6
<b>OTSDUW DC CONVERTER CONTROL SYSTEMS</b> (PC.A.5.4.3.2)										
Static $V_{DC} - P_{DC}$ (DC voltage – DC power) or Static $V_{DC} - I_{DC}$ (DC voltage – DC current) characteristic (as appropriate) when operating as	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
	Diagram	<input type="checkbox"/>			<b>DPD II</b>					
–Rectifier	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
	–Inverter									
Details of rectifier mode control system, in block diagram form together with parameters showing transfer functions of individual elements.	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Details of inverter mode control system, in block diagram form showing transfer functions of individual elements including parameters (as applicable).	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Details of <b>OTSDUW DC Converter</b> transformer tap changer control system in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Details of AC filter control systems in block diagram form showing transfer functions of individual elements including parameters	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Details of any frequency and/or load control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Details of any large or small signal modulating controls, such as power oscillation damping controls or sub- synchronous oscillation damping controls, that have not been submitted as part of the above control system data.	Diagram	<input type="checkbox"/>		<b>DPD II</b>						
Transfer block diagram representation of the reactive power control at converter ends for a voltage source converter.										

## SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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Data Description	Units	DATA to RTL		Data Category	Operating configuration						
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6	
LOADING PARAMETERS (PC.A.5.4.3.3)											
MW Export from the <b>Offshore Grid Entry Point</b> to the <b>Transmission Interface Point</b> Nominal loading rate Maximum (emergency) loading rate	MW/s MW/s			<b>DPD I</b> <b>DPD I</b>							
Maximum recovery time, to 90% of pre-fault loading, following an AC system fault or severe voltage depression.	s	<input type="checkbox"/>		<b>DPD II</b>							
Maximum recovery time, to 90% of pre-fault loading, following a transient DC Network fault.	s	<input type="checkbox"/>		<b>DPD II</b>							

## SCHEDULE 19 - USER DATA FILE STRUCTURE

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The structure of the **User Data File Structure** is given below.

i.d.	Folder name	Description of contents
<b>Part A: Commercial &amp; Legal</b>		
<b>A2</b>	Commissioning	Commissioning & Test Programmes
<b>A3</b>	Statements	Statements of Readiness
<b>A9</b>	AS Monitoring	Ancillary Services Monitoring
<b>A10</b>	Self Certification	User Self Certification of Compliance
<b>A11</b>	Compliance statements	Compliance Statement
<b>Part 1: Safety &amp; System Operation</b>		
<b>1.1</b>	Interface Agreements	Interface Agreements
<b>1.2</b>	Safety Rules	Safety Rules
<b>1.3</b>	Switching Procedures	Local Switching Procedures
<b>1.4</b>	Earthing	Earthing
<b>1.5</b>	SRS	Site Responsibility Schedules
<b>1.6</b>	Diagrams	Operational and Gas Zone Diagrams
<b>1.7</b>	Drawings	Site Common Drawings
<b>1.8</b>	Telephony	Control Telephony
<b>1.9</b>	Safety Procedures	Local Safety Procedures
<b>1.10</b>	Co-ordinators	Safety Co-ordinators
<b>1.11</b>	RISSP	Record of Inter System Safety Precautions
<b>1.12</b>	Tel Numbers	Telephone Numbers for Joint System Incidents
<b>1.13</b>	Contact Details	Contact Details (fax, tel, email)
<b>1.14</b>	Restoration Plan	Local Joint Restoration Plan (incl. black start if applicable)
<b>1.15</b>	Maintenance	Maintenance Standards
<b>Part 2: Connection Technical Data</b>		
<b>2.1</b>	DRC Schedule 5	DRC Schedule 5 – Users System Data
<b>2.2</b>	Protection Report	Protection Settings Reports
<b>2.3</b>	Special Automatic Facilities	Special Automatic Facilities e.g. intertrip
<b>2.4</b>	Operational Metering	Operational Metering
<b>2.5</b>	Tariff Metering	Tariff Metering
<b>2.6</b>	Operational Comms	Operational Communications
<b>2.7</b>	Monitoring	Performance Monitoring
<b>2.8</b>	Power Quality	Power Quality Test Results (if required)

## SCHEDULE 19 - USER DATA FILE STRUCTURE

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<b>Part 3: Generator Technical Data</b>		
<b>3.1</b>	DRC Schedule 1	DRC Schedule 1 - Generating Unit
<b>3.2</b>	DRC Schedule 2	DRC Schedule 2 - Generation Planning Data
<b>3.3</b>	DRC Schedule 4	DRC Schedule 4 – Frequency Droop & Response
<b>3.4</b>	DRC Schedule 14	DRC Schedule 14 – Fault Infeed Data – Generators
<b>3.5</b>	Special Generator Protection	Special Generator Protection eg Pole slipping; islanding
<b>3.6</b>	Compliance Tests	Compliance Tests & Evidence
<b>3.7</b>	Compliance Studies	Compliance Simulation Studies
<b>3.8</b>	Site Specific	Bilateral Connections Agreement Technical Data & Compliance
<b>Part 4: General DRC Schedules</b>		
<b>4.1</b>	DRC Schedule 3	DRC Schedule 3 – Large Power Station Outage Information
<b>4.2</b>	DRC Schedule 6	DRC Schedule 6 – Users Outage Information
<b>4.3</b>	DRC Schedule 7	DRC Schedule 7 – Load Characteristics
<b>4.4</b>	DRC Schedule 8	DRC Schedule 8 – BM Unit Data (if applicable)
<b>4.5</b>	DRC Schedule 10	DRC Schedule 10 –Demand Profiles
<b>4.6</b>	DRC Schedule 11	DRC Schedule 11 – Connection Point Data
<b>Part 5: OTSDUW Data And Information</b> (if applicable and prior to <b>OTSUA Transfer Time</b> )		
		Diagrams Circuits Plant and Apparatus Circuit Parameters Protection Operation and Autoswitching Automatic Control Systems
		Mathematical model of dynamic compensation plant

**< END OF DATA REGISTRATION CODE >**

# REVISIONS

(R)

(This section does not form part of the Grid Code)

- R.1 **NGET's Transmission Licence** sets out the way in which changes to the Grid Code are to be made and reference is also made to **NGET's** obligations under the General Conditions.
- R.2 All pages re-issued have the revision number on the lower left hand corner of the page and date of the revision on the lower right hand corner of the page.
- R.3 The Grid Code was introduced in March 1990 and the first issue was revised 31 times. In March 2001 the New Electricity Trading Arrangements were introduced and Issue 2 of the Grid Code was introduced which was revised 16 times. At British Electricity Trading and Transmission Arrangements (BETTA) Go-Active Issue 3 of the Grid Code was introduced and subsequently revised 35 times. At Offshore Go-active Issue 4 of the Grid Code was introduced and has been revised 13 times since its original publication. Issue 5 of the Grid Code was published to accommodate the changes made by Grid Code Modification A/10 which has incorporated the **Generator** compliance process into the Grid Code.
- R.4 This Revisions section provides a summary of the sections of the Grid Code changed by each revision to Issue 5.
- R.5 All enquiries in relation to revisions to the Grid Code, including revisions to Issues 1, 2, 3, 4 and 5 should be addressed to the Grid Code development team at the following email address:  
[Grid.Code@nationalgrid.com](mailto:Grid.Code@nationalgrid.com)

<b>Revision</b>	<b>Section</b>	<b>Related Modification</b>	<b>Effective Date</b>
0	Glossary and Definitions	A/10 and G/11	17 August 2012
0	Planning Code – PC.2.1	G/11	17 August 2012
0	Planning Code – PC.5.4	G/11	17 August 2012
0	Planning Code – PC.8	G/11	17 August 2012
0	Planning Code – PC.8.2	G/11	17 August 2012
0	Planning Code – PC.A.1	G/11	17 August 2012
0	Planning Code – PC.A.2	A/10 and G/11	17 August 2012
0	Planning Code – PC.A.3	G/11	17 August 2012
0	Planning Code – PC.A.5	A/10 and G/11	17 August 2012
0	Compliance Processes	A/10	17 August 2012
0	Connection Conditions – CC.1.1	A/10	17 August 2012
0	Connection Conditions – CC.2.2	G/11	17 August 2012
0	Connection Conditions – CC.3.3	A/10	17 August 2012
0	Connection Conditions – CC.4.1	A/10	17 August 2012
0	Connection Conditions – CC.5.2	G/11	17 August 2012
0	Connection Conditions – CC.6.1	G/11	17 August 2012
0	Connection Conditions – CC.6.3	G/11	17 August 2012
0	Connection Conditions – CC.6.6	A/10	17 August 2012
0	Connection Conditions – CC.7.2	G/11	17 August 2012

<b>Revision</b>	<b>Section</b>	<b>Related Modification</b>	<b>Effective Date</b>
0	Connection Conditions – CC.7.4	G/11	17 August 2012
0	Connection Conditions – CC.A.1	G/11	17 August 2012
0	Connection Conditions – CC.A.2	G/11	17 August 2012
0	Connection Conditions – CC.A.3	G/11	17 August 2012
0	Connection Conditions – CC.A.4	G/11	17 August 2012
0	Connection Conditions – CC.A.6	A/10	17 August 2012
0	Connection Conditions – CC.A.7	A/10 and G/11	17 August 2012
0	Connection Conditions – Figure CC.A.3.1	G/11	17 August 2012
0	Operating Code No. 2 – OC2.4	G/11	17 August 2012
0	Operating Code No. 2 – OC2.A.1	G/11	17 August 2012
0	Operating Code No. 5 – OC5.3	A/10	17 August 2012
0	Operating Code No. 5 – OC5.5	A/10 and G/11	17 August 2012
0	Operating Code No. 5 – OC5.7	G/11	17 August 2012
0	Operating Code No. 5 – OC5.8	A/10 and G/11	17 August 2012
0	Operating Code No. 5 – OC5.A.1	A/10	17 August 2012
0	Operating Code No. 5 – OC5.A.2	A/10	17 August 2012
0	Operating Code No. 5 – OC5.A.3	A/10	17 August 2012
0	Operating Code No. 5 – OC5.A.4	A/10	17 August 2012
0	Operating Code No. 7 – OC7.4	G/11	17 August 2012
0	Operating Code No. 8 – OC8.2	G/11	17 August 2012

<b>Revision</b>	<b>Section</b>	<b>Related Modification</b>	<b>Effective Date</b>
0	Operating Code No. 8 – OC8A.1	G/11	17 August 2012
0	Operating Code No. 8 – OC8A.5	G/11	17 August 2012
0	Operating Code No. 8 – OC8B.1	G/11	17 August 2012
0	Operating Code No. 8 – OC8B.4	G/11	17 August 2012
0	Operating Code No. 8 – OC8B.5	G/11	17 August 2012
0	Operating Code No. 8 – OC8B Appendix E	G/11	17 August 2012
0	Operating Code No. 9 – OC9.2	G/11	17 August 2012
0	Operating Code No. 9 – OC9.4	G/11	17 August 2012
0	Operating Code No. 9 – OC9.5	G/11	17 August 2012
0	Operating Code No. 12 – OC12.3	G/11	17 August 2012
0	Operating Code No. 12 – OC12.4	G/11	17 August 2012
0	Balancing Code No. 1 – BC1.5	G/11	17 August 2012
0	Balancing Code No. 1 – BC1.8	G/11	17 August 2012
0	Balancing Code No. 1 – BC1.A.1	G/11	17 August 2012
0	Balancing Code No. 2 – BC2.5	G/11	17 August 2012
0	Balancing Code No. 2 – BC2.8	G/11	17 August 2012
0	Balancing Code No. 2 – BC2.A.2	G/11	17 August 2012
0	Balancing Code No. 2 – BC2.A.3	G/11	17 August 2012
0	Balancing Code No. 2 – BC2.A.4	G/11	17 August 2012
0	Balancing Code No. 3 – BC3.5	G/11	17 August 2012

<b>Revision</b>	<b>Section</b>	<b>Related Modification</b>	<b>Effective Date</b>
0	Balancing Code No. 3 – BC3.7	G/11	17 August 2012
0	Data Registration Code – DRC.1.5	G/11	17 August 2012
0	Data Registration Code – DRC.4.2	G/11	17 August 2012
0	Data Registration Code – DRC.4.4	G/11	17 August 2012
0	Data Registration Code – DRC.5.2	A/10 and G/11	17 August 2012
0	Data Registration Code – DRC.5.5	G/11	17 August 2012
0	Data Registration Code – DRC.6.1	A/10 and G/11	17 August 2012
0	Data Registration Code – DRC.6.2	A/10	17 August 2012
0	Data Registration Code – Schedule 1	A/10 and G/11	17 August 2012
0	Data Registration Code – Schedule 2	G/11	17 August 2012
0	Data Registration Code – Schedule 3	G/11	17 August 2012
0	Data Registration Code – Schedule 4	G/11	17 August 2012
0	Data Registration Code – Schedule 5	G/11	17 August 2012
0	Data Registration Code – Schedule 10	G/11	17 August 2012
0	Data Registration Code – Schedule 12A	G/11	17 August 2012
0	Data Registration Code – Schedule 14	A/10 and G/11	17 August 2012
0	Data Registration Code – Schedule 15	G/11	17 August 2012
0	Data Registration Code – Schedule 19	A/10	17 August 2012
0	General Conditions – GC.4	G/11	17 August 2012
0	General Conditions – GC.12	G/11	17 August 2012

<b>Revision</b>	<b>Section</b>	<b>Related Modification</b>	<b>Effective Date</b>
0	General Conditions – GC.15	G/11	17 August 2012
0	General Conditions – GC.A1	G/11	17 August 2012
0	General Conditions – GC.A2	G/11	17 August 2012
0	General Conditions – GC.A3	G/11	17 August 2012
1	Operating Code No. 8 – OC8A.5.3.4	C/12	6 November 2012
1	Operating Code No. 8 – OC8B.5.3.4	C/12	6 November 2012
2	Balancing Code No. 1 – BC1.2.1	B/12	31 January 2013
2	Balancing Code No. 1 – BC1.4.2	B/12	31 January 2013
2	Balancing Code No. 1 – BC1.A.1.5	B/12	31 January 2013
2	Connection Conditions – CC.7.7	D/12	31 January 2013
3	Glossary and Definitions	C/11	2 April 2013
3	Operating Code No. 8 – OC8A.4.3.5	B/10	2 April 2013
3	Operating Code No. 8 – OC8B.4.3.5	B/10	2 April 2013
3	Balancing Code No. 2 – BC2.5	C/11	2 April 2013
4	Glossary and Definitions	GC0060 (F/12)	19 August 2013
4	Planning Code - PC.A.5	GC0040 (A/12)	19 August 2013
4	Operating Code No. 2 – OC2.A.10	GC0060 (F/12)	19 August 2013
4	Data Registration Code – Schedule 1	GC0040 (A/12)	19 August 2013
4	Data Registration Code – Schedule 2	GC0060 (F/12)	19 August 2013
5	Glossary and Definitions	GC0033, 71, 72 and 73	05 November 2013

<b>Revision</b>	<b>Section</b>	<b>Related Modification</b>	<b>Effective Date</b>
5	General Conditions – GC.4	GC0071, 72 and 73	05 November 2013
5	General Conditions – GC.14	GC0071, 72 and 73	05 November 2013
5	General Conditions – GC.16	GC0071, 72 and 73	05 November 2013
6	Connection Conditions – CC.A.7	GC0065	13 December 2013
6	Planning Code – PC.A.3	GC0037	13 December 2013
6	Operating Code No. 2 – OC2.4.2	GC0037	13 December 2013
6	Operating Code No. 2 – Appendix 4	GC0037	13 December 2013
6	Balancing Code No. 1 – BC1.4.2	GC0037	13 December 2013
6	Balancing Code No. 1 – BC1.A.1.8	GC0037	13 December 2013
7	Glossary and Definitions	GC0044	31 March 2014
7	Operating Code No. 9 – OC9.2.5	GC0044	31 March 2014
7	Operating Code No. 9 – OC9.4.6	GC0044	31 March 2014
7	Operating Code No. 9 – OC9.4.7.4	GC0044	31 March 2014
7	Operating Code No. 9 – OC9.4.7.9	GC0044	31 March 2014
7	Operating Code No. 9 – OC9.4.7.10	GC0044	31 March 2014
7	Balancing Code No. 2 – BC2.9.2.2	GC0044	31 March 2014
8	Glossary and Definitions	Secretary of State direction - Generator	10 June 2014

<b>Revision</b>	<b>Section</b>	<b>Related Modification</b>	<b>Effective Date</b>
		Commissioning Clause	
8	Planning Code	Secretary of State direction - Generator Commissioning Clause	10 June 2014
8	Connection Conditions	Secretary of State direction - Generator Commissioning Clause	10 June 2014
8	Compliance Processes	Secretary of State direction - Generator Commissioning Clause	10 June 2014
8	Operating Code No. 5	Secretary of State direction - Generator Commissioning Clause	10 June 2014
8	Operating Code No. 7	Secretary of State direction - Generator Commissioning Clause	10 June 2014
8	Operating Code No. 8	Secretary of State direction - Generator Commissioning Clause	10 June 2014
8	Operating Code No. 8A	Secretary of State direction - Generator Commissioning Clause	10 June 2014
8	Operating Code No. 8B	Secretary of State direction - Generator Commissioning Clause	10 June 2014
8	Balancing Code No. 2	Secretary of State direction - Generator Commissioning Clause	10 June 2014

<b>Revision</b>	<b>Section</b>	<b>Related Modification</b>	<b>Effective Date</b>
9	Operating Code No. 6 – OC6.5	GC0050	01 July 2014
9	Operating Code No. 6 – OC6.7	GC0050	01 July 2014
9	Balancing Code No. 2 – Appendix 3 Annexures	GC0068	01 July 2014
9	Balancing Code No. 2 – Appendix 4 Annexure	GC0068	01 July 2014
10	Glossary and Definitions	Secretary of State direction - EMR	01 August 2014
10	Planning Code – PC.5.4	Secretary of State direction - EMR	01 August 2014
10	Planning Code – PC.5.6	Secretary of State direction - EMR	01 August 2014
10	General Conditions – GC.4.6	Secretary of State direction - EMR	01 August 2014
10	General Conditions – GC.12	Secretary of State direction - EMR	01 August 2014
11	Planning Code – PC.A.3.1.4	GC0042	21 August 2014
11	Planning Code – PC.A.5	GC0042	21 August 2014
11	Data Registration Code – DRC6.1.11	GC0042	21 August 2014
11	Data Registration Code – Schedule 11	GC0042	21 August 2014

**< END OF REVISIONS >**

