

**GC0117 LEGAL TEXT – ALTERNATIVE 2  
HYBRID LEEMPS PLUS AND RDP SOLUTION  
DATED 5 JULY 2022**

**Extracts from the Glossary and Definitions**

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<b>BM Participant</b>	A person who is responsible for and controls one or more <b>BM Units</b> or where a <b>Bilateral Agreement</b> specifies that a <b>User</b> (including a <b>Generator</b> in respect of a <b>Type II Licence Exempt Embedded Medium Power Station</b> ) is required to be treated as a <b>BM Participant</b> for the purposes of the Grid Code. For the avoidance of doubt, it does not imply that they must be active in the <b>Balancing Mechanism</b> .
<b>Control Point</b>	<p>The point from which:-</p> <p>(a) A <b>Non-Embedded Customer's Plant and Apparatus</b> is controlled; or</p> <p>(b) A <b>BM Unit</b> at a <b>Large Power Station</b> or at a <b>Medium Power Station</b> or representing a <b>Cascade Hydro Scheme</b> or with a <b>Demand Capacity</b> with a magnitude of:</p> <p style="margin-left: 40px;">(i) 50MW or more in <b>NGET's Transmission Area</b>; or</p> <p style="margin-left: 40px;">(ii) 30MW or more in <b>SPT's Transmission Area</b>; or</p> <p style="margin-left: 40px;">(iii) 10MW or more in <b>SHETL's Transmission Area</b>,</p> <p style="margin-left: 40px;">(iv) 10MW or more which is connected to an <b>Offshore Transmission System</b></p> <p>is physically controlled by a <b>BM Participant</b>; or</p> <p>(c) In the case of any other <b>BM Unit</b> or <b>Generating Unit</b> (which could be part of a <b>Power Generating Module</b>), data submission is co-ordinated for a <b>BM Participant</b> and instructions are received from <b>The Company</b>,</p> <p>as the case may be. For a <b>Generator</b>, this will be at a <b>Power Station</b> or at an alternative location agreed with <b>The Company</b>. In the case of a <b>DC Converter Station</b> or <b>HVDC System</b>, the <b>Control Point</b> will be at a location agreed with <b>The Company</b>. In the case of a <b>BM Unit</b> of an <b>Interconnector User</b>, the <b>Control Point</b> will be the <b>Control Centre</b> of the relevant <b>Externally Interconnected System Operator</b>.</p>
<b>Embedded Person</b>	The party responsible for a <b>Licence Exempt Embedded Medium Power Station</b> or <b>DC Converter Station</b> not subject to a <b>Bilateral Agreement</b> or <b>HVDC System</b> not subject to a <b>Bilateral Agreement</b> connected to or proposed to be connected to a <b>Network Operator's System</b> .
<b>Type I Licence Exempt Embedded Medium Power Station</b>	A <b>Licence Exempt Embedded Medium Power Station</b> owned and operated by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant and Apparatus</b> before XXXX (date) not subject to or proposed to be subject to a <b>Bilateral Agreement</b> .

<p><b>Generating Unit Data</b></p>	<p>The <b>Physical Notification, Export and Import Limits</b> and <b>Other Relevant Data</b> only in respect of each <b>Generating Unit</b> (which could be part of a <b>Power Generating Module</b>):</p> <ul style="list-style-type: none"> <li>(a) which forms part of the <b>BM Unit</b> which represents that <b>Cascade Hydro Scheme</b>;</li> <li>(b) at an <b>Embedded Exemptable Large Power Station</b>, where the relevant <b>Bilateral Agreement</b> specifies that compliance with <b>BC1</b> and/or <b>BC2</b> is required: <ul style="list-style-type: none"> <li>(i) to each <b>Generating Unit</b>, or</li> <li>(ii) to each <b>Power Park Module</b> where the <b>Power Station</b> comprises <b>Power Park Modules</b>.</li> </ul> </li> </ul> <p>For the avoidance of doubt <b>Generating Unit Data</b> does not include data submitted from <b>Generators</b> in respect of <b>Power Generating Modules</b> forming part of a <b>Type II Licence Exempt Embedded Medium Power Station</b> from whom <b>BM Unit Data</b> is required to be submitted.</p>
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**Large Power Station**

- (a) A **Power Station** owned by a **Generator** who had concluded **Purchase Contracts** for its **Main Plant** and **Apparatus** before DDMMYY and which is directly connected to:
- (i) **NGET's Transmission System** where such **Power Station** has a **Registered Capacity** of 100MW or more; or
  - (ii) **SPT's Transmission System** where such **Power Station** has a **Registered Capacity** of 30MW or more; or
  - (iii) **SHETL's Transmission System** where such **Power Station** has a **Registered Capacity** of 10MW or more; or
  - (iv) an **Offshore Transmission System** where such **Power Station** has a **Registered Capacity** of 10MW or more;

or,

- (b) A **Power Station** owned by a **Generator** who had concluded **Purchase Contracts** for its **Main Plant** and **Apparatus** before DDMMYY and which is **Embedded** within a **User System** (or part thereof) and where such **User System** (or part thereof) is connected under normal operating conditions to:
- (i) **NGET's Transmission System** and such **Power Station** has a **Registered Capacity** of 100MW or more; or
  - (ii) **SPT's Transmission System** and such **Power Station** has a **Registered Capacity** of 30MW or more; or
  - (iii) **SHETL's Transmission System** and such **Power Station** has a **Registered Capacity** of 10MW or more;

or,

- (c) A **Power Station** owned by a **Generator** who had concluded **Purchase Contracts** for its **Main Plant** and **Apparatus** before DDMMYY and which is **Embedded** within a **User System** (or part thereof) where the **User System** (or part thereof) is not connected to the **National Electricity Transmission System**, although such **Power Station** is in:
- (i) **NGET's Transmission Area** where such **Power Station** has a **Registered Capacity** of 100MW or more; or
  - (ii) **SPT's Transmission Area** where such **Power Station** has a **Registered Capacity** of 30MW or more; or
  - (i) **SHETL's Transmission Area** where such **Power Station** has a **Registered Capacity** of 10MW or more;

or,

- (d) A **Power Station** owned by a **Generator** who had concluded **Purchase Contracts** for its **Main Plant** and **Apparatus** on or after DDMMYY and which is directly connected to the **National Electricity Transmission System** and such **Power Station** has a **Registered Capacity** of 100MW or more, or where the **Generator** has concluded **Purchase Contracts** relating to a **Substantial Modification** on or after DDMMYY such that its **Registered Capacity** is 100MW or more.

or,

- (e) A **Power Station** owned by a **Generator** who had concluded **Purchase Contracts** for its **Main Plant** and **Apparatus** on or after DDMMYY and which is **Embedded** within a **User System** (or part thereof) and where such **User System** (or part thereof) is connected

	<p>under normal operating conditions to the <b>National Electricity Transmission System</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of 100MW or more or where the <b>Generator</b> has concluded <b>Purchase Contracts</b> relating to a <b>Substantial Modification</b> on or after DDMMYY such that its <b>Registered Capacity</b> is 100MW or more.</p> <p>or,</p> <p>(f) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> on or after DDMMYY and which is <b>Embedded</b> within a <b>User System</b> (or part thereof) and where the <b>User System</b> (or part thereof) is not connected to the <b>National Electricity Transmission System</b>, although such <b>Power Station</b> is within the <b>GB Synchronous Area</b> and where such <b>Power Station</b> has a <b>Registered Capacity</b> of 100MW or more or where the <b>Generator</b> has concluded <b>Purchase Contracts</b> relating to a <b>Substantial Modification</b> on or after DDMMYY such that its <b>Registered Capacity</b> is 100MW or more;</p> <p>For the avoidance of doubt, a <b>Large Power Station</b> could comprise of <b>Type A, Type B, Type C</b> or <b>Type D Power Generating Modules</b>.</p>
<p><b>Licence Exempt Embedded Medium Power Station</b></p>	<p>An <b>Embedded Medium Power Station</b> belonging to a <b>Generator</b> who is exempt from holding a generation licence.</p> <p>A <b>Licence Exempt Embedded Medium Power Station</b> can be either a <b>Type I Licence Exempt Embedded Medium Power Station</b> or a <b>Type II Licence Exempt Embedded Medium Power Station</b>.</p>

<p><b>Medium Power Station</b></p>	<p>(a) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> before DDMMYY and which is directly connected to <b>NGET's Transmission System</b> where such <b>Power Station</b> has a <b>Registered Capacity</b> of 50MW or more but less than 100MW;</p> <p>or,</p> <p>(b) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> before DDMMYY and which is <b>Embedded</b> within a <b>User System</b> (or part thereof) where such <b>User System</b> (or part thereof) is connected under normal operating conditions to <b>NGET's Transmission System</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of 50MW or more but less than 100MW;</p> <p>or,</p> <p>(c) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> before DDMMYY and which is <b>Embedded</b> within a <b>User System</b> (or part thereof) where the <b>User System</b> (or part thereof) is not connected to the <b>National Electricity Transmission System</b>, although such <b>Power Station</b> is in <b>NGET's Transmission Area</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of 50MW or more but less than 100MW;</p> <p>or,</p> <p>(d) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> on or after DDMMYY and which is directly connected to the <b>National Electricity Transmission System</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of 50MW or more but less than 100MW, or where the <b>Generator</b> has concluded <b>Purchase Contracts</b> relating to a <b>Substantial Modification</b> on or after DDMMYY such that its <b>Registered Capacity</b> is 50MW or more but less than 100MW;</p> <p>or</p> <p>(e) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> on or after DDMMYY and which is <b>Embedded</b> within a <b>User System</b> (or part thereof) and where such <b>User System</b> (or part thereof) is connected under normal operating conditions to the <b>National Electricity Transmission System</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of 50MW or more but less than 100MW or where the <b>Generator</b> has concluded <b>Purchase Contracts</b> relating to a <b>Substantial Modification</b> on or after DDMMYY such that its <b>Registered Capacity</b> is 50MW or more but less than 100MW.</p> <p>or</p> <p>(f) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> on or after DDMMYY and which is <b>Embedded</b> within a <b>User System</b> (or part thereof) and where the <b>User System</b> (or part thereof) is not connected to the <b>National Electricity Transmission System</b>, although such <b>Power Station</b> is within the <b>GB Synchronous Area</b> and where such <b>Power Station</b> has a <b>Registered Capacity</b> of 50MW or more but less than 100MW or where the <b>Generator</b> has concluded <b>Purchase Contracts</b> relating to a <b>Substantial Modification</b> on or after DDMMYY such that its <b>Registered</b></p>
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	<p><b>Capacity</b> is 50MW or more but less than 100MW.</p> <p>For the avoidance of doubt a <b>Medium Power Station</b> could comprise of <b>Type A, Type B, Type C</b> or <b>Type D Power Generating Modules</b>.</p>
<b>Non-Confidential BM Unit Data</b>	<p><b>BM Unit Data</b> submitted by a <b>Generator</b> to a <b>Network Operator</b> in respect of its <b>Power Generating Modules</b> forming part of a <b>Type II Licence Exempt Embedded Medium Power Station</b>. This data would reflect the operating and dynamic parameters associated with each <b>Power Generating Module</b> within that <b>Type II Licence Exempt Embedded Medium Power Station</b> but would not extend to commercially sensitive data.</p>
<b>Regional Development Programme Control System</b>	<p>A control system installed on a <b>Network Operators System</b> to enable <b>The Company</b> to give instructions to that relevant <b>Network Operator</b> to control the output of selected <b>Power Generating Modules</b> forming part of a <b>Embedded Small Power Station</b> which are not registered as <b>BM Units</b> or <b>Generating Units</b> as provided for in <b>BC1</b> or <b>BC2</b> and which have a <b>Registered Capacity</b> of 10MW or greater and less than 50MW.</p>
<b>Type II Licence Exempt Embedded Medium Power Station</b>	<p>A <b>Licence Exempt Embedded Medium Power Station</b> owned and operated by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> on or after XXXX <b>(date)</b> not subject to or proposed to be subject to a <b>Bilateral Agreement</b> or where the <b>Generator</b> has concluded <b>Purchase Contracts</b> relating to a <b>Substantial Modification</b> on or after XXXX <b>(date)</b> and is not subject to or proposed to be subject to a <b>Bilateral Agreement</b>.</p>

<p><b>Small Power Station</b></p>	<p>(a) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> before DDMMYY and which is directly connected to is directly connected to:</p> <ul style="list-style-type: none"> <li>(i) <b>NGET's Transmission System</b> where such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 50MW; or</li> <li>(ii) <b>SPT's Transmission System</b> where such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 30MW; or</li> <li>(iii) <b>SHETL's Transmission System</b> where such a <b>Power Station</b> has a <b>Registered Capacity</b> of less than 10 MW; or</li> <li>(iv) an <b>Offshore Transmission System</b> where such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 10MW;</li> </ul> <p>or,</p> <p>(b) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> before DDMMYY and which is <b>Embedded</b> within a <b>User System</b> (or part thereof) where such <b>User System</b> (or part thereof) is connected under normal operating conditions to:</p> <ul style="list-style-type: none"> <li>(i) <b>NGET's Transmission System</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 50MW; or</li> <li>(ii) <b>SPT's Transmission System</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 30MW; or</li> <li>(iii) <b>SHETL's Transmission System</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 10MW;</li> </ul> <p>or,</p> <p>(c) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> before DDMMYY and which is <b>Embedded</b> within a <b>User System</b> (or part thereof) before DDMMYY where the <b>User System</b> (or part thereof) is not connected to the <b>National Electricity Transmission System</b>, although such <b>Power Station</b> is in:</p> <ul style="list-style-type: none"> <li>(i) <b>NGET's Transmission Area</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 50MW; or</li> <li>(ii) <b>SPT's Transmission Area</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 30MW; or</li> <li>(iii) <b>SHETL's Transmission Area</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 10MW;</li> </ul> <p>or,</p> <p>(d) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> on or after DDMMYY and which is directly connected to the <b>National Electricity Transmission System</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 50MW, or where the <b>Generator</b> has concluded <b>Purchase Contracts</b> relating to a <b>Substantial Modification</b> on or after DDMMYY such that its <b>Registered Capacity</b> is less than 50MW;</p>
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	<p>or,</p> <p>(e) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> on or after DDMMYY and which is <b>Embedded</b> within a <b>User System</b> (or part thereof) and where such <b>User System</b> (or part thereof) is connected under normal operating conditions to the <b>National Electricity Transmission System</b> and such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 50MW or where the <b>Generator</b> has concluded <b>Purchase Contracts</b> relating to a <b>Substantial Modification</b> on or after DDMMYY such that its <b>Registered Capacity</b> is less than 50MW;</p> <p>or,</p> <p>(f) A <b>Power Station</b> owned by a <b>Generator</b> who had concluded <b>Purchase Contracts</b> for its <b>Main Plant</b> and <b>Apparatus</b> on or after DDMMYY and which is <b>Embedded</b> within a <b>User System</b> (or part thereof) and where the <b>User System</b> (or part thereof) is not connected to the <b>National Electricity Transmission System</b>, although such <b>Power Station</b> is within the <b>GB Synchronous Area</b> and where such <b>Power Station</b> has a <b>Registered Capacity</b> of less than 50MW or where the <b>Generator</b> has concluded <b>Purchase Contracts</b> relating to a <b>Substantial Modification</b> on or after DDMMYY such that its <b>Registered Capacity</b> is less than 50MW.</p> <p>For the avoidance of doubt, a <b>Small Power Station</b> could comprise of <b>Type A, Type B, Type C</b> or <b>Type D Power Generating Modules</b>.</p>
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**Extracts from the Planning Code**

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PC.3.2 In the case of **Embedded Power Stations, Embedded DC Converter Stations** and **Embedded HVDC Systems**, 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 **The Company** 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 or **HVDC System Owner** shall provide the data direct to **The Company** in respect of **Embedded DC Converter Stations** and **Embedded HVDC Systems** subject to a **Bilateral Agreement**;
- (c) each **Network Operator** shall provide the data to **The Company** in respect of each **Licence Exempt Embedded Medium Power Station** or **Embedded DC Converter Station** not subject to a **Bilateral Agreement** or **Embedded HVDC System** 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** or **HVDC System** under this **PC**, each **Network Operator** in whose **System** they are **Embedded** should provide the data (contained in the Appendix) to **The Company** in respect of **Embedded Small Power Stations** or **Embedded** installations of direct current converters which do not form a **DC Converter Station** or **Embedded** installations of **HVDC Systems** 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 **The Company** 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**, **Embedded DC Converter Stations** or **Embedded HVDC Systems**, as provided in PC.A.1.12.

In summary, **Network Operators** are required to supply the following data in respect of **Licence Exempt Embedded Medium Power Stations** or **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** or **Embedded HVDC Systems** 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 **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** and **Embedded HVDC Systems** 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 **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** and **Embedded HVDC Systems** not subject to a **Bilateral Agreement** are treated as **Onshore Generators** or **Onshore DC Converter Station** owners or **HVDC System Owners** connected to an **Onshore User System Entry Point**.

PC.4.3.1 Seven Year Statement

To enable the **Seven Year Statement** to be prepared, each **User** is required to submit to **The Company** (subject to the provisions relating to **Embedded Power Stations** and **Embedded DC Converter Stations** and **Embedded HVDC Systems** 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, **The Company** 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 a **Licence Exempt Embedded Medium Power Station** or **Embedded DC Converter Station** not subject to a **Bilateral Agreement**, or **Embedded HVDC System** 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.

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PC.4.4.3 Embedded Development Agreement - Data Requirements

The **Network Operator** shall submit the following data in relation to an **Licence Exempt Embedded Medium Power Station** 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 **The Company**, the relevant **Detailed Planning Data** as listed in Part 2 of the Appendix.

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**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 **The Company**, shall provide **The Company** 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 **Licence Exempt Embedded Medium Power Stations** within its **System** connected to the **Subtransmission System**, shall provide **The Company** 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** and **Embedded HVDC System Owner** subject to a **Bilateral Agreement**, or **Network Operator** in the case of **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** or **Embedded HVDC Systems** not subject to a **Bilateral Agreement**, connected to the **Subtransmission System** shall provide **The Company** with fault infeed data as specified in PC.A.2.5.6.

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, **HVDC System Owners** and **Network Operators**, in respect of **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** and **Embedded HVDC Systems** within such **Network Operator's Systems** are required to submit data in accordance with PC.A.2.5.5.

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PC.A.2.5.5 Data from **Generators** (including **Generators** undertaking **OTSDUW** and those responsible for **DC Connected Power Park Modules**), **DC Converter Station** owners, **HVDC System Owners** and from **Network Operators** in respect of **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** and **Embedded HVDC Systems** within such **Network Operator's Systems**.

PC.A.2.5.5.1 For each **Generating Unit** (including **Synchronous Generating Units** forming part of a **Synchronous Power Generating Module**) with one or more associated **Unit Transformers**, the **Generator**, or the **Network Operator** in respect of **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** and **Embedded HVDC Systems** 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** (including **Synchronous Generating Units** forming part of a **Synchronous Power Generating Module**) 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.

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Embedded

- PC.A.3.1.2 (a) Each **Generator, HVDC System Owner** and **DC Converter Station** owner in respect of its existing, and/or proposed, **Embedded Large Power Stations** and/or **Embedded HVDC Systems** 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 **Licence Exempt Embedded Medium Power Stations** and/or **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** and/or **Embedded HVDC Systems** not subject to a **Bilateral Agreement** within such **Network Operator's System** in each case connected to the **Subtransmission System**, shall provide **The Company** with data relating to that **Power Station** or **DC Converter Station** or **HVC System**, 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** or **HVDC System**, 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 **The Company** under PC.A.3.1.4.
- 

#### 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 **Licence Exempt Embedded Medium Power Stations** within its **System** shall provide **The Company** 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 **HVDC System Owner**, or **Network Operator** in the case of an **Embedded DC Converter Station** or **Embedded HVDC System** not subject to a **Bilateral Agreement** within its **System** with existing or proposed **HVDC Systems** or **DC Converter Stations** shall provide **The Company** with data relating to each of those **HVDC Systems** or **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** or **Embedded HVDC Systems** 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 **The Company** under PC.A.5.1.4.

**GB Generators, DC Converter Station** owners, **EU Generators** and **HVDC System Owners** shall ensure that the models supplied in respect of their **Plant** and **Apparatus** provide a true and accurate behaviour of the plant as built as required under PC.A.5.3.2(c), PC.A.5.4.2(a) and PC.A.5.4.3 and verified through the **Compliance Processes (CP)** or **European Compliance Processes (ECP)** as applicable

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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 **The Company** with the relevant information specified under PC.A.3.1.4 . On receipt of this data further details may be required at **The Company's** discretion as follows:

- (i) in the case of details required from the **Network Operator** for **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** and **Embedded HVDC Systems** not subject to a **Bilateral Agreement** and **Embedded Small Power Stations** and **Embedded DC Converters** and **Embedded HVDC Systems** 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** or **HVDC System Owner** of an **Embedded HVDC System Owner** 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 **The Company** reasonably considers that the collective effect of a number of such **Embedded Small Power Stations**, **Embedded Medium Power Stations**, **Embedded DC Converter Stations**, **Embedded HVDC Systems**, **DC Converters** and **Customer Generating Plants** may have a significant system effect on the **National Electricity Transmission System**.

PC.A.5.2.2 Where the **Power Station** or **DC Converter Station** or **HVDC System** 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, **HVDC System Owner** or the **Network Operator** (in the case of **Licence Exempt Embedded Medium Power Stations** within its **System**), as the case may be, shall supply forecasts for each **Power Station** or **DC Converter Station** or **HVDC System** 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 **The Company** 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** and each **HVDC System Owner** in respect of its **HVDC System** subject to a **Bilateral Agreement** and each **Network Operator** in respect of each **Licence Exempt Embedded Medium Power Station** and each **Embedded DC Converter Station** or **Embedded HVDC System** 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.5.3.2 The following **Synchronous Generating Unit** (including **Synchronous Generating Units** within a **Synchronous Power Generating Module**) and **Power Station** data should be supplied:

(a) **Synchronous Generating Unit** Parameters

Rated terminal volts (kV)

Maximum terminal voltage set point (kV)

Terminal voltage set point step resolution – if not continuous (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** connected to 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**

Stator Current Limiter (applicable only to **Synchronous Power Generating Modules**)

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**. **EU Generators** are also required to submit the data as set out in option 2. Additional data required from **EU Generators** which own or operate **Type C** or **Type D Power Generating Modules** are marked in brackets with an asterisk (eg (\*)). For the avoidance of doubt, items marked as (\*) need not be supplied by **GB Generators**.

#### 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 <b>Active Energy</b> )	s
HP turbine response ratio:	
proportion of <b>Primary Response</b> 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** (including **Synchronous Generating Units** within a **Synchronous Power Generating Module**)

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** need only be provided for **Large Power Stations** owned and operated by **GB Generators** (and both **Frequency Response Deadband** and **Frequency Response Insensitivity** should be supplied in respect of **Type C** and **D Power Generating Modules** within **Large Power Stations** and **Medium Power Stations** excluding **Licence Exempt Embedded Medium Power Stations** \*) owned and operated by **EU Code Generators**.

- Maximum Setting            ±Hz

- Normal Setting            ±Hz

- Minimum Setting            ±Hz

Where the **Generating Unit** governor does not have a selectable **Governor Deadband** (or **Frequency Response Deadband** and **Frequency Response Insensitivity**)\* facility as specified above, then the actual value of the **Governor Deadband** or (**Frequency Response Deadband** and **Frequency Response Insensitivity**)\* 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)

(v) Governor Parameters – Synchronous Electricity Storage Units

For **Synchronous Electricity Storage Modules** which are derived from compressed air energy storage systems, the following data should be provided. For other **Synchronous Electricity Storage Modules**, data should be supplied as required by **The Company** in accordance with PC.A.7

Valve Actuator Time Constant (in seconds)

Valve Opening Limits (%)

Valve Opening Rate Limits (%/second)

Valve Closing Rate Limits (%/second)

[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>Governor Deadband</b> or (maximum <b>Frequency Response Deadband</b> and maximum <b>Frequency Response Insensitivity*</b> )	±Hz
Normal <b>Governor Deadband</b> or (normal <b>Frequency Response Deadband</b> and normal <b>Frequency Response Insensitivity*</b> )	±Hz
Minimum <b>Governor Deadband</b> or (minimum <b>Frequency Response Deadband</b> and minimum <b>Frequency Response Insensitivity*</b> )	±Hz
Maximum output <b>Governor Deadband</b> (or maximum output <b>Frequency Response Deadband</b> and maximum <b>Frequency Response Insensitivity*</b> )	±MW
Normal output <b>Governor Deadband</b> (or normal output <b>Frequency Response Deadband</b> and normal output <b>Frequency Response Insensitivity*</b> )	±MW
Minimum output <b>Governor Deadband</b> or (minimum output <b>Frequency Response Deadband</b> and minimum output <b>Frequency Response Insensitivity*</b> )	±MW

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

- Maximum                      Hz
- Normal                        Hz
- Minimum                      Hz

State if sustained response is normally selected.

(\* **GB Generators** which are not required to satisfy the requirements of the **European Connection Conditions** are not required to supply **Frequency Response Insensitivity** or **Frequency Response Deadband** data but should instead supply **Governor Deadband** data). For the avoidance of doubt, **EU Code Generators** in respect of **Type C** and **Type D Power Generating Modules** are required to supply **Frequency Response Deadband** and **Frequency Response Insensitivity** data).

(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 partx1, PC.A.3.3.1, to facilitate an early assessment by **The Company** 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 **The Company** to assess the interaction between the **Total System** and the mechanical components of **Generating Units**. For **Generating Units** (including **Synchronous Generating Units** within a **Synchronous Power Generating Module**) 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.

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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** or **HVDC System** (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 **The Company'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** (including **Electricity Storage Units**) 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 **The Company**. 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 a **Licence Exempt Embedded Medium Power Station** the **Network Operator** will provide **The Company** with the validation evidence if requested by **The Company**. 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 or **Power Park Modules** within a **Power Generating Module**.

(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 (as applicable)

Year for which the air density is submitted (as applicable)

Number of pole pairs (as applicable)

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

Gear box ratio (as applicable)

Mechanical drive train (as applicable)

For each **Power Park Unit**, details of the parameters of the drive train (as applicable) 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 **HVDC System**, or for a **Power Park Unit** not driven by a wind turbine, the data to be supplied shall be agreed with **The Company** in accordance with PC.A.7.

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

For the type of **Power Park Unit** (as applicable), 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 **The Company** to evaluate the production of flicker and harmonics on the **National Electricity Transmission System** and **User's Systems**. At **The Company'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 **The Company** 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.

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PC.A.5.6 Mothballed Power Generating Module, Mothballed Generating Unit, Mothballed Power Park Module (including DC Connected Power Park Modules), Mothballed HVDC Systems 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 **The Company's** reasonable request.

In the case of **Licence Exempt Embedded Medium Power Stations, Embedded HVDC Systems** not subject to a **Bilateral Agreement** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**, upon request from **The Company** 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 in respect of such **Embedded Medium Power Stations** and **Embedded DC Converters Stations** and **Embedded HVDC Systems** with their **System**.

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***Extracts from the Connection Conditions***

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CC.3.3 **Licence Exempt Embedded Medium Power Stations and Embedded DC Converter Stations** not subject to a **Bilateral Agreement** Provisions.

The following provisions apply in respect of **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**.

CC.3.3.1 The obligations within the **CC** that are expressed to be applicable to **GB Generators** in respect of **Licence Exempt Embedded Medium Power Stations** and **DC Converter Station Owners** in respect of **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** (where the obligations are in each case listed in CC.3.3.2) shall be read and construed as obligations that the **Network Operator** within whose **System** any such **Medium Power Station** or **DC Converter Station** is **Embedded** must ensure are performed and discharged by the **GB Generator** or the **DC Converter Station** owner. **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** which are located **Offshore** and which are connected to an **Onshore GB Code Users System** will be required to meet the applicable requirements of the Grid Code as though they are an **Onshore GB Generator** or **Onshore DC Converter Station Owner** connected to an **Onshore User System Entry Point**.

CC.3.3.2 The **Network Operator** within whose **System** a **Licence Exempt Medium Power Station** is **Embedded** or a **DC Converter Station** not subject to a **Bilateral Agreement** is **Embedded** must ensure that the following obligations in the **CC** are performed and discharged by the **GB Generator** in respect of each such **Embedded Medium Power Station** or the **DC Converter Station** owner in the case of an **Embedded DC Converter Station**:

CC.5.1

CC.5.2.2

CC.5.3

CC.6.1.3

CC.6.1.5 (b)

CC.6.3.2, CC.6.3.3, CC.6.3.4, CC.6.3.6, CC.6.3.7, CC.6.3.8, CC.6.3.9, CC.6.3.10, CC.6.3.12, CC.6.3.13, CC.6.3.15, CC.6.3.16

CC.6.4.4

CC.6.5.6 (where required by CC.6.4.4)

In respect of CC.6.2.2.2, CC.6.2.2.3, CC.6.2.2.5, CC.6.1.5(a), CC.6.1.5(b) and CC.6.3.11 equivalent provisions as co-ordinated and agreed with the **Network Operator** and **GB Generator** or **DC Converter Station** owner may be required. Details of any such requirements will be notified to the **Network Operator** in accordance with CC.3.5.

CC.3.3.3 In the case of **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** the requirements in:

CC.6.1.6

CC.6.3.8

CC.6.3.12

CC.6.3.15

CC.6.3.16

that would otherwise have been specified in a **Bilateral Agreement** will be notified to the relevant **Network Operator** in writing in accordance with the provisions of the **CUSC** and the **Network Operator** must ensure such requirements are performed and discharged by the **GB Generator** or the **DC Converter Station** owner.

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CC.5 CONNECTION

CC.5.1 The provisions relating to connecting to the **National Electricity Transmission System** (or to a **User's System** in the case of a connection of an **Embedded Large Power Station** or **Embedded Medium Power Station** or **Embedded DC Converter Station**) are contained in:

- (a) the **CUSC** and/or **CUSC Contract** (or in the relevant application form or offer for a **CUSC Contract**);
- (b) or, in the case of an **Embedded Development**, the relevant **Distribution Code** and/or the **Embedded Development Agreement** for the connection (or in the relevant application form or offer for an **Embedded Development Agreement**),

and include provisions relating to both the submission of information and reports relating to compliance with the relevant **Connection Conditions** for that **GB Code User, Safety Rules**, commissioning programmes, **Operation Diagrams** and approval to connect (and their equivalents in the case of **Licence Exempt Embedded Medium Power Stations** or **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**). References in the **CC** to the "**Bilateral Agreement**" and/or "**Construction Agreement**" and/or "**Embedded Development Agreement**" shall be deemed to include references to the application form or offer therefor.

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- CC.6.3.7
- (a) Each **Generating Unit, DC Converter** or **Power Park Module** (excluding **Onshore Power Park Modules** in Scotland with a **Completion Date** before 1 July 2004 or **Onshore Power Park Modules** in a **Power Station** in Scotland with a **Registered Capacity** less than 50MW or **Offshore Power Park Modules** in a **Large Power Station** located **Offshore** with a **Registered Capacity** less than 50MW) must be fitted with a fast acting proportional **Frequency** control device (or turbine speed governor) and unit load controller or equivalent control device to provide **Frequency** response under normal operational conditions in accordance with **Balancing Code 3 (BC3)**. In the case of a **Power Park Module** the **Frequency** or speed control device(s) may be on the **Power Park Module** or on each individual **Power Park Unit** or be a combination of both. The **Frequency** control device(s) (or speed governor(s)) must be designed and operated to the appropriate:
    - (i) **European Specification**; or
    - (ii) in the absence of a relevant **European Specification**, such other standard which is in common use within the European Community (which may include a manufacturer specification);as at the time when the installation of which it forms part was designed or (in the case of modification or alteration to the **Frequency** control device (or turbine speed governor)) when the modification or alteration was designed.

The **European Specification** or other standard utilised in accordance with sub-paragraph CC.6.3.7 (a) (ii) will be notified to **The Company** by the **GB Generator** or **DC Converter Station** owner or, in the case of a **Licence Exempt Embedded Medium Power Station** or **Embedded DC Converter Station** not subject to a **Bilateral Agreement**, the relevant **Network Operator**:

    - (i) as part of the application for a **Bilateral Agreement**; or
    - (ii) as part of the application for a varied **Bilateral Agreement**; or
    - (iii) in the case of an **Embedded Development**, within 28 days of entry into the **Embedded Development Agreement** (or such later time as agreed with **The Company**); or
    - (iv) as soon as possible prior to any modification or alteration to the **Frequency** control device (or governor); and
  - (b) The **Frequency** control device (or speed governor) in co-ordination with other control devices must control the **Generating Unit, DC Converter** or **Power Park Module Active Power Output** with stability over the entire operating range of the **Generating Unit, DC Converter** or **Power Park Module**; and

- (c) The **Frequency** control device (or speed governor) must meet the following minimum requirements:
- (i) Where a **Generating Unit, DC Converter or Power Park Module** becomes isolated from the rest of the **Total System** but is still supplying **Customers**, the **Frequency** control device (or speed governor) must also be able to control **System Frequency** below 52Hz unless this causes the **Generating Unit, DC Converter or Power Park Module** to operate below its **Designed Minimum Operating Level** when it is possible that it may, as detailed in BC 3.7.3, trip after a time. For the avoidance of doubt, the **Generating Unit, DC Converter or Power Park Module** is only required to operate within the **System Frequency** range 47 - 52 Hz as defined in CC.6.1.3;
  - (ii) the **Frequency** control device (or speed governor) must be capable of being set so that it operates with an overall speed **Droop** of between 3% and 5%. For the avoidance of doubt, in the case of a **Power Park Module** the speed **Droop** should be equivalent of a fixed setting between 3% and 5% applied to each **Power Park Unit** in service;
  - (iii) in the case of all **Generating Units, DC Converter or Power Park Module** other than the **Steam Unit** within a **CCGT Module** the **Frequency** control device (or speed governor) deadband should be no greater than 0.03Hz (for the avoidance of doubt,  $\pm 0.015\text{Hz}$ ). In the case of the **Steam Unit** within a **CCGT Module**, the speed **Governor Deadband** should be set to an appropriate value consistent with the requirements of CC.6.3.7(c)(i) and the requirements of BC3.7.2 for the provision of **Limited High Frequency Response**;

For the avoidance of doubt, the minimum requirements in (ii) and (iii) for the provision of **System Ancillary Services** do not restrict the negotiation of **Commercial Ancillary Services** between **The Company** and the **GB Code User** using other parameters; and

- (d) A facility to modify, so as to fulfil the requirements of the **Balancing Codes**, the **Target Frequency** setting either continuously or in a maximum of 0.05 Hz steps over at least the range  $50 \pm 0.1$  Hz should be provided in the unit load controller or equivalent device.
- (e)
  - (i) Each **Onshore Generating Unit** and/or **CCGT Module** which has a **Completion Date** after 1 January 2001 in England and Wales, and after 1 April 2005 in Scotland, must be capable of meeting the minimum **Frequency** response requirement profile subject to and in accordance with the provisions of Appendix 3.
  - (ii) Each **DC Converter** at a **DC Converter Station** which has a **Completion Date** on or after 1 April 2005 and each **Offshore DC Converter** at a **Large Power Station** must be capable of meeting the minimum **Frequency** response requirement profile subject to and in accordance with the provisions of Appendix 3.
  - (iii) Each **Onshore Power Park Module** in operation in England and Wales with a **Completion Date** on or after 1 January 2006 must be capable of meeting the minimum **Frequency** response requirement profile subject to and in accordance with the provisions of Appendix 3.
  - (iv) Each **Onshore Power Park Module** in operation on or after 1 January 2006 in Scotland (with a **Completion Date** on or after 1 April 2005 and a **Registered Capacity** of 50MW or more) must be capable of meeting the minimum **Frequency** response requirement profile subject to and in accordance with the provisions of Appendix 3.
  - (v) Each **Offshore Generating Unit** in a **Large Power Station** must be capable of meeting the minimum **Frequency** response requirement profile subject to and in accordance with the provisions of Appendix 3.
  - (vi) Each **Offshore Power Park Module** in a **Large Power Station** with a **Registered Capacity** of 50 MW or greater, must be capable of meeting the minimum **Frequency** response requirement profile subject to and in accordance with the provisions of Appendix 3.
  - (vii) Subject to the requirements of CC.6.3.7(e), **Offshore Generating Units** at a **Large**

**Power Station, Offshore Power Park Modules** at a **Large Power Station** and **Offshore DC Converters** in a **Large Power Station** shall comply with the requirements of CC.6.3.7. **GB Generators** should be aware that Section K of the **STC** places requirements on **Offshore Transmission Licensees** which utilise a **Transmission DC Converter** as part of their **Offshore Transmission System** to make appropriate provisions to enable **GB Generators** to fulfil their obligations.

- (viii) Each **OTSDUW DC Converter** must be capable of providing a continuous signal indicating the real time frequency measured at the **Interface Point** to the **Offshore Grid Entry Point**.
- (f) For the avoidance of doubt, the requirements of Appendix 3 do not apply to:
- (i) **Generating Units** and/or **CCGT Modules** which have a **Completion Date** before 1 January 2001 in England and Wales, and before 1 April 2005 in Scotland, for whom the remaining requirements of this clause CC.6.3.7 shall continue to apply unchanged; or
  - (ii) **DC Converters** at a **DC Converter Station** which have a **Completion Date** before 1 April 2005; or
  - (iii) **Onshore Power Park Modules** in England and Wales with a **Completion Date** before 1 January 2006 for whom only the requirements of **Limited Frequency Sensitive Mode** (BC3.5.2) operation shall apply; or
  - (iv) **Onshore Power Park Modules** in operation in Scotland before 1 January 2006 for whom only the requirements of **Limited Frequency Sensitive Mode** (BC3.5.2) operation shall apply; or
  - (v) **Onshore Power Park Modules** in operation after 1 January 2006 in Scotland which have a **Completion Date** before 1 April 2005 for whom the remaining requirements of this clause CC.6.3.7 shall continue to apply unchanged; or
  - (vi) **Offshore Power Park Modules** which are in a **Large Power Station** with a **Registered Capacity** less than 50MW for whom only the requirements of **Limited Frequency Sensitive Mode** (BC3.5.2) operation shall apply; or

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CC.6.3.15.1 **Fault Ride through applicable to **Generating Units, Power Park Modules** and **DC Converters** and **OTSDUW Plant and Apparatus****

- (a) Short circuit faults on the **Onshore Transmission System** (which may include an **Interface Point**) at **Supergrid Voltage** up to 140ms in duration.
- (i) Each **Generating Unit, DC Converter, or Power Park Module** and any constituent **Power Park Unit** thereof and **OTSDUW Plant and Apparatus** shall remain transiently stable and connected to the **System** without tripping of any **Generating Unit, DC Converter or Power Park Module** and / or any constituent **Power Park Unit, OTSDUW Plant and Apparatus**, and for **Plant and Apparatus** installed on or after 1 December 2017, reactive compensation equipment, for a close-up solid three-phase short circuit fault or any unbalanced short circuit fault on the **Onshore Transmission System** (including in respect of **OTSDUW Plant and Apparatus, the Interface Point**) operating at **Supergrid Voltages** for a total fault clearance time of up to 140 ms. A solid three-phase or unbalanced earthed fault results in zero voltage on the faulted phase(s) at the point of fault. The duration of zero voltage is dependent on local **Protection** and circuit breaker operating times. This duration and the fault clearance times will be specified in the **Bilateral Agreement**. Following fault clearance, recovery of the **Supergrid Voltage** on the **Onshore Transmission System** to 90% may take longer than 140ms as illustrated in Appendix 4A Figures CC.A.4A.1 (a) and (b). It should be noted that in the case of an **Offshore Generating Unit, Offshore DC Converter or Offshore Power Park Module** (including any **Offshore Power Park Unit** thereof) which is connected to an **Offshore Transmission System** which includes a **Transmission DC Converter** as part of that **Offshore Transmission System, the Offshore Grid Entry Point**

voltage may not indicate the presence of a fault on the **Onshore Transmission System**. The fault will affect the level of **Active Power** that can be transferred to the **Onshore Transmission System** and therefore subject the **Offshore Generating Unit, Offshore DC Converter or Offshore Power Park Module** (including any **Offshore Power Park Unit** thereof) to a load rejection.

- (ii) Each **Generating Unit, Power Park Module and OTSDUW Plant and Apparatus**, shall be designed such that upon both clearance of the fault on the **Onshore Transmission System** as detailed in CC.6.3.15.1 (a) (i) and within 0.5 seconds of the restoration of the voltage at the **Onshore Grid Entry Point** (for **Onshore Generating Units or Onshore Power Park Modules**) or **Interface Point** (for **Offshore Generating Units, Offshore Power Park Modules or OTSDUW Plant and Apparatus**) to the minimum levels specified in CC.6.1.4 (or within 0.5 seconds of restoration of the voltage at the **User System Entry Point** to 90% of nominal or greater if **Embedded**), **Active Power** output or in the case of **OTSDUW Plant and Apparatus, Active Power** transfer capability, shall be restored to at least 90% of the level available immediately before the fault. Once the **Active Power** output, or in the case of **OTSDUW Plant and Apparatus, Active Power** transfer capability, has been restored to the required level, **Active Power** oscillations shall be acceptable provided that:

- the total **Active Energy** delivered during the period of the oscillations is at least that which would have been delivered if the **Active Power** was constant
- the oscillations are adequately damped

During the period of the fault as detailed in CC.6.3.15.1 (a) (i) for which the voltage at the **Grid Entry Point** (or **Interface Point** in the case of **OTSDUW Plant and Apparatus**) is outside the limits specified in CC.6.1.4, each **Generating Unit or Power Park Module or OTSDUW Plant and Apparatus** shall generate maximum reactive current without exceeding the transient rating limit of the **Generating Unit, OTSDUW Plant and Apparatus or Power Park Module** and / or any constituent **Power Park Unit** or reactive compensation equipment. For **Plant and Apparatus** installed on or after 1 December 2017, switched reactive compensation equipment (such as mechanically switched capacitors and reactors) shall be controlled such that it is not switched in or out of service during the fault but may act to assist in post fault voltage recovery.

- (iii) Each **DC Converter** shall be designed to meet the **Active Power** recovery characteristics (and **OTSDUW DC Converter** shall be designed to meet the **Active Power** transfer capability at the **Interface Point**) as specified in the **Bilateral Agreement** upon clearance of the fault on the **Onshore Transmission System** as detailed in CC.6.3.15.1 (a) (i).

- (b) **Supergrid Voltage** dips on the **Onshore Transmission System** greater than 140ms in duration
- (1b) Requirements applicable to **Synchronous Generating Units** subject to **Supergrid Voltage** dips on the **Onshore Transmission System** greater than 140ms in duration.

In addition to the requirements of CC.6.3.15.1 (a) each **Synchronous Generating Unit**, each with a **Completion Date** on or after **1 April 2005** shall:

- (i) remain transiently stable and connected to the **System** without tripping of any **Synchronous Generating Unit** for balanced **Supergrid Voltage** dips and associated durations on the **Onshore Transmission System** (which could be at the **Interface Point**) anywhere on or above the heavy black line shown in Figure 5a. Appendix 4A and Figures CC.A.4A.3.2 (a), (b) and (c) provide an explanation and illustrations of Figure 5a; and,

NOT TO SCALE

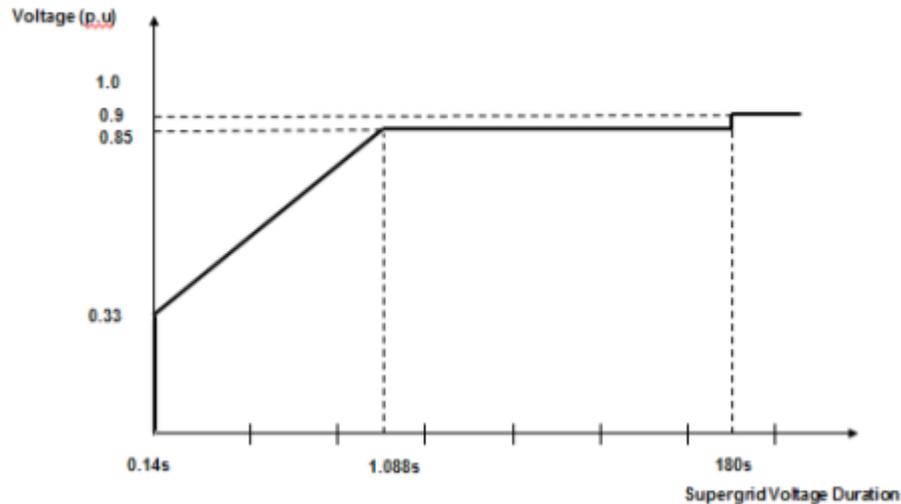


Figure 5a

- (ii) provide **Active Power** output at the **Grid Entry Point**, during **Supergrid Voltage** dips on the **Onshore Transmission System** as described in Figure 5a, at least in proportion to the retained balanced voltage at the **Onshore Grid Entry Point** (for **Onshore Synchronous Generating Units**) or **Interface Point** (for **Offshore Synchronous Generating Units**) (or the retained balanced voltage at the **User System Entry Point** if **Embedded**) and shall generate maximum reactive current (where the voltage at the **Grid Entry Point** is outside the limits specified in CC.6.1.4) without exceeding the transient rating limits of the **Synchronous Generating Unit** and,
- (iii) restore **Active Power** output following **Supergrid Voltage** dips on the **Onshore Transmission System** as described in Figure 5a, within 1 second of restoration of the voltage to 1.0p.u. of the nominal voltage at the:

**Onshore Grid Entry Point** for directly connected **Onshore Synchronous Generating Units** or,

**Interface Point** for **Offshore Synchronous Generating Units** or,

**User System Entry Point** for **Embedded Onshore Synchronous Generating Units** or,

**User System Entry Point** for **Licence Exempt Embedded Medium Power Stations** which comprise **Synchronous Generating Units** and with an **Onshore User System Entry Point** (irrespective of whether they are located **Onshore** or **Offshore**)

to at least 90% of the level available immediately before the occurrence of the dip. Once the **Active Power** output has been restored to the required level, **Active Power** oscillations shall be acceptable provided that:

- the total **Active Energy** delivered during the period of the oscillations is at least that which would have been delivered if the **Active Power** was constant
- the oscillations are adequately damped.

For the avoidance of doubt a balanced **Onshore Transmission System Supergrid Voltage** meets the requirements of CC.6.1.5 (b) and CC.6.1.6.

- (2b) Requirements applicable to **OTSDUW Plant and Apparatus** and **Power Park Modules** subject to **Supergrid Voltage** dips on the **Onshore Transmission System** greater than 140ms in duration

In addition to the requirements of CC.6.3.15.1 (a) each **OTSDUW Plant and Apparatus** or each **Power Park Module** and / or any constituent **Power Park Unit**, each with a **Completion Date** on or after the 1 April 2005 shall:

- (i) remain transiently stable and connected to the **System** without tripping of any **OTSDUW Plant and Apparatus**, or **Power Park Module** and / or any constituent **Power Park Unit**, for balanced **Supergrid Voltage** dips and associated durations on the **Onshore Transmission System** (which could be at the **Interface Point**) anywhere on or above the heavy black line shown in Figure 5b. Appendix 4A and Figures CC.A.4A.3.4 (a), (b) and (c) provide an explanation and illustrations of Figure 5b; and,

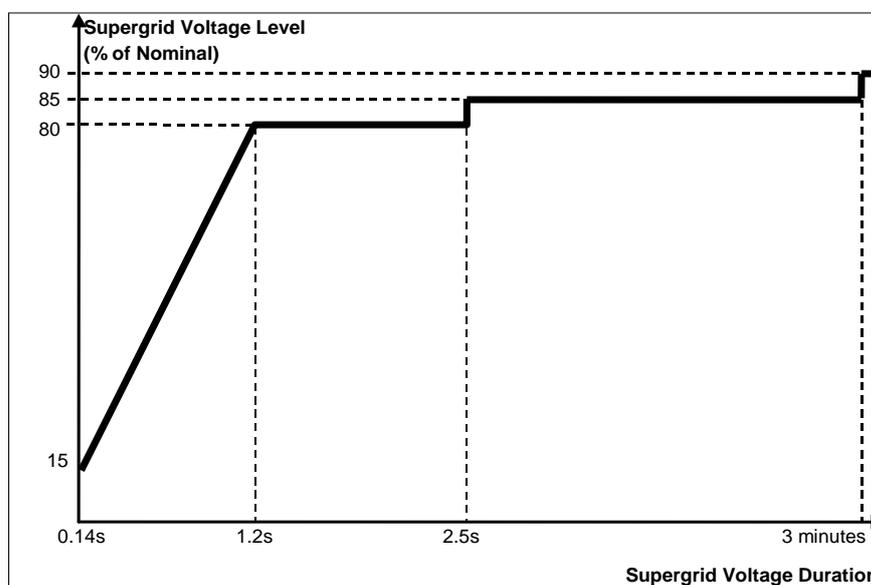


Figure 5b

- (ii) provide **Active Power** output at the **Grid Entry Point** or in the case of an **OTSDUW**, **Active Power** transfer capability at the **Transmission Interface Point**, during **Supergrid Voltage** dips on the **Onshore Transmission System** as described in Figure 5b, at least in proportion to the retained balanced voltage at the **Onshore Grid Entry Point** (for **Onshore Power Park Modules**) or **Interface Point** (for **OTSDUW Plant and Apparatus** and **Offshore Power Park Modules**) (or the retained balanced voltage at the **User System Entry Point** if **Embedded**) except in the case of a **Non-Synchronous Generating Unit** or **OTSDUW Plant and Apparatus** or **Power Park Module** where there has been a reduction in the **Intermittent Power Source** or in the case of **OTSDUW Active Power** transfer capability in the time range in Figure 5b that restricts the **Active Power** output or in the case of an **OTSDUW Active Power** transfer capability below this level and shall generate maximum reactive current (where the voltage at the **Grid Entry Point**, or in the case of an **OTSDUW Plant and Apparatus**, the **Interface Point** voltage, is outside the limits specified in CC.6.1.4) without exceeding the transient rating limits of the **OTSDUW Plant and Apparatus** or **Power Park Module** and any constituent **Power Park Unit**; and,
- (iii) restore **Active Power** output (or, in the case of **OTSDUW**, **Active Power** transfer capability), following **Supergrid Voltage** dips on the **Onshore Transmission System** as described in Figure 5b, within 1 second of restoration of the voltage at the:

**Onshore Grid Entry Point** for directly connected **Onshore Power Park Modules** or,

**Interface Point** for **OTSDUW Plant and Apparatus** and **Offshore Power Park Modules** or,

**User System Entry Point** for **Embedded Onshore Power Park Modules** or,

**User System Entry Point for Licence Exempt Embedded Medium Power Stations** which comprise **Power Park Modules** and with an **Onshore User System Entry Point** (irrespective of whether they are located **Onshore** or **Offshore**)

to the minimum levels specified in CC.6.1.4 to at least 90% of the level available immediately before the occurrence of the dip except in the case of a **Non-Synchronous Generating Unit, OTSDUW Plant and Apparatus** or **Power Park Module** where there has been a reduction in the **Intermittent Power Source** in the time range in Figure 5b that restricts the **Active Power** output or, in the case of **OTSDUW, Active Power** transfer capability below this level. Once the **Active Power** output or, in the case of **OTSDUW, Active Power** transfer capability has been restored to the required level, **Active Power** oscillations shall be acceptable provided that:

- the total **Active Energy** delivered during the period of the oscillations is at least that which would have been delivered if the **Active Power** was constant
- the oscillations are adequately damped.

For the avoidance of doubt a balanced **Onshore Transmission System Supergrid**

Operational Metering

CC.6.4.4 Where **The Company** can reasonably demonstrate that an **Embedded Medium Power Station** or **Embedded DC Converter Station** has a significant effect on the **National Electricity Transmission System**, it may require the **Network Operator** within whose **System** the **Embedded Medium Power Station** or **Embedded DC Converter Station** is situated to ensure that the operational metering equipment described in CC.6.5.6 is installed such that **The Company** can receive the data referred to in CC.6.5.6. In the case of an **Embedded Medium Power Station** subject to, or proposed to be subject to a **Bilateral Agreement**, **The Company** shall notify such **Network Operator** of the details of such installation in writing within 3 months of being notified of the application to connect under **CUSC** and in the case of a **Licence Exempt Embedded Medium Power Station** in writing as a **Site Specific Requirement** in accordance with the timescales in CUSC 6.5.5. In either case the **Network Operator** shall ensure that the data referred to in CC.6.5.6 is provided to **The Company**.

CC.6.4.5 Regional Development Programme Control System

CC.6.4.5.1 In order to ensure the operational standards detailed in the **SQSS** are met, and to protect the integrity of the **Network Operator's System**, each **Network Operator** shall install a **Regional Development Programme Control System** in accordance with the requirements of the **Bilateral Agreement** for specified **Grid Supply Point(s)** to ensure that **The Company** can control and has visibility of the actions and/or output of **Embedded Small Power Stations** which are not subject to, or proposed to be subject to a **Bilateral Agreement** and which have a **Registered Capacity** of 10MW or greater and less than 50MW. Each **Regional Development Programme Control System** shall monitor the flow of **Active Power** and **Reactive Power** at each selected **Grid Supply Point**. Instructions to adjust the output of **Embedded Small Power Stations** which are not subject to, or proposed to be subject to a **Bilateral Agreement** and which have a **Registered Capacity** of 10MW or greater and less than 50MW would be specified by **The Company** to the relevant **Network Operator**. The sitespecific requirements and technical requirements of the **Regional Development Programme Control System** in respect of each selected **Grid Supply Point** shall be agreed by **The Company** and the **Network Operator** and set out in the **Bilateral Agreement**.

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CC.A.3.4 Testing of Frequency Response Capability

The response capabilities shown diagrammatically in Figure CC.A.3.1 are measured by taking the responses as obtained from some of the dynamic response tests specified by **The Company** and carried out by **GB Generators** and **DC Converter Station** owners for compliance purposes and to validate the content of **Ancillary Services Agreements** using an injection of a **Frequency** change to the plant control system (i.e. governor and load controller). The injected signal is a linear ramp from zero to 0.5 Hz **Frequency** change over a ten second period, and is sustained at 0.5 Hz **Frequency** change thereafter, as illustrated diagrammatically in figures CC.A.3.2 and CC.A.3.3. In the case of **Licence Exempt Embedded Medium Power Stations** or **Embedded DC Converter Station** not subject to a **Bilateral Agreement**, **The Company** may require the **Network Operator** within whose **System** the **Licence Exempt Embedded Medium Power Station** or **Embedded DC Converter Station** is situated, to ensure that the **Embedded Person** performs the dynamic response tests reasonably required by **The Company** in order to demonstrate compliance within the relevant requirements in the **CC**.

The **Primary Response** capability (P) of a **Generating Unit** or a **CCGT Module** or **Power Park Module** or **DC Converter** is the minimum increase in **Active Power** output between 10 and 30 seconds after the start of the ramp injection as illustrated diagrammatically in Figure CC.A.3.2. This increase in **Active Power** output should be released increasingly with time over the period 0 to 10 seconds from the time of the start of the **Frequency** fall as illustrated by the response from Figure CC.A.3.2.

The **Secondary Response** capability (S) of a **Generating Unit** or a **CCGT Module** or **Power Park Module** or **DC Converter** is the minimum increase in **Active Power** output between 30 seconds and 30 minutes after the start of the ramp injection as illustrated diagrammatically in Figure CC.A.3.2.

The **High Frequency Response** capability (H) of a **Generating Unit** or a **CCGT Module** or **Power Park Module** or **DC Converter** is the decrease in **Active Power** output provided 10 seconds after the start of the ramp injection and sustained thereafter as illustrated diagrammatically in Figure CC.A.3.3. This reduction in **Active Power** output should be released increasingly with time over the period 0 to 10 seconds from the time of the start of the **Frequency** rise as illustrated by the response in Figure CC.A.3.2.

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***Extracts from the European Connection Conditions***

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ECC.1            INTRODUCTION

ECC.1.1        The **European Connection Conditions** ("**ECC**") specify both:

- (a) the minimum technical, design and operational criteria which must be complied with by:
  - (i) any **EU Code User** connected to or seeking connection with the **National Electricity Transmission System**, or
  - (ii) **EU Generators** or **HVDC System Owners** connected to or seeking connection to a **User's System** which is located in **Great Britain** or **Offshore**, or
  - (iii) **Network Operators** who are **EU Code Users**
  - (iv) **Network Operators** who are **GB Code Users** but only in respect of:-
    - (a) Their obligations in respect of **Licence Exempt Embedded Medium Power Stations** for whom the requirements of ECC.3.1(b)(iii) apply alone; and/or
    - (b) The requirements of this **ECC** only in relation to each **EU Grid Supply Point**. **Network Operators** in respect of all other **Grid Supply Points** should continue to satisfy the requirements as specified in the **CCs**.
  - (v) **Non-Embedded Customers** who are **EU Code Users**

- (b) the minimum technical, design and operational criteria with which **The Company** will comply in relation to the part of the **National Electricity Transmission System** at the **Connection Site** with **Users**. In the case of any **OTSDUW Plant and Apparatus**, the **ECC** also specify the minimum technical, design and operational criteria which must be complied with by the **User** when undertaking **OTSDUW**.
- (c) The requirements of **Retained EU Law** (Commission Regulation (EU) 2016/631) shall not apply to
  - (i) **Power Generating Modules** that are installed to provide backup power and operate in parallel with the **Total System** for less than 5 minutes per calendar month while the **System** is in normal state. Parallel operation during maintenance or commissioning of tests of that **Power Generating Module** shall not count towards that five minute limit.
  - (ii) **Power Generating Modules** connected to the **Transmission System** or **Network Operators System** which are not operated in synchronism with a **Synchronous Area**.
  - (iii) **Power Generating Modules** that do not have a permanent **Connection Point** or **User System Entry Point** and used by **The Company** to temporarily provide power when normal **System** capacity is partly or completely unavailable.
  - (iv) **Electricity Storage Modules**.
- (d) **Storage Users** are required to comply with the entirety of the **ECC** but are not subject to the requirements of **Retained EU Law** (Commission Regulation (EU) 2016/631, Commission Regulation (EU) 2016/1388 and Commission Regulation (EU) 2016/1485). The requirements of the **ECC** shall therefore be enforceable against **Storage Users** under the Grid Code only (and not under any of the aforementioned **Retained EU Law**) and any derogation sought by a **Storage User** in respect of the **ECC** shall be deemed a derogation from the Grid Code only (and not from the aforementioned **Retained EU Law**).

---

ECC.3            SCOPE

ECC.3.1        The **ECC** applies to **The Company** and to **Users**, which in the **ECC** means:

- (a) **EU Generators** (other than those which only have **Embedded Small Power Stations**), including those undertaking **OTSDUW** including **Power Generating Modules**, and **DC Connected Power Park Modules**. For the avoidance of doubt, **Electricity Storage Modules** are included within the definition of **Power Generating Modules** for which the requirements of the **ECC** would be equally applicable.
- (b) **Network Operators** but only in respect of:-
  - (i) **Network Operators** who are **EU Code Users**
  - (ii) **Network Operators** who only have **EU Grid Supply Points**
  - (iii) **Licence Exempt Embedded Medium Power Stations** as provided for in ECC.3.2, ECC.3.3, EC3.4, EC3.5, ECC5.1, ECC.6.4.4 and ECA.3.4 and in addition **Type II Licence Exempt Embedded Medium Power Stations** are also required to satisfy the requirements of ECC.6.5.1, ECC.6.5.2, ECC.6.5.4, ECC.6.5.5, ECC.6.5.7, ECC.6.5.8 and ECC7.9. ;
  - (iv) Notwithstanding the requirements of ECC3.1(b)(i)(ii) and (iii) , **Network Operators** who own and/or operate **EU Grid Supply Points**, are only required

to satisfy the requirements of this **ECC** in relation to each **EU Grid Supply Point. Network Operators** in respect of all other **Grid Supply Points** should continue to satisfy the requirements as specified in the **CCs**.

- (c) **Non-Embedded Customers** who are also **EU Code Users** ;
- (d) **HVDC System Owners** who are also **EU Code Users**; and
- (e) **BM Participants** and **Externally Interconnected System Operators** who are also **EU Code Users** in respect of ECC.6.5 only.

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ECC.3.3 **Licence Exempt Embedded Medium Power Stations** and **Embedded HVDC Systems** not subject to a **Bilateral Agreement** Provisions.

The following provisions apply in respect of **Licence Exempt Embedded Medium Power Stations** and **Embedded HVDC Systems** not subject to a **Bilateral Agreement**.

ECC.3.3.1 The obligations within the **ECC** that are expressed to be applicable to **EU Generators** in respect of **Licence Exempt Embedded Medium Power Stations** **HVDC System Owners** in respect of **Embedded HVDC Systems** not subject to a **Bilateral Agreement** (where the obligations are in each case listed in ECC.3.3.2) shall be read and construed as obligations that the **Network Operator** within whose **System** any such **Medium Power Station** or **HVDC System** is **Embedded** must ensure are performed and discharged by the **EU Generator** or the **HVDC Owner**. **Licence Exempt Embedded Medium Power Stations** and **Embedded HVDC Systems** not subject to a **Bilateral Agreement** which are located **Offshore** and which are connected to an **Onshore User System** will be required to meet the applicable requirements of the Grid Code as though they are an **Onshore Generator** or **Onshore HVDC System Owner** connected to an **Onshore User System Entry Point**.

ECC.3.3.2 The **Network Operator** within whose **System** a **Licence Exempt Embedded Medium Power Station** or a **HVDC System** not subject to a **Bilateral Agreement** is **Embedded** must ensure that the following obligations in the **ECC** are performed and discharged by the **EU Generator** in respect of each such **Embedded Medium Power Station** or the **HVDC System Owner** in the case of an **Embedded HVDC System**:

ECC.5.1

ECC.5.2.2

ECC.5.3

ECC.6.1.2

ECC.6.1.5 (b)

ECC.6.3.2, ECC.6.3.3, ECC.6.3.4, ECC.6.3.6, ECC.6.3.7, ECC.6.3.8, ECC.6.3.9, ECC.6.3.10, ECC.6.3.12, ECC.6.3.13, ECC.6.3.15, ECC.6.3.16, ECC.6.3.17

ECC.6.4.4

ECC.6.5.6 (where required by ECC.6.4.4)

In respect of ECC.6.2.2.2, ECC.6.2.2.3, ECC.6.2.2.5, ECC.6.1.5(a), ECC.6.1.5(b) and ECC.6.3.11 equivalent provisions as co-ordinated and agreed with the **Network Operator** and **EU Generator** or **HVDC System Owner** may be required. Details of any such requirements will be notified to the **Network Operator** in accordance with ECC.3.5.

ECC.3.3.3 In the case of **Licence Exempt Embedded Medium Power Stations** and **Embedded HVDC Systems** not subject to a **Bilateral Agreement** the requirements in:

ECC.6.1.6

ECC.6.3.8

ECC.6.3.12

ECC.6.3.15

ECC.6.3.16

ECC.6.3.17

that would otherwise have been specified in a **Bilateral Agreement** will be notified to the relevant **Network Operator** in writing in accordance with the provisions of the **CUSC** and the **Network Operator** must ensure such requirements are performed and discharged by the **Generator** or the **HVDC System** owner.

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ECC.5            CONNECTION

ECC.5.1        The provisions relating to connecting to the **National Electricity Transmission System** (or to a **User's System** in the case of a connection of an **Embedded Large Power Station** or **Embedded Medium Power Stations** or **Embedded HVDC System**) are contained in:

- (a) the **CUSC** and/or **CUSC Contract** (or in the relevant application form or offer for a **CUSC Contract**);
- (b) or, in the case of an **Embedded Development**, the relevant **Distribution Code** and/or the **Embedded Development Agreement** for the connection (or in the relevant application form or offer for an **Embedded Development Agreement**),

and include provisions relating to both the submission of information and reports relating to compliance with the relevant **European Connection Conditions** for that **EU Code User**, **Safety Rules**, commissioning programmes, **Operation Diagrams** and approval to connect (and their equivalents in the case of **Licence Exempt Embedded Medium Power Stations** or **Embedded HVDC Systems** not subject to a **Bilateral Agreement**). References in the **ECC** to the "**Bilateral Agreement**" and/or "**Construction Agreement**" and/or "**Embedded Development Agreement**" shall be deemed to include references to the application form or offer therefor.

---

ECC.6.3.15.9.2.1    The **Fault Ride Through** requirements for **Type C** and **Type D Synchronous Power Generating Modules** subject to faults and voltage disturbances on the Onshore Transmission System in excess of 140ms are defined in ECC.6.3.15.9.2.1(a) and the **Fault Ride Through Requirements** for **Type C** and **Type D Power Park Modules** and **OTSDUW Plant and Apparatus** subject to faults and voltage disturbances on the Onshore Transmission System greater than 140ms in duration are defined in ECC.6.3.15.9.2.1(b).

- (a) Requirements applicable to **Synchronous Power Generating Modules** subject to **Supergrid Voltage** dips on the **Onshore Transmission System** greater than 140ms in duration.

In addition to the requirements of ECC.6.3.15.1 – ECC.6.3.15.8 each **Synchronous Power Generating Module** shall:

- (i) remain transiently stable and connected to the **System** without tripping of any **Synchronous Power Generating Module** for balanced **Supergrid Voltage** dips and associated durations on the **Onshore Transmission System** (which could be at the **Interface Point**) anywhere on or above the heavy black line shown in Figure ECC.6.3.15.9(a) Appendix 4 and Figures EA.4.3.2(a), (b) and (c) provide an explanation and illustrations of Figure ECC.6.3.15.9(a); and,

NOT TO SCALE

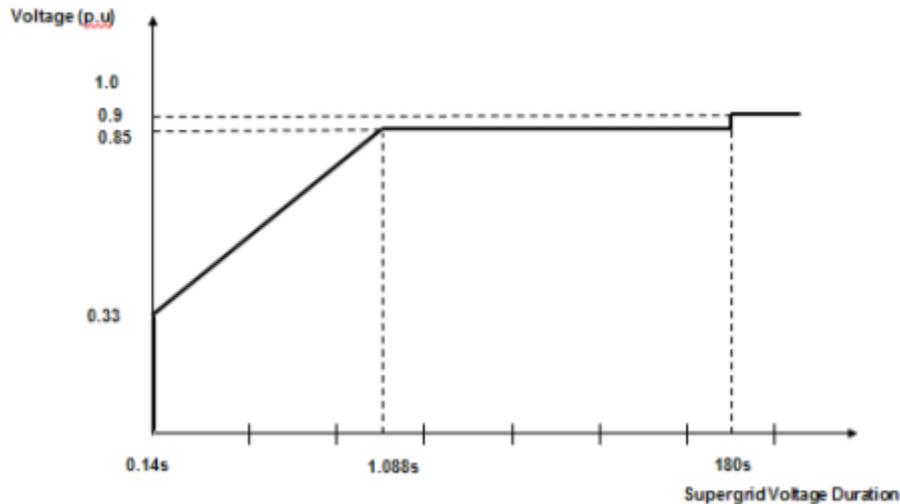


Figure ECC.6.3.15.9(a)

- (ii) provide **Active Power** output at the **Grid Entry Point**, during **Supergrid Voltage** dips on the **Onshore Transmission System** as described in Figure ECC.6.3.15.9(a), at least in proportion to the retained balanced voltage at the **Onshore Grid Entry Point** (for **Onshore Synchronous Power Generating Modules**) or **Interface Point** (for **Offshore Synchronous Power Generating Modules**) (or the retained balanced voltage at the **User System Entry Point** if **Embedded**) and shall generate maximum reactive current (where the voltage at the **Grid Entry Point** is outside the limits specified in ECC.6.1.4) without exceeding the transient rating limits of the **Synchronous Power Generating Module** and,
- (iii) restore **Active Power** output following **Supergrid Voltage** dips on the **Onshore Transmission System** as described in Figure ECC.6.3.15.9(a), within 1 second of restoration of the voltage to 1.0pu of the nominal voltage at the:

**Onshore Grid Entry Point** for directly connected **Onshore Synchronous Power Generating Modules** or,

**Interface Point** for **Offshore Synchronous Power Generating Modules**

or,

**User System Entry Point** for **Embedded Onshore Synchronous Power Generating Modules**

or,

**User System Entry Point** for **Licence Exempt Embedded Medium Power Stations** which comprise **Synchronous Generating Units** and with an **Onshore User System Entry Point** (irrespective of whether they are located **Onshore** or **Offshore**)

to at least 90% of the level available immediately before the occurrence of the dip. Once the **Active Power** output has been restored to the required level, **Active Power** oscillations shall be acceptable provided that:

- the total **Active Energy** delivered during the period of the oscillations is at least that which would have been delivered if the **Active Power** was constant
- the oscillations are adequately damped.

For the avoidance of doubt a balanced **Onshore Transmission System Supergrid Voltage** meets the requirements of ECC.6.1.5 (b) and ECC.6.1.6.

- (b) Requirements applicable to **Type C** and **Type D Power Park Modules** and **OTSDUW Plant and Apparatus** (excluding **OTSDUW DC Converters**) subject to **Supergrid Voltage** dips on the **Onshore Transmission System** greater than 140ms in duration.

In addition to the requirements of ECC.6.3.15.5, ECC.6.3.15.6 and ECC.6.3.15.8 (as applicable) each **OTSDUW Plant and Apparatus** or each **Power Park Module** and / or any constituent **Power Park Unit**, shall:

- (i) remain transiently stable and connected to the **System** without tripping of any **OTSDUW Plant and Apparatus**, or **Power Park Module** and / or any constituent **Power Park Unit**, for balanced **Supergrid Voltage** dips and associated durations on the **Onshore Transmission System** (which could be at the **Interface Point**) anywhere on or above the heavy black line shown in Figure ECC.6.3.15.9(b). Appendix 4 and Figures EA.4.3.4 (a), (b) and (c) provide an explanation and illustrations of Figure ECC.6.3.15.9(b) ; and,

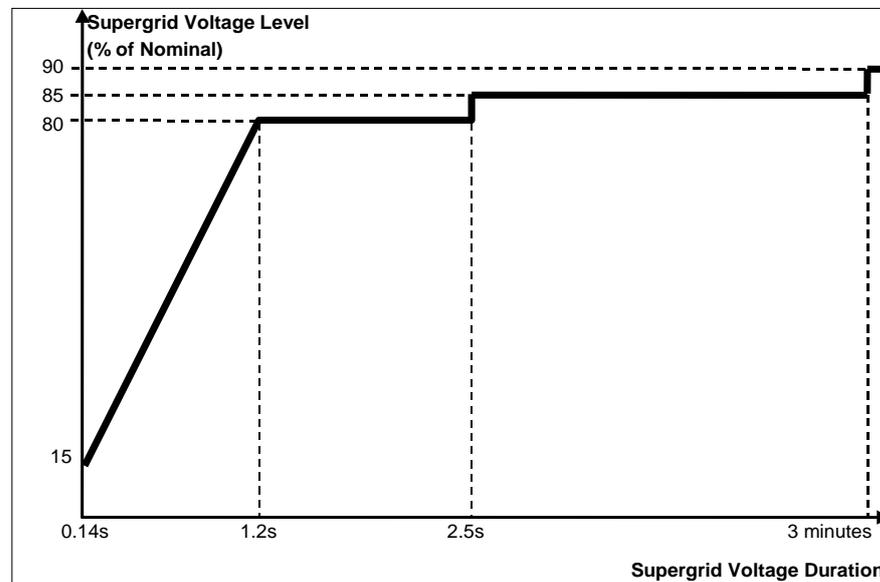


Figure ECC.6.3.15.9(b)

- (ii) be required to satisfy the requirements of ECC.6.3.16. In the case of a **Non-Synchronous Generating Unit** or **OTSDUW Plant and Apparatus** or **Power Park Module** where there has been a reduction in the **Intermittent Power Source** or in the case of **OTSDUW Active Power** transfer capability in the time range in Figure ECC.6.3.15.9(b) an allowance shall be made for the fall in input power and the corresponding reduction of real and reactive current.
- (iii) restore **Active Power** output (or, in the case of **OTSDUW**, **Active Power** transfer capability), following **Supergrid Voltage** dips on the **Onshore Transmission System** as described in Figure ECC.6.3.15.9(b), within 1 second of restoration of the voltage to 0.9 pu of the nominal voltage at the:

**Onshore Grid Entry Point** for directly connected **Onshore Power Park Modules** or,

**Interface Point** for **OTSDUW Plant and Apparatus** and **Offshore Power Park Modules** or,

**User System Entry Point** for **Embedded Onshore Power Park Modules** or ,

**User System Entry Point** for **Licence Exempt Embedded Medium Power Stations** which comprise **Power Park Modules** and with an **Onshore User System Entry Point** (irrespective of whether they are located **Onshore** or **Offshore**)

to at least 90% of the level available immediately before the occurrence of the dip except in the case of a **Non-Synchronous Generating Unit**, **OTSDUW Plant and Apparatus** or **Power Park Module** where there has been a reduction in the **Intermittent Power Source** in the time range in Figure ECC.6.3.15.9(b) that restricts the **Active Power** output or, in the case of **OTSDUW**, **Active Power** transfer capability below this level. Once the **Active Power** output or, in the case of **OTSDUW**, **Active Power** transfer capability has been restored to the required level,

**Active Power** oscillations shall be acceptable provided that:

- the total **Active Energy** delivered during the period of the oscillations is at least that which would have been delivered if the **Active Power** was constant
- the oscillations are adequately damped.

For the avoidance of doubt a balanced **Onshore Transmission System Supergrid Voltage** meets the requirements of ECC.6.1.5 (b) and ECC.6.1.6.

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#### Operational Metering

ECC.6.4.4 Where **The Company** can reasonably demonstrate that a **Licence Exempt Embedded Medium Power Station** or **Embedded HVDC System** has a significant effect on the **National Electricity Transmission System**, it may require the **Network Operator** within whose **System** the **Licence Exempt Embedded Medium Power Station** or **Embedded HVDC System** is situated to ensure that the operational metering equipment described in ECC.6.5.6 is installed such that **The Company** can receive the data referred to in ECC.6.5.6. In the case of an **Embedded Medium Power Station** not subject to, or proposed to be subject to a **Bilateral Agreement**, **The Company** shall notify such **Network Operator** of the details of such installation in writing within 3 months of being notified of the application to connect under **CUSC** and in the case of an **Licence Exempt Embedded Medium Power Station** in writing as a **Site Specific Requirement** in accordance with the timescales in CUSC 6.5.5. In either case the **Network Operator** shall ensure that the data referred to in ECC.6.5.6 is provided to **The Company**.

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ECC.6.4.6 Regional Development Programme Control System

ECC.6.4.6.1 In order to ensure the operational standards detailed in the **SQSS** are met, and to protect the integrity of the **Network Operator's System**, each **Network Operator** shall install a **Regional Development Programme Control System** in accordance with the requirements of the **Bilateral Agreement** for specified **Grid Supply Point(s)** to ensure that **The Company** can control and has visibility of the actions and/or output of **Embedded Small Power Stations** which are not subject to, or proposed to be subject to a **Bilateral Agreement** and which have a **Registered Capacity** of 10MW or greater and less than 50MW. Each **Regional Development Programme Control System** shall monitor the flow of **Active Power** and **Reactive Power** at each selected **Grid Supply Point**. Instructions to adjust the output of **Embedded Small Power Stations** which are not subject to, or proposed to be subject to a **Bilateral Agreement** and which have a **Registered Capacity** of 10MW or greater and less than 50MW would be specified by **The Company** to the relevant **Network Operator**. The sitespecific requirements and technical requirements of the **Regional Development Programme Control System** in respect of each selected **Grid Supply Point** shall be agreed by **The Company** and the **Network Operator** and set out in the **Bilateral Agreement**.

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#### Electronic Data Communication Facilities

ECC.6.5.8 (a) All **BM Participants** must ensure that appropriate electronic data communication facilities are in place to permit the submission of data, as required by the **Grid Code**, to **The Company**.

(b) In addition,

(1) any **User** that wishes to participate in the **Balancing Mechanism**;

or

(2) any **BM Participant** in respect of its **BM Units** at a **Power Station** and the **BM Participant** is required to provide all **Part 1 System Ancillary Services** in accordance with ECC.8.1 (unless **The Company** has otherwise agreed);

or

- (3) any **Generator** in respect of a **Type II Licence Exempt Embedded Medium Power Station** and **Network Operator** in respect of **Type II Licence Exempt Embedded Medium Power Stations**

must ensure that appropriate automatic logging devices are installed at the **Control Points** of its **BM Units** to submit data to and to receive instructions from **The Company**, as required by the **Grid Code**. For the avoidance of doubt, in the case of an **Interconnector User** the **Control Point** will be at the **Control Centre** of the appropriate **Externally Interconnected System Operator**. In the case of **Type II Licence Exempt Embedded Medium Power Stations**, instructions will be issued by **The Company** to the relevant **Network Operator**. The relevant **Network Operator** will then issue that instruction to the relevant **Type II Licence Exempt Embedded Medium Power Station** and acknowledge completion of any instructions by the **Type II Licence Exempt Embedded Medium Power Station** back to **The Company**.

- (c) Detailed specifications of these required electronic facilities will be provided by **The Company** on request and they are listed as **Electrical Standards** in the Annex to the **General Conditions**.

#### Facsimile Machines

ECC.6.5.9 Each **User** and **The Company** shall provide a facsimile machine or machines:

- (a) in the case of **Generators** (including those in respect of **Type II Licence Exempt Embedded Medium Power Stations**), at the **Control Point** of each **Power Station** and at its **Trading Point**;
- (b) in the case of **The Company** and **Network Operators**, at the **Control Centre(s)**; and
- (c) in the case of **Non-Embedded Customers** and **HVDC Equipment** owners at the **Control Point**.

Each **User** shall notify, prior to connection to the **System** of the **User's Plant and Apparatus**, **The Company** of its or their telephone number or numbers, and will notify **The Company** of any changes. Prior to connection to the **System** of the **User's Plant and Apparatus** **The Company** shall notify each **User** of the telephone number or numbers of its facsimile machine or machines and will notify any changes.

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ECC.7.9 **Generators, HVDC System** owners and **BM Participants** shall provide a **Control Point**.

- a) In the case of **EU Generators** and **HVDC System** owners, for each **Power Station** or **HVDC System** directly connected to the **National Electricity Transmission System** and for each **Embedded Large Power Station** or **Embedded HVDC System** or **Type II Licence Exempt Embedded Medium Power Station**, appointed personnel at the **Control Point** shall receive and act upon instructions pursuant to OC7 and BC2 at all times that **Power Generating Modules** at the **Power Station** are generating or available to generate or **HVDC Systems** are importing or exporting or available to do so. In the case of all **BM Participants**, the **Control Point** shall be continuously staffed except where the **Bilateral Agreement** specifies that compliance with BC2 is not required, in which case the **Control Point** shall be staffed between the hours of 0800 and 1800 each day. In the case of **Type II Licence Exempt Embedded Medium Power Stations** instructions will be issued from **The Company** to the **Network Operator** and from the **Network Operator** to the **Type II Licence Exempt Embedded Medium Power Station** unless there is a need for commercially sensitive data or instructions to be provided.
- b) In the case of **BM Participants**, the **BM Participant's Control Point** shall be capable of receiving and acting upon instructions from **The Company** or in the case of **Type II Licence Exempt Embedded Medium Power Stations**, **BM Participants** shall be capable of receiving and acting upon instructions from the relevant **Network Operator** which have originally been issued by **The Company**.

Notwithstanding the requirements of ECC.7.9(a) **The Company** will normally issue instructions via automatic logging devices in accordance with the requirements of ECC.6.5.8(b).

Where the **BM Participant's Plant and Apparatus** does not respond to an instruction from **The Company** via automatic logging devices, or where it is not possible for **The Company** to issue the instruction via automatic logging devices, **The Company** shall issue the instruction by telephone.

In the case of **BM Participants** who own and/or operate a **Power Station** or **HVDC System** with an aggregated **Registered Capacity** or **BM Participants** with **BM Units** with an aggregated **Demand Capacity** per **Control Point** of less than 50MW, or, where a site is not part of a Virtual Lead Party as defined in the **BSC**, a **Registered Capacity** or **Demand Capacity** per site of less than 10MW

- a) where this situation arises, a representative of the **BM Participant** is required to be available to respond to instructions from **The Company** via the **Control Telephony** or **System Telephony** system, as provided for in ECC.6.5.4, between the hours of 0800-1800 each day.
- b) Outside the hours of 0800-1800 each day, the requirements of BC2.9.7 shall apply.

For the avoidance of doubt, **BM Participants** who are unable to provide **Control Telephony** and do not have a continuously staffed **Control Point** may be unable to act as a **Defence Service Provider** and shall be unable to act as a **Restoration Service Provider** or **Black Start Service Provider** where these require **Control Telephony** or a **Control Point** in respect of the specification of any such services falling into these categories.

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#### ECC.A.3.4 Testing of Frequency Response Capability

The frequency response capabilities shown diagrammatically in Figure ECC.A.3.1 are measured by taking the responses as obtained from some of the dynamic step response tests specified by **The Company** and carried out by **Generators** and **HVDC System** owners for compliance purposes. The injected signal is a step of 0.5Hz from zero to 0.5 Hz **Frequency** change, and is sustained at 0.5 Hz **Frequency** change thereafter, the latter as illustrated diagrammatically in figures ECC.A.3.4 and ECC.A.3.5.

In addition to provide and/or to validate the content of **Ancillary Services Agreements** a progressive injection of a **Frequency** change to the plant control system (i.e. governor and load controller) is used. The injected signal is a ramp of 0.5Hz from zero to 0.5 Hz **Frequency** change over a ten second period, and is sustained at 0.5 Hz **Frequency** change thereafter, the latter as illustrated diagrammatically in figures ECC.A.3.2 and ECC.A.3.3. In the case of a **Licence Exempt Embedded Medium Power Station** or **Embedded HVDC System** not subject to a **Bilateral Agreement**, **The Company** may require the **Network Operator** within whose **System** the **Licence Exempt Embedded Medium Power Station** or **Embedded HVDC System** is situated, to ensure that the **Embedded Person** performs the dynamic response tests reasonably required by **The Company** in order to demonstrate compliance within the relevant requirements in the **ECC**.

The **Primary Response** capability (P) of a **Power Generating Module** or a **CCGT Module** or **Power Park Module** or **HVDC Equipment** is the minimum increase in **Active Power** output between 10 and 30 seconds after the start of the ramp injection as illustrated diagrammatically in Figure ECC.A.3.2. This increase in **Active Power** output should be released increasingly with time over the period 0 to 10 seconds from the time of the start of the **Frequency** fall as illustrated by the response from Figure ECC.A.3.2.

The **Secondary Response** capability (S) of a **Power Generating Module** or a **CCGT Module** or **Power Park Module** or **HVDC Equipment** is the minimum increase in **Active Power** output between 30 seconds and 30 minutes after the start of the ramp injection as illustrated diagrammatically in Figure ECC.A.3.2.

The **High Frequency Response** capability (H) of a **Power Generating Module** or a **CCGT Module** or **Power Park Module** or **HVDC Equipment** is the decrease in **Active Power** output provided 10 seconds after the start of the ramp injection and sustained thereafter as illustrated diagrammatically in Figure ECC.A.3.3. This reduction in **Active Power** output should be released increasingly with time over the period 0 to 10 seconds from the time of the start of the **Frequency** rise as illustrated by the response in Figure ECC.A.3.2.

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*Extracts from the Compliance Processes*

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CP.3 SCOPE

CP.3.1 The **CP** applies to **The Company** and to **GB Code Users**, which in the **CP** means:

- (a) **GB Generators** (other than in relation to **Embedded Small Power Stations** or **Licence Exempt Embedded Medium Power Stations**) including those undertaking **OTSDUW**.
  - (b) **Network Operators**;
  - (c) **Non-Embedded Customers**;
  - (d) **DC Converter Station** owners (other than those which only have **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**).
- 

CP.4.3 **Licence Exempt Embedded Medium Power Stations and Embedded DC Converter Stations not subject to a Bilateral Agreement**

CP.4.3.1 For the avoidance of doubt, the process in this **CP** does not apply to **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**.

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CP.6.6 When the requirements of CP.6.2 to CP.6.5 have been met, **The Company** will notify the **Generator** or **DC Converter Station** owner that the:

**Generating Unit,**  
**CCGT Module,**  
**Power Park Module,**  
Dynamically controlled **OTSUA** or  
**DC Converter,**

as applicable may (subject to the **Generator** or **DC Converter Station** owner having fulfilled the requirements of CP.6.3 where that applies) be **Synchronised** to the **Total System** through the issue of an **Interim Operational Notification**. Where the **Generator** is undertaking **OTSDUW**, then the **Interim Operational Notification** will be in two parts, with the “**Interim Operational Notification Part A**” applicable to the **OTSUA** and the “**Interim Operational Notification Part B**” applicable to the **GB Code Users Plant and Apparatus**. For the avoidance of doubt, the **Interim Operational Notification Part A** and the **Interim Operational Notification Part B** can be issued together or at different times. In respect of an **Embedded Power Station** or **Embedded DC Converter Station** (other than **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**), **The Company** will notify the **Network Operator** that an **Interim Operational Notification** has been issued.

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CP.7.4 If the requirements of CP.7.2 and CP.7.3 have been successfully met, **The Company** will notify the **Generator** or **DC Converter Station** owner that compliance with the relevant Grid Code provisions has been demonstrated for the **Generating Unit(s)**, **CCGT Module(s)**, **Power Park Module(s)**, **OTSUA**, if applicable or **DC Converter(s)** as applicable through the issue of a **Final Operational Notification**. In respect of an **Embedded Power Station** or **Embedded DC Converter Station** other than **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**, **The Company** will notify the **Network Operator** that a **Final Operational Notification** has been issued.

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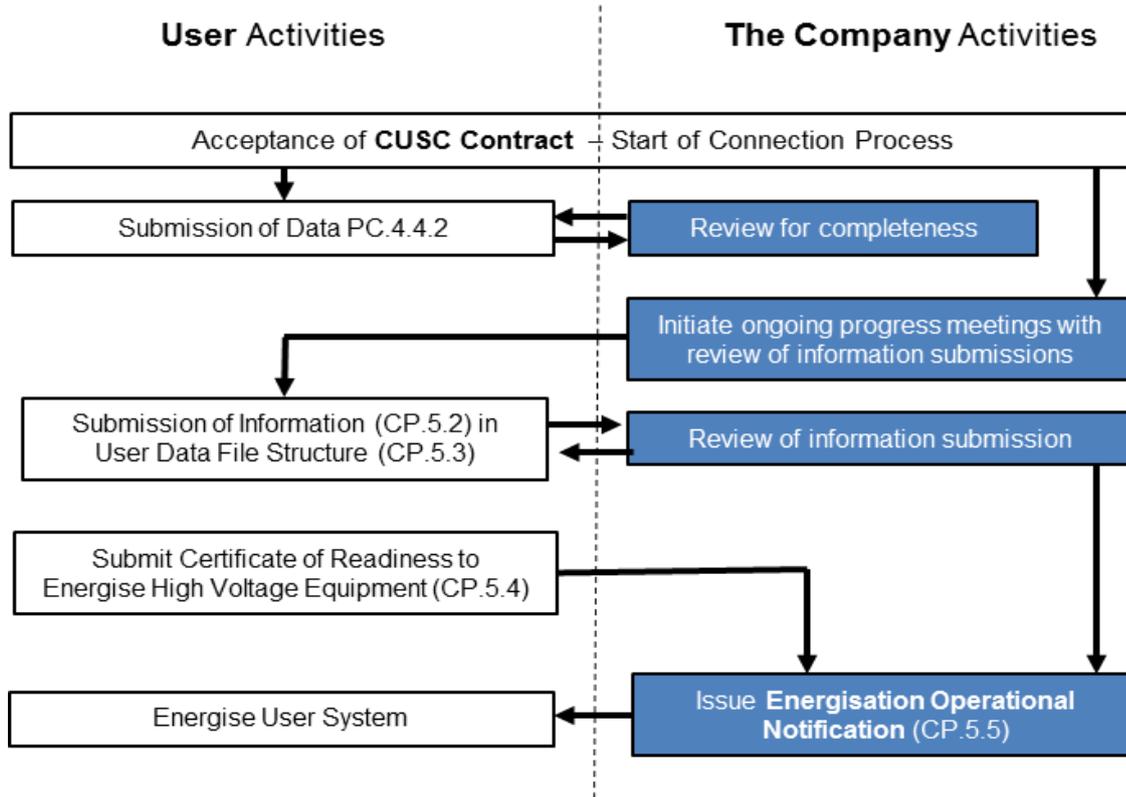
CP.8 **LIMITED OPERATIONAL NOTIFICATION**

CP.8.1 Following the issue of a **Final Operational Notification** if:

- (i) the **Generator** or **DC Converter Station** owner becomes aware, that the capability of its **Plant** and/or **Apparatus**' (including **OTSUA** if applicable) to meet any provisions of the Grid Code, or where applicable the **Bilateral Agreement** is not fully available, then the **Generator** or **DC Converter Station** owner shall follow the process in CP.8.2 to CP.8.11; or,
  - (ii) a **Network Operator** becomes aware, that the capability of **Plant** and/or **Apparatus**' belonging to an **Embedded Power Station** or **Embedded DC Converter Station** (other than **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**) is failing to meet any provisions of the Grid Code, or where applicable the **Bilateral Agreement**, then the **Network Operator** shall inform **The Company** and **The Company** shall inform the **Generator** or **DC Converter Station** owner to then follow the process in CP.8.2 to CP.8.11; or,
  - (iii) **The Company** becomes aware through monitoring as described in OC5.4, that a **Generator** or **DC Converter Station** owner **Plant** and/or **Apparatus**' (including **OTSUA** if applicable) capability to meet any provisions of the Grid Code, or where applicable the **Bilateral Agreement** is not fully available, then **The Company** shall inform the other party. Where **The Company** and the **Generator** or **DC Converter Station** owner cannot agree from the monitoring as described in OC5.4 whether the **Plant and/or Apparatus** (including **OTSUA** if applicable) is fully available and/or is compliant with the requirements of the Grid Code and where applicable the **Bilateral Agreement**, the parties shall first apply the process in OC5.5.1, before applying the process defined in CP.8 (**LON**) if applicable. Where the testing instructed in accordance with OC.5.5.1 indicates that the **Plant** and/or **Apparatus** (including **OTSUA** if applicable) is not fully available and/or is not compliant with the requirements of the Grid Code and/or the **Bilateral Agreement**, or if the parties so agree, the process in CP.8.2 to CP.8.11 shall be followed.
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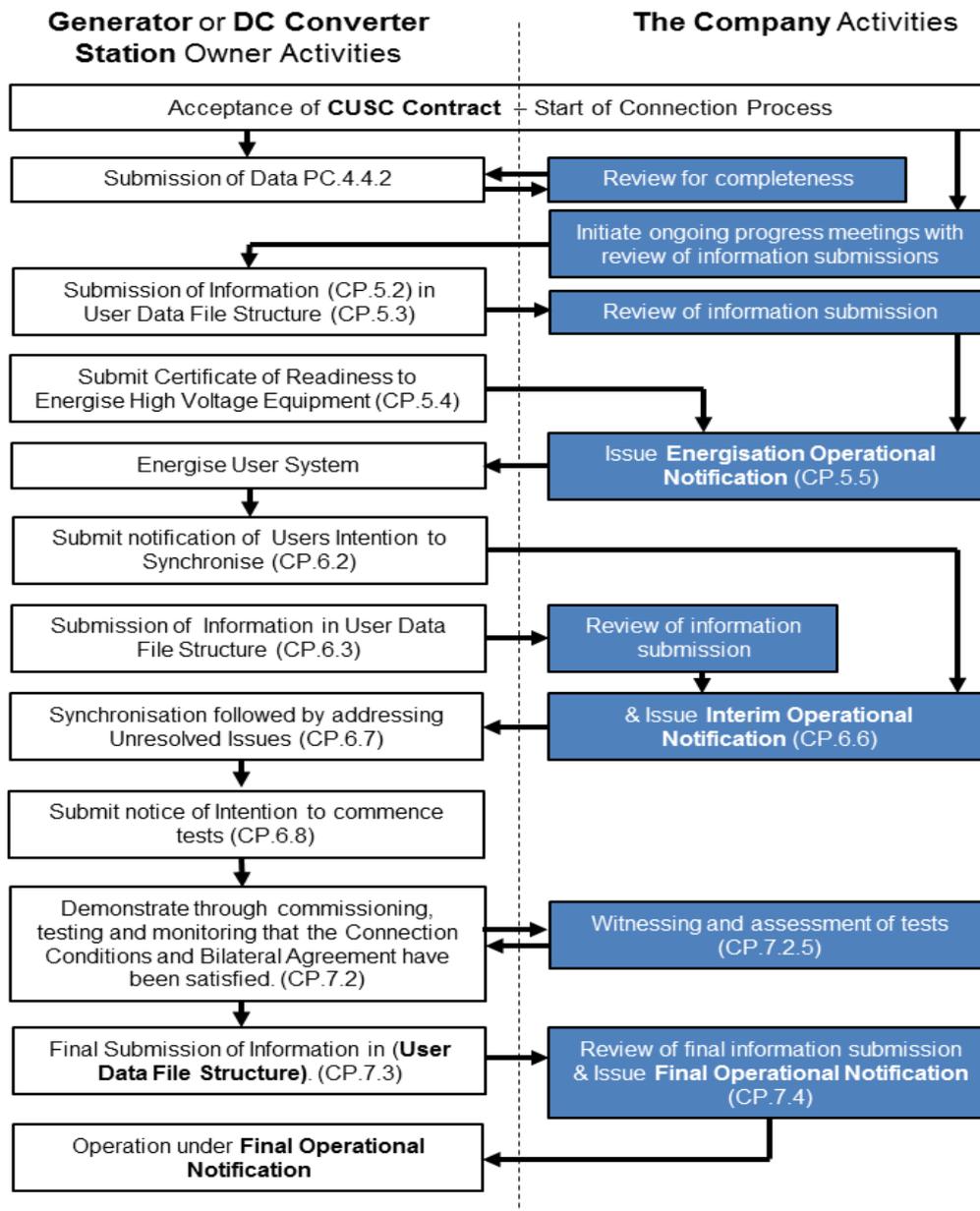
# APPENDIX 1 - ILLUSTRATIVE PROCESS DIAGRAMS

## CP.A.1.1 Illustrative Compliance Process for Energisation of a User



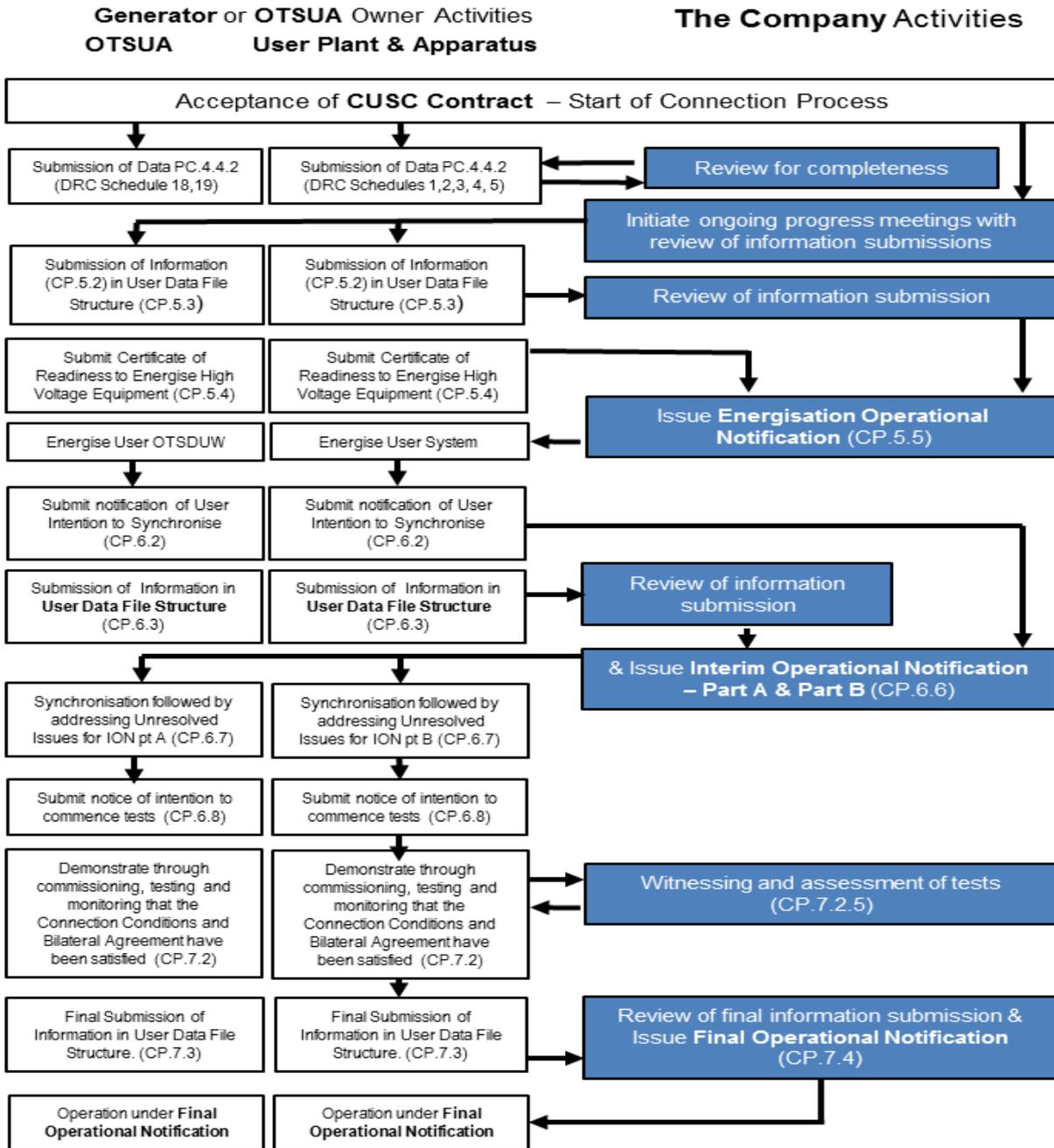
The process illustrated in CP.A.1.1 applies to all **GB Code Users** energising passive network **Plant and Apparatus** including **Distribution Network Operators, Non-Embedded Customers, Generators** and **DC Converter Station** owners. This process is a subset of the full process for **Generators** and **DC Converter Station** owners shown in CP.A.1.2. This diagram illustrates the process in the **CP** and includes references in brackets to specific Grid Code clauses.

CP.A.1.2 Illustrative Compliance Process for Power Stations/DC Converter Stations



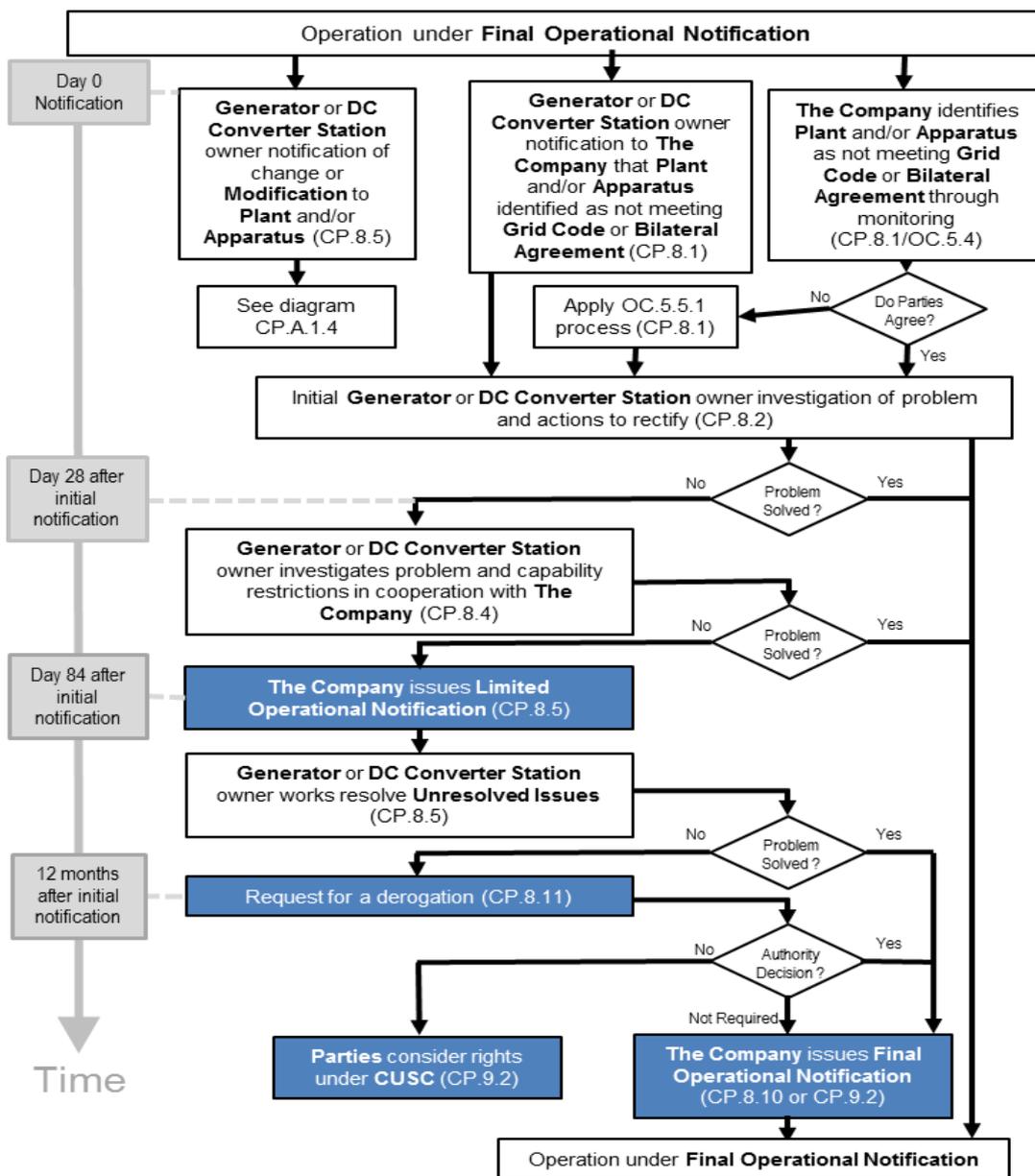
This diagram illustrates the process in the CP and includes references in brackets to specific Grid Code clauses. For the avoidance of doubt this process does not apply to **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**.

CP.A.1.3 Illustrative Compliance Process for Offshore Power Stations and OTSUA



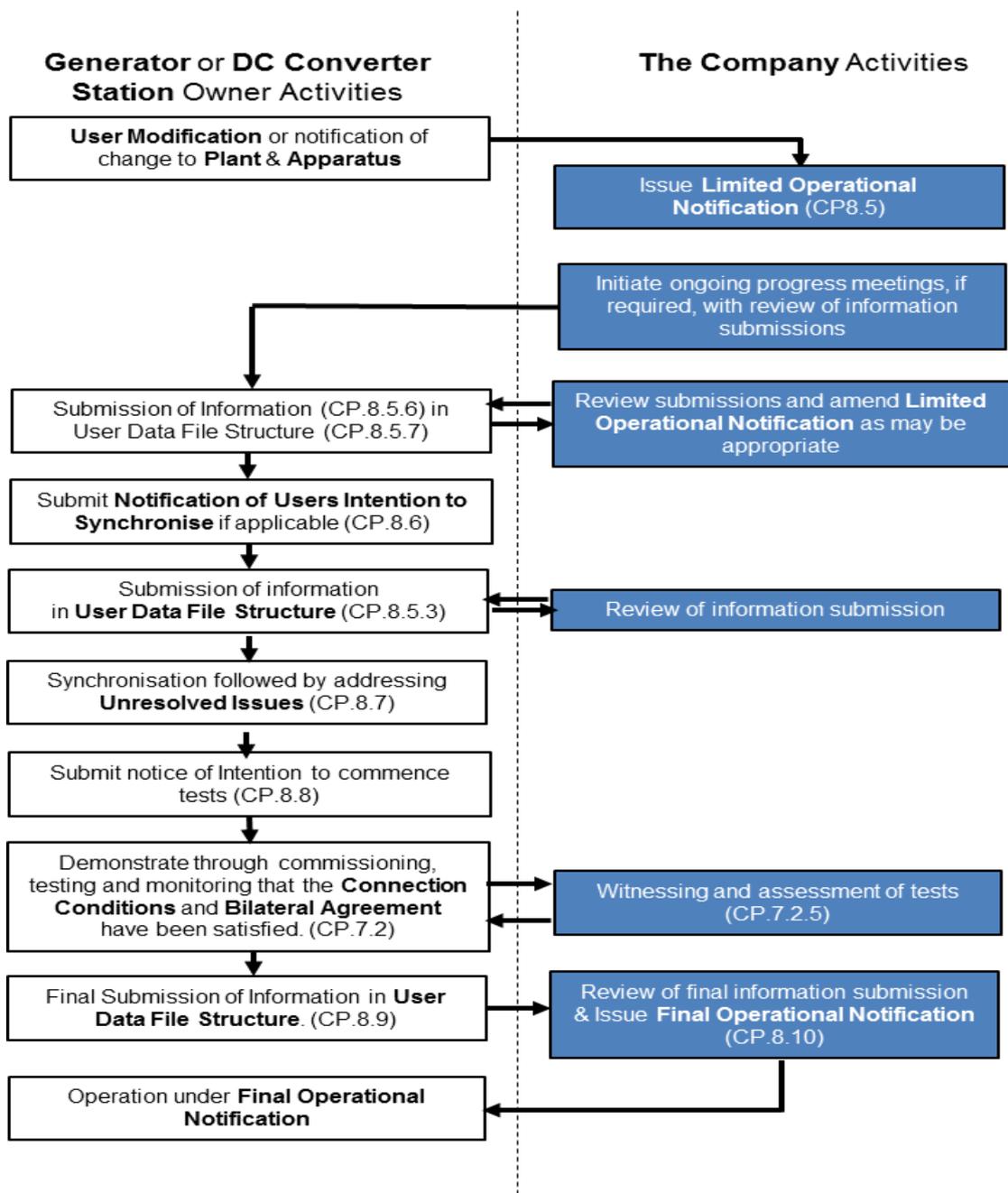
This diagram illustrates the process in the CP and includes references in brackets to specific Grid Code clauses.

CP.A.1.4 Illustrative Compliance Process for Ongoing Compliance



This diagram illustrates the process in the CP and includes references in brackets to specific Grid Code clauses. For the avoidance of doubt this process does not apply to **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**.

CP.A.1.5 Illustrative Compliance Process for Modification or change



This diagram illustrates the process in the CP and includes references in brackets to specific Grid Code clauses. For the avoidance of doubt this process does not apply to Licence Exempt Embedded Medium Power Stations and Embedded DC Converter Stations not subject to a Bilateral Agreement.

Extracts from the European Compliance Processes

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ECP.4.3      **Licence Exempt Embedded Medium Power Stations and Embedded HVDC Equipment** not subject to a **Bilateral Agreement**

ECP.4.3.1      In the case of **Licence Exempt Embedded Medium Power Stations and Embedded HVDC Systems** not subject to a **Bilateral Agreement**, ensuring the obligations of the **ECC** and Appendix E of the relevant **Bilateral Agreement** between **The Company** and the host **Network Operator** are performed and discharged by the relevant party. For the avoidance of doubt, the process in this **ECP** does not apply to **Licence Exempt Embedded Medium Power Stations and Embedded HVDC Equipment** not subject to a **Bilateral Agreement** other than in respect of of compliance with ECC.6.5.1, ECC.6.5.2, ECC.6.5.4, ECC.6.5.5, ECC.6.5.7, ECC.6.5.8 and ECC7.9.

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ECP.6.2.6      When the requirements of ECP.6.2.2 to ECP.6.2.5 have been met, **The Company** will notify the **Generator** that the:  
                    **Synchronous Power Generating Module,**  
                    **CCGT Module,**  
                    **Power Park Module** or  
                    Dynamically controlled **OTSUA**

as applicable may (subject to the **Generator** having fulfilled the requirements of ECP.6.2.3 where that applies) be **Synchronised** to the **Total System** through the issue of an **Interim Operational Notification**. Where the **Generator** is undertaking **OTSDUW** then the **Interim Operational Notification** will be in two parts, with the “**Interim Operational Notification Part A**” applicable to **OTSUA** and the **Interim Operational Notification Part B**” applicable to the **EU Code Users Plant** and **Apparatus**. For the avoidance of doubt, the “**Interim Operational Notification Part A**” and the “**Interim Operational Notification Part B**” can be issued together or at different times. In respect of an **Embedded Power Station** or **Embedded HVDC Equipment Station** (other than an **Licence Exempt Embedded Medium Power Stations** and **Embedded HVDC Equipment Stations** not subject to a **Bilateral Agreement**), **The Company** will notify the **Network Operator** that an **Interim Operational Notification** has been issued.

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ECP.6.3.6 When the requirements of ECP.6.3.2 to ECP.6.3.5 have been met, **The Company** will notify the **Generator** or **HVDC System Owner** that the:  
**Synchronous Power Generating Module,**  
**CCGT Module,**  
**Power Park Module**  
Dynamically controlled **OTSUA** or  
**HVDC Equipment,**

as applicable may (subject to the **Generator** or **HVDC System Owner** having fulfilled the requirements of ECP.6.3.3 where that applies) be **Synchronised** to the **Total System** through the issue of an **Interim Operational Notification**. Where the **Generator** is undertaking **OTSDUW** then the **Interim Operational Notification** will be in two parts, with the “**Interim Operational Notification Part A**” applicable to **OTSUA** and the “**Interim Operational Notification Part B**” applicable to the **EU Code Users Plant** and **Apparatus**. For the avoidance of doubt, the “**Interim Operational Notification Part A**” and the “**Interim Operational Notification Part B**” can be issued together or at different times. In respect of an **Embedded Power Station** or **Embedded HVDC Equipment Station** (other than **Licence Exempt Embedded Medium Power Stations** and **Embedded HVDC Equipment** not subject to a **Bilateral Agreement**), **The Company** will notify the **Network Operator** that an **Interim Operational Notification** has been issued.

ECP.7.4 If the requirements of ECP.7.2 and ECP.7.3 have been successfully met, **The Company** will notify the **Generator** or **HVDC System Owner** that compliance with the relevant **Grid Code** provisions has been demonstrated for the **Power Generating Module(s)**, **OTSUA** if applicable or **HVDC Equipment** as applicable through the issue of a **Final Operational Notification**. In respect of an **Embedded Power Station** or **Embedded HVDC Equipment** other than an **Licence Exempt Embedded Medium Power Stations** and **Embedded HVDC Equipment** not subject to a **Bilateral Agreement**, **The Company** will notify the **Network Operator** that a **Final Operational Notification** has been issued.

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## ECP.8 LIMITED OPERATIONAL NOTIFICATION

ECP.8.1 Following the issue of a **Final Operational Notification** for a **Power Station** consisting of **Type B, Type C** or **Type D Power Generating Module** or an **HVDC System** or **Network Operators** or **Non-Embedded Customers Plant** and **Apparatus** if:

- (i) the **Generator** or **HVDC System Owner** or **Network Operator** or **Non-Embedded Customer** becomes aware, that its **Plant** and/or **Apparatus**’ (including **OTSUA** if applicable) capability to meet any provisions of the **Grid Code**, or where applicable the **Bilateral Agreement** is not fully available then the **Generator** or **HVDC System Owner** or **Network Operator** or **Non-Embedded Customer** shall follow the process in ECP.8.2 to ECP.8.11; or,
- (ii) a **Network Operator** becomes aware, that the capability of **Plant** and/or

**Apparatus** belonging to an **Embedded Power Station** or **Embedded HVDC Equipment Station** (other than a **Licence Exempt Embedded Medium Power Station** and **Embedded HVDC Equipment Stations** not subject to a **Bilateral Agreement**) is failing to meet any provisions of the **Grid Code**, or where applicable the **Bilateral Agreement**, then the **Network Operator** shall inform **The Company** and **The Company** shall inform the **Generator** or **HVDC System Owner** to then follow the process in ECP.8.2 to ECP.8.11; or,

- (iii) **The Company** becomes aware through monitoring as described in OC5.4, that a **Generator** or **HVDC System Owner Plant** and/or **Apparatus** (including **OTSUA** if applicable) capability to meet any provisions of the **Grid Code**, or where applicable the **Bilateral Agreement** is not fully available then **The Company** shall inform the other party. Where **The Company** and the **Generator** or **HVDC System Owner** cannot agree from the monitoring as described in OC5.4 whether the **Plant and/or Apparatus** (including **OTSUA** if applicable) is fully available and/or is compliant with the requirements of the **Grid Code** and where applicable the **Bilateral Agreement**, the parties shall first apply the process in OC5.5.1, before applying the process defined in ECP.8 (**LON**) if applicable. Where the testing instructed in accordance with OC.5.5.1 indicates that the **Plant and/or Apparatus** (including **OTSUA** if applicable) is not fully available and/or is not compliant with the requirements of the **Grid Code** and/or the **Bilateral Agreement**, or if the parties so agree, the process in ECP.8.2 to ECP.8.11 shall be followed.
- (iv) **The Company** becomes aware that a **Network Operator's** or **Non-Embedded Customer's Plant** and **Apparatus** capability to meet any provisions of the **Grid Code**, or where applicable the **Bilateral Agreement**, is not fully available then **The Company** shall inform the other party and the process in ECP.8.2 to ECP.8.11 shall be followed.

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### **Extracts from the Operating Code OC5**

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OC5.1

#### INTRODUCTION

**Operating Code No. 5 ("OC5")** specifies the procedures to be followed by **The Company** in carrying out:

- (a) monitoring
  - (i) of **BM Units** against their expected input or output;
  - (ii) of compliance by **Users** with the **CC** or **ECC** as applicable and in the case of response to **Frequency, BC3**; and
  - (iii) of the provision by **Users** of **Ancillary Services** which they are required or have agreed to provide; and
- (b) the following tests (which are subject to **System** conditions prevailing on the day):
  - (i) tests on **Gensets, CCGT Modules, Power Generating Modules, Power Park Modules, DC Converters, HVDC Equipment, OTSUA** (prior to the **OTSUA Transfer Time**) and **Generating Units** (excluding **Power Park Units**) to test that they have the capability to comply with the **CC** and **ECC**, and in the case of response to **Frequency, BC3** and to provide the **Ancillary Services** that they are either required or have agreed to provide;
  - (ii) tests on **BM Units**, to ensure that the **BM Units** are available in accordance with their submitted **Export and Import Limits** and **Dynamic Parameters**.

The **OC5** tests include the **Black Start Test** procedure.

**OC5** also specifies in OC5.8 the procedures which apply to the monitoring and testing of **Licence Exempt Embedded Medium Power Stations** and **Embedded DC Converter Stations** (or **Embedded HVDC Equipment**) not subject to a **Bilateral Agreement**.

In respect of a **Cascade Hydro Scheme** the provisions of **OC5** shall be applied as follows:

- (a) in respect of the **BM Unit** for the **Cascade Hydro Scheme** the parameters referred to at OC5.4.1 (a) and (c) in respect of **Commercial Ancillary Services** will be monitored and tested;
- (b) in respect of each **Genset** forming part of the **Cascade Hydro Scheme** the parameters referred to at OC5.4.1 (a), (b) and (c) will be tested and monitored. In respect of OC5.4.1 (a) the performance of the **Gensets** will be tested and monitored against their expected input or output derived from the data submitted under BC1.4.2(a)(2). Where necessary to give effect to the requirements for **Cascade Hydro Schemes** in the following provisions of **OC5**, the term **Genset** will be read and construed in the place of **BM Unit**.

In respect of **Embedded Exemptable Large Power Stations** the provisions of **OC5** shall be applied as follows:

- (a) where there is a **BM Unit** registered in the **BSC** in respect of **Generating Units** the provisions of **OC5** shall apply as written;
- (b) in all other cases, in respect of each **Power Generating Module**, and/or **Generating Unit** and **HVDC Equipment** the parameters referred to at OC5.4.1(a), (b) and (c) will be tested and monitored. In respect of OC5.4.1(a) the performance of the **Power Generating Module** and/or **Generating Unit** and **HVDC Equipment** will be tested and monitored against their expected input or output derived from the data submitted under BC1.4.2(a)(2). Where necessary to give effect to the requirements for such **Embedded Exemptable Large Power Stations** in the provisions of **OC5**, the term **Generating Unit** will be read and construed in place of **BM Unit**.

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#### OC5.5.4 Test And Monitoring Assessment

The criteria must be read in conjunction with the full text under the Grid Code reference. The **BM Unit**, **Power Generating Module**, **CCGT Module**, **Power Park Module** or **Generating Unit** (excluding **Power Park Units**), **HVDC Equipment** and **DC Converters** and **OTSUA** will pass the test the criteria below are met:

<u>Parameter to be Tested</u>		<u>Criteria against which the test results will be assessed by The Company.</u>
Voltage Quality	Harmonic Content	CC.6.1.5(a) or ECC.6.1.5(a) Measured harmonic emissions do not exceed the limits specified in the <b>Bilateral Agreement</b> or where no such limits are specified, the relevant planning level specified in <b>Engineering Recommendation G5</b> .
	Phase Unbalance	CC.6.1.5(b) or ECC.6.1.5(b), The measured maximum <b>Phase (Voltage) Unbalance</b> on the <b>National Electricity Transmission System</b> should remain, in England and Wales, below 1% and, in Scotland, below 2% and <b>Offshore</b> will be defined in relevant <b>Bilateral Agreement</b> .  CC.6.1.6 or ECC.6.1.6 In England and Wales, measured infrequent short duration peaks in <b>Phase (Voltage) Unbalance</b> should not exceed the maximum value stated in the <b>Bilateral Agreement</b> .
	Rapid Voltage Change	CC.6.1.7(a) or ECC.6.1.7(a) The measured Rapid Voltage Change at the <b>Point of Common Coupling</b> shall not exceed the Planning Levels specified in CC.6.1.7(a) or ECC 6.1.7.(i)
	Flicker Severity	CC.6.1.7(j) or ECC.6.1.7(j) The measured Flicker Severity at the <b>Point of Common Coupling</b> shall not exceed the limits specified in the table of CC.6.1.7(j) or ECC 6.1.7(j).
	Voltage Fluctuation	CC.6.1.8 or ECC.6.1.8 <b>Offshore</b> , measured voltage fluctuations at the <b>Point of Common Coupling</b> shall not exceed the limits set out in the <b>Bilateral Agreement</b> .
Fault Clearance	Fault Clearance Times	CC.6.2.2.2.2(a), CC.6.2.3.1.1(a), ECC.6.2.2.2.2(a), ECC.6.2.3.1.1(a), <b>Bilateral Agreement</b>
	<b>Back Up Protection</b>	CC.6.2.2.2.2(b), CC.6.2.3.1.1(b), ECC.6.2.2.2.2(a), ECC.6.2.3.1.1(a), <b>Bilateral Agreement</b>
	Circuit Breaker Fail <b>Protection</b>	CC.6.2.2.2.2(c), CC.6.2.3.1.1(c), ECC.6.2.2.2.2(c), ECC.6.2.3.1.1(c)

<u>Parameter to be Tested</u>		<u>Criteria against which the test results will be assessed by The Company.</u>
	Reactive Capability	<p>CC.6.3.2 or ECC.6.3.2 (and in the case of CC.6.3.2(e)(iii) and ECC.6.3.2.5 and ECC.6.3.2.6, the <b>Bilateral Agreement</b>), CC.6.3.4, <b>Ancillary Services Agreement</b>.</p> <p>For a test initiated under OC.5.5.1.1 the <b>Power Generating Module, Generating Unit, HVDC Equipment, DC Converter or Power Park Module</b> or (prior to the <b>OTSUA Transfer Time</b>) <b>OTSUA</b> will pass the test if it is within <math>\pm 5\%</math> of the reactive capability registered with <b>The Company</b> under <b>OC2</b>. The duration of the test will be for a period of up to 60 minutes during which period the <b>System</b> voltage at the <b>Grid Entry Point</b> for the relevant <b>Power Generating Module, Generating Unit, HVDC Equipment, DC Converter or Power Park Module</b> or <b>Interface Point</b> in the case of <b>OTSUA</b> will be maintained by the <b>Generator or HVDC System Owner, DC Converter Station</b> owner at the voltage specified pursuant to BC2.8 by adjustment of <b>Reactive Power</b> on the remaining <b>Power Generating Module, Generating Unit, HVDC Equipment, DC Converter or Power Park Modules</b> or <b>OTSUA</b>, if necessary. Any test performed in respect of an <b>Licence Exempt Embedded Medium Power Station</b> or, an <b>Embedded DC Converter Station</b> or <b>Embedded HVDC System</b> not subject to a <b>Bilateral Agreement</b> shall be as confirmed pursuant to OC5.8.3.</p> <p>Measurements of the <b>Reactive Power</b> output under steady state conditions should be consistent with Grid Code requirements i.e. fully available within the voltage range <math>\pm 5\%</math> at all voltages.</p>
Governor / Frequency Control	Primary Secondary and High <b>Frequency</b> Response	<p><b>Ancillary Services Agreement</b>, CC.6.3.7 and where applicable CC.A.3 or ECC.6.3.7 and where applicable ECC.A.3.</p> <p>For a test initiated under OC.5.5.1.1 the measured response in MW/Hz is within <math>\pm 5\%</math> of the level of response specified in the <b>Ancillary Services Agreement</b> for that <b>Genset</b>.</p>
	Stability with Voltage	CC.6.3.4 or ECC.6.3.4
	Governor / Load / <b>Frequency</b> Controller <b>System</b> Compliance	CC.6.3.6(a), CC.6.3.7, CC.6.3.9, CC8.1, where applicable CC.A.3, BC3.5, BC3.6, BC3.7 or ECC.6.3.6, ECC.6.3.7, ECC.6.3.9, ECC8.1, where applicable ECC.A.3, BC3.5, BC3.6, BC3.7
	Output at Reduced <b>System Frequency</b>	CC.6.3.3 or ECC.6.3.3 - For variations in <b>System Frequency</b> exceeding 0.1Hz within a period of less than 10 seconds, the <b>Active Power</b> output is within $\pm 0.2\%$ of the requirements of CC.6.3.3 or ECC.6.3.3 when monitored at prevailing external air temperatures of up to 25°C., BC3.5.1
	<b>Fast Start</b>	<b>Ancillary Services Agreement</b> requirements
	<b>Black Start</b>	OC5.7

<u>Parameter to be Tested</u>		<u>Criteria against which the test results will be assessed by The Company.</u>
	Excitation/Voltage <b>Control System</b>	CC.6.3.6(b), CC.6.3.8, CC.A.6 or CC.A.7 as applicable, BC2.11.2, and the <b>Bilateral Agreement</b> or ECC.6.3.6, ECC.6.3.8, ECC.A.6 or ECC.A.7 or ECC.A.8 and the <b>Bilateral Agreement</b> as applicable
	Fault Ride Through and Fast Fault Current Injection	CC.6.3.15, CC.A.4.A or CC.A.4.B as applicable or ECC.6.3.15, ECC.6.3.16, ECC.A.4 as applicable
Dynamic Parameters	<b>Export and Import Limits and Dynamic Parameters</b>	BC2 The <b>Export and Import Limits and Dynamic Parameters</b> under test are within 2½% of the declared value being tested.
	Synchronisation time	BC2.5.2.3 <b>Synchronisation</b> takes place within ±5 minutes of the time it should have achieved <b>Synchronisation</b> .
	Run-up rates	BC2 Achieves the instructed output and, where applicable, the first and/or second intermediate breakpoints, each within ±3 minutes of the time it should have reached such output and breakpoints from <b>Synchronisation</b> (or break point, as the case may be), calculated from the run-up rates in its <b>Dynamic Parameters</b> .
	Run-down rates	BC2 Achieves the instructed output and, where applicable, the first and/or second intermediate breakpoints, each within ±5 minutes of the time it should have reached such output and breakpoints from <b>Synchronisation</b> (or break point, as the case may be), calculated from the run-up rates in its <b>Dynamic Parameters</b> .
	Demand Response	DRSC.11.7 <b>Non-Embedded Customers and BM Participants</b> who are also <b>Demand Response Providers</b> shall execute a demand modification test when requested as per DRSC.11.7 to ensure the requirements of the <b>Ancillary Services</b> agreement and <b>Demand Response Services Code</b> are satisfied.

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OC5.8 PROCEDURES APPLYING TO LICENCE EXEMPT EMBEDDED MEDIUM POWER STATIONS AND EMBEDDED DC CONVERTER STATIONS NOT SUBJECT TO A BILATERAL AGREEMENT

OC5.8.3 Testing Of Licence Exempt Embedded Medium Power Stations Or Embedded DC Converter Stations Not Subject To A Bilateral Agreement or Embedded HVDC Equipment Not Subject To A Bilateral Agreement

**The Company** may, in accordance with the provisions of OC5.8.2, at any time (although not normally more than twice in any calendar year in respect of any particular **Licence Exempt Embedded Medium Power Station** or **Embedded DC Converter Station** or **Embedded HVDC Equipment** not subject to a **Bilateral Agreement**) issue an instruction requiring the **Network Operator** within whose **System** the relevant **Licence Exempt Embedded Medium Power Station** or **DC Converter Station** or **HVDC Equipment** not subject to a **Bilateral Agreement** is **Embedded**, to require the **Embedded Person** to carry out a test.

Such test shall be carried out at a time no sooner than 48 hours from the time that the instruction was issued, on any one or more of the **Generating Units, Power Generating Modules, Power Park Modules** or **DC Converters** or **HVDC Equipment** comprising part of the relevant **Licence Exempt Embedded Medium Power Station** or **Embedded DC Converter Station** or **HVDC System** and should only be to demonstrate that:

- (a) the relevant **Generating Unit, Power Generating Module, Power Park Module** or **DC Converter** or **HVDC Equipment** meets the requirements of the paragraphs in the **CC** or **ECC** which are applicable to such **Generating Units, Power Generating Modules, Power Park Module** or **DC Converter** or **HVDC Equipment**;
- (b) the **Reactive Power** capability registered with **The Company** under **OC2** meets the requirements set out in CC.6.3.2 or ECC.6.3.2 as applicable.

The instruction may only be issued where, following consultation with the relevant **Network Operator, The Company** has:

- (c) confirmed to the relevant **Network Operator** the manner in which the test will be conducted, which shall be consistent with the principles established in OC5.5.3; and
- (d) received confirmation from the relevant **Network Operator** that the relevant **Generating Unit, Power Generating Module, Power Park Module** or **DC Converter** or **HVDC Equipment** would not then be unavailable by reason of forced outage or **Planned Outage** expected prior to the instruction.

The relevant **Network Operator** is responsible for ensuring the performance of any test so required by **The Company** and the **Network Operator** shall ensure that the **Embedded Person** retains the responsibility for ensuring the safety of personnel and plant during the test.

OC5.8.4 Test Failures/Re-Tests And Disputes

The relevant **Network Operator** shall:

- (a) ensure that provisions equivalent to OC5.5.5, OC5.5.6 and OC5.6 apply to **Licence Exempt Embedded Medium Power Stations, Embedded DC Converter Stations** not the subject of a **Bilateral Agreement** or **Embedded HVDC Equipment** not the subject of a **Bilateral Agreement** within its **System** in respect of test failures, re-tests and disputes as to test failures and re-tests;
- (b) ensure that the provisions equivalent to OC5.5.5, OC5.5.6 and OC5.6 referred to in OC5.8.4(a) are effective so that **The Company** may require, if it so wishes, the provision to it of any reports or other information equivalent to those or that to which **The Company** would be entitled in relation to test failures, re-tests and disputes as to test failures and re-tests under the provisions of OC5.5.5, OC5.5.6 and OC5.6; and

- (c) the provisions equivalent to OC5.5.5, OC5.5.6 and OC5.6 referred to in OC5.8.4(a) are effective to permit **The Company** to conduct itself and take decisions in such a manner in relation to test failures, re-tests and disputes as to test failures and re-tests in respect of Licence Exempt **Embedded Medium Power Stations**, **Embedded DC Converter Stations** not the subject of a **Bilateral Agreement** or **Embedded HVDC Equipment** not the subject of a **Bilateral Agreement** as it is able to conduct itself and take decisions in relation to test failures, re-tests and disputes as to test failures and re-tests under OC5.5.5, OC5.5.6 and OC5.6.

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### **Extracts from the Balancing Code BC1**

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#### BC1.2 OBJECTIVE

The procedure for the submission of **BM Unit Data** and/or **Generating Unit Data** is intended to enable **The Company** to assess which **BM Units** and **Generating Units** (which could be part of a **Power Generating Module**) are expected to be operating in order that **The Company** can ensure (so far as possible) the integrity of the **National Electricity Transmission System**, and the security and quality of supply.

Where reference is made in this **BC1** to **Generating Units** and/or **Power Generating Modules** (unless otherwise stated) it only applies:

- (a) to each **Generating Unit** which forms part of the **BM Unit** of a **Cascade Hydro Scheme**; and
- (b) at an **Embedded Exemptable Large Power Station** where the relevant **Bilateral Agreement** specifies that compliance with **BC1** is required:
  - (i) to each **Generating Unit** which could be part of a **Synchronous Power Generating Module**, or
  - (ii) to each **Power Park Module** where the **Power Station** comprises **Power Park Modules**.

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#### BC1.4.1 Communication With Users

- (a) Submission of **BM Unit Data** and **Generating Unit Data** by **Users** to **The Company** specified in BC1.4.2 to BC1.4.4 (with the exception of BC1.4.2(f)) is to be by use of electronic data communications facilities, as provided for in CC.6.5.8 or ECC.6.5.8 (as applicable). However, data specified in BC1.4.2(c) and BC1.4.2(e) only, may be submitted by telephone or fax. In the case of **BM Unit Data** in respect of **Type II Licence Exempt Embedded Medium Power Stations**, **Users** should supply all **Non Confidential BM Unit Data** to **Network Operators**. **Network Operators** will be responsible for the submission of that **Non-Confidential BM Unit Data** to **The Company**.
- (b) In the event of a failure of the electronic data communication facilities, the data to apply in relation to a pre-**Gate Closure** period will be determined in accordance with the **Data Validation, Consistency and Defaulting Rules**, based on the most recent data received and acknowledged by **The Company**.
- (c) **Planned Maintenance Outages** will normally be arranged to take place during periods of low data transfer activity.

- (d) Upon any **Planned Maintenance Outage**, or following an unplanned outage described in BC1.4.1(b) (where it is termed a "failure") in relation to a pre-**Gate Closure** period:
- (i) **BM Participants** should continue to act in relation to any period of time in accordance with the **Physical Notifications** current at the time of the start of the **Planned Maintenance Outage** or the computer system failure in relation to each such period of time subject to the provisions of BC2.5.1. Depending on when in relation to **Gate Closure** the planned or unplanned maintenance outage arises such operation will either be operation in preparation for the relevant output in real time, or will be operation in real time. No further submissions of **BM Unit Data** and/or **Generating Unit Data** (other than data specified in BC1.4.2(c) and BC1.4.2(e)) should be attempted. Plant failure or similar problems causing significant deviation from **Physical Notification** should be notified to **The Company** by the submission of a revision to **Export and Import Limits** in relation to the **BM Unit** and /or **Generating Unit** so affected;
  - (ii) during the outage, revisions to the data specified in BC1.4.2(c) and BC1.4.2(e) may be submitted. Communication between **Users Control Points** and **The Company** during the outage will be conducted by telephone; and
  - (iii) no data will be transferred from **The Company** to the **BMRA** until the communication facilities are re-established.

#### BC1.4.2 Day Ahead Submissions

Data for any **Operational Day** may be submitted to **The Company** up to several days in advance of the day to which it applies, as provided in the **Data Validation, Consistency and Defaulting Rules**. However, **Interconnector Users** must submit **Physical Notifications**, and any associated data as necessary, each day by 11:00 hours in respect of the next following **Operational Day** in order that the information used in relation to the capability of the respective **External Interconnection** is expressly provided. **The Company** shall not by the inclusion of this provision be prevented from utilising the provisions of BC1.4.5 if necessary.

The data may be modified by further data submissions at any time prior to **Gate Closure**, in accordance with the other provisions of **BC1**. The data to be used by **The Company** for operational planning will be determined from the most recent data that has been received by **The Company** by 11:00 hours on the day before the **Operational Day** to which the data applies, or from the data that has been defaulted at 11:00 hours on that day in accordance with BC1.4.5. Any subsequent revisions received by **The Company** under the Grid Code will also be utilised by **The Company**. In the case of all data items listed below, with the exception of item (e), **Dynamic Parameters** (Day Ahead), the latest submitted or defaulted data, as modified by any subsequent revisions, will be carried forward into operational timescales. The individual data items are listed below:

##### (a) Physical Notifications

**Physical Notifications**, being the data listed in **BC1** Appendix 1 under that heading, are required by **The Company** at 11:00 hours each day for each **Settlement Period** of the next following **Operational Day**, in respect of;

##### (1) **BM Units:**

- (i) with a **Demand Capacity** with a magnitude of 50MW or more in **NGET's Transmission Area** or 10MW or more in **SHETL's Transmission Area** or 30MW or more in **SPT's Transmission Area**; or
- (ii) comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or **Power Generating Modules** and/or **CCGT Modules** and/or **Power Park Modules** in each case at **Large Power Stations**, **Medium Power Stations** and **Small Power Stations** where such **Small Power Stations** are directly connected to the **Transmission System**; or
- (iii) where the **BM Participant** chooses to submit **Bid-Offer Data** in accordance with BC1.4.2(d) for **BM Units** not falling within (i) or (ii) above,

and

(2) each **Generating Unit** where applicable under BC1.2.

**Physical Notifications** may be submitted to **The Company** by **BM Participants**, for the **BM Units**, and **Generating Units**, specified in this BC1.4.2(a) at an earlier time, or **BM Participants** may rely upon the provisions of BC1.4.5 to create the **Physical Notifications** by data defaulting pursuant to the **Grid Code** utilising the rules referred to in that paragraph at 11:00 hours in any day.

**Physical Notifications** (which must comply with the limits on maximum rates of change listed in **BC1 Appendix 1**) must, subject to the following operating limits, represent the **Users** best estimate of expected input or output of **Active Power** and shall be prepared in accordance with **Good Industry Practice**. **Physical Notifications** for any **BM Unit**, and any **Generating Units**, should normally be consistent with the **Dynamic Parameters** and **Export and Import Limits** and must not reflect any **BM Unit** or any **Generating Units**, proposing to operate outside the limits of its **Demand Capacity** and (and in the case of **BM Units**) **Generation Capacity** and, in the case of a **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or **Power Generating Module** and/or **CCGT Module** and/or **Power Park Module**, its **Registered Capacity**.

These **Physical Notifications** provide, amongst other things, indicative **Synchronising** and **De-Synchronising** times to **The Company** in respect of any **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or **Power Generating Module** and/or **CCGT Module** and/or **Power Park Module**, and for any **Generating Units**, and provide an indication of significant **Demand** changes in respect of other **BM Units**.

(b) Not Used.

(c) Export and Import Limits

Each **BM Participant** may, in respect of each of its **BM Units** and its **Generating Units** submit to **The Company** for any part or for the whole of the next following **Operational Day** the data listed in **BC1 Appendix 1** under the heading of “**Export and Import Limits**” to amend the data already held by **The Company** in relation to **Export and Import Limits**, which would otherwise apply for those **Settlement Periods**.

**Export and Import Limits** respectively represent the maximum export to or import from the **National Electricity Transmission System** for a **BM Unit** and a **Generating Unit** and are the maximum levels that the **BM Participant** wishes to make available and must be prepared in accordance with **Good Industry Practice**.

(d) Bid-Offer Data

Each **BM Participant** may, in respect of each of its **BM Units**, but must not in respect of its **Generating Units** submit to **The Company** for any **Settlement Period** of the next following **Operational Day** the data listed in **BC1 Appendix 1** under the heading of “**Bid-Offer Data**” to amend the data already held by **The Company** in relation to **Bid-Offer Data**, which would otherwise apply to those **Settlement Periods**. The submitted **Bid-Offer Data** will be utilised by **The Company** in the preparation and analysis of its operational plans for the next following **Operational Day**. **Bid-Offer Data** may not be submitted unless an automatic logging device has been installed at the **Control Point** for the **BM Unit** in accordance with CC.6.5.8(b) or ECC.6.5.8(b) (as applicable).

(e) Dynamic Parameters (Day Ahead)

Each **BM Participant** may, in respect of each of its **BM Units**, but must not in respect of its **Generating Units** submit to **The Company** for the next following **Operational Day** the data listed in **BC1** Appendix 1 under the heading of “**Dynamic Parameters**” to amend that data already held by **The Company**.

These **Dynamic Parameters** shall reasonably reflect the expected true operating characteristics of the **BM Unit** and shall be prepared in accordance with **Good Industry Practice**.

The **Dynamic Parameters** applicable to the next following **Operational Day** will be utilised by **The Company** in the preparation and analysis of its operational plans for the next following **Operational Day** and may be used to instruct certain **Ancillary Services**. For the avoidance of doubt, the **Dynamic Parameters** to be used in the current **Operational Day** will be those submitted in accordance with BC2.5.3.1.

(f) Other Relevant Data

By 11:00 hours each day, each **BM Participant**, in respect of each of its **BM Units** and **Generating Units** for which **Physical Notifications** are being submitted, shall, if it has not already done so, submit to **The Company** (save in respect of item (vi) and (vii) where the item shall be submitted only when reasonably required by **The Company**), in respect of the next following **Operational Day** the following:

- (i) in the case of a **CCGT Module** and/or a **Synchronous Power Generating Module**, a **CCGT Module Matrix** and/or a **Synchronous Power Generating Module Matrix** as described in **BC1** Appendix 1;
- (ii) details of any special factors which in the reasonable opinion of the **BM Participant** may have a material effect or present an enhanced risk of a material effect on the likely output (or consumption) of such **BM Unit(s)**. Such factors may include risks, or potential interruptions, to **BM Unit** fuel supplies, or developing plant problems, details of tripping tests, etc. This information will normally only be used to assist in determining the appropriate level of **Operating Margin** that is required under OC2.4.6;
- (iii) in the case of **Generators**, any temporary changes, and their possible duration, to the **Registered Data** of such **BM Unit**;
- (iv) in the case of **Suppliers**, details of **Customer Demand Management** taken into account in the preparation of its **BM Unit Data**;
- (v) details of any other factors which **The Company** may take account of when issuing **Bid-Offer Acceptances** for a **BM Unit** (e.g., **Synchronising** or **De-Synchronising Intervals**);
- (vi) in the case of a **Cascade Hydro Scheme**, the **Cascade Hydro Scheme Matrix** as described in **BC1** Appendix 1;
- (vii) in the case of a **Power Park Module**, a **Power Park Module Availability Matrix** as described in **BC1** Appendix 1;
- (viii) in the case of an **Additional BM Unit** or a **Secondary BM Unit** an **Aggregator Impact Matrix** as described in **BC1** Appendix 1.

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BC1.6 SPECIAL PROVISIONS RELATING TO NETWORK OPERATORS

BC1.6.1 User System Data From Network Operators

- (a) By 1000 hours each day each **Network Operator** will submit to **The Company**, confirmation or notification of the following in respect of the next **Operational Day**:
- (i) constraints in writing on its **User System** which **The Company** may need to take into account in operating the **National Electricity Transmission System**. In this BC1.6.1 the term "constraints" shall include restrictions on the operation of **Embedded Power Generating Modules**, and/or **Embedded CCGT Units**, and/or **Embedded Power Park Modules** as a result of the **User System** to which the **Power Generating Module** and/or **CCGT Unit** and/or **Power Park Module** is connected at the **User System Entry Point** being operated or switched in a particular way, for example, splitting the relevant busbar. It is a matter for the **Network Operator** and the **Generator** to arrange the operation or switching, and to deal with any resulting consequences. The **Generator**, after consultation with the **Network Operator**, is responsible for ensuring that no **BM Unit Data** submitted to **The Company** can result in the violation of any such constraint on the **User System**.
  - (ii) the requirements of voltage control and MVAR reserves in writing which **The Company** may need to take into account for **System** security reasons.
  - (iii) where applicable, updated best estimates in writing of **Maximum Export Capacity** and **Maximum Import Capacity** and **Interface Point Target Voltage/Power Factor** for any **Interface Point** connected to its **User System** including any requirement for post-fault actions to be implemented on the relevant **Offshore Transmission System** by **The Company**.
  - (iv) constraints in writing on its **User System** which **The Company** may need to take into account when issuing **Bid-Offer Acceptances** to **Additional BM units** or **Secondary BM units**.
  - v) **Non Confidential BM Unit Data** in respect **Type II Licence Exempt Embedded Medium Power Stations**.
- (b) The form of the submission will be:
- (i) that of a **BM Unit** output or consumption (for MW and for MVAR, in each case a fixed value or an operating range, on the **User System** at the **User System Entry Point**, namely in the case of a **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) on the higher voltage side of the generator step-up transformer, and/or in the case of a **Power Generating Module**, at the point of connection and/or in the case of a **Power Park Module**, at the point of connection) required for particular **BM Units** (identified in the submission) connected to that **User System** for each **Settlement Period** of the next **Operational Day**;

- (ii) adjusted in each case for MW by the conversion factors applicable for those **BM Units** to provide output or consumption at the relevant **Grid Supply Points**.
- (c) At any time and from time to time, between 1000 hours each day and the expiry of the next **Operational Day**, each **Network Operator** must submit to **The Company** in writing any revisions to the information submitted under this BC1.6.1.

#### BC1.6.2 Notification Of Times To Network Operators

**The Company** will make available indicative **Synchronising** and **De-Synchronising** times to each **Network Operator**, but only relating to **Power Generating Modules** within **Type II Licence Exempt Embedded Medium Power Stations** and **BM Units** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) or a **Power Park Module** or a **CCGT Module** and/or a **Power Generating Module, Embedded** within that **Network Operator's User System** and those **Gensets** directly connected to the **National Electricity Transmission System** which **The Company** has identified under **OC2** as being those which may, in the reasonable opinion of **The Company**, affect the integrity of that **User System**. If in preparing for the operation of the **Balancing Mechanism**, **The Company** becomes aware that a **BM Unit** directly connected to the **National Electricity Transmission System** may, in its reasonable opinion, affect the integrity of that other **User System** which, in the case of a **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or a **Power Generating Module** and/or a **CCGT Module** and/or a **Power Park Module**, it had not so identified under **OC2**, then **The Company** may make available details of its indicative **Synchronising** and **De-Synchronising** times to that other **User** and shall inform the relevant **BM Participant** that it has done so, identifying the **BM Unit** concerned.

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### *Extracts from the Balancing Code BC2*

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#### BC2.1 INTRODUCTION

**Balancing Code No 2 (BC2)** sets out the procedure for:

- (a) the physical operation of **BM Units** and **Generating Units** (which could be part of a **Power Generating Module**) in the absence of any instructions from **The Company**;
- (b) the acceptance by **The Company** of **Balancing Mechanism** Bids and Offers,
- (c) the calling off by **The Company** of **Ancillary Services**;
- (d) the issuing and implementation of **Emergency Instructions**; and
- (e) the issuing by **The Company** of other operational instructions and notifications.

In addition, **BC2** deals with any information exchange between **The Company** and **BM Participants** or specific **Users** that takes place after **Gate Closure**.

In this **BC2**, "consistent" shall be construed as meaning to the nearest integer MW level.

In this **BC2**, references to "a **BM Unit** returning to its **Physical Notification**" shall take account of any **Bid-Offer Acceptances** already issued to the **BM Unit** in accordance with BC2.7 and any **Emergency Instructions** already issued to the **BM Unit** or **Generating Unit** (which could be part of a **Power Generating Module**) in accordance with BC2.9.

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#### BC2.5.2.5 Notification Of Times To Network Operators

**The Company** will make changes to the **Synchronising** and **De-Synchronising** times available to each **Network Operator**, but only relating to **BM Units Embedded** within its **User System** (including **Power Generating Modules** forming part of a **Type II Licence Exempt Embedded Medium Power Station**) and those **BM Units** directly connected to the **National Electricity Transmission System** which **The Company** has identified under **OC2** and/or **BC1** as being those which may, in the reasonable opinion of **The Company**, affect the integrity of that **User System** and shall inform the relevant **BM Participant** that it has done so, identifying the **BM Unit** concerned.

Each **Network Operator** must notify **The Company** of any changes to its **User System** data as soon as practicable in accordance with BC1.6.1(c). Each **Network Operator** is also required to submit **Non-Confidential BM Unit Data** to **The Company** in respect of each relevant **Power Generating Module** forming part of a **Type II Licence Exempt Embedded Medium Power Station**.

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BC2.5.5 Commencement or Termination of Participation in the Balancing Mechanism

BC2.5.5.1 In the event that a **BM Participant** in respect of a **BM Unit** with a **Demand Capacity** with a magnitude of less than 50MW in **NGET's Transmission Area** or less than 10MW in **SHETL's Transmission Area** or less than 30MW in **SPT's Transmission Area** or comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC2.2) and/or **Power Generating Modules** and/or **CCGT Modules** and/or **Power Park Modules** at a **Small Power Station**, notifies **The Company** at least 30 days in advance that from a specified **Operational Day** it will:

- (a) no longer submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day**, that **BM Participant** no longer has to meet the requirements of BC2.5.1 nor the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**. Also, with effect from that **Operational Day**, any defaulted **Physical Notification** and defaulted **Bid-Offer Data** in relation to that **BM Unit** arising from the **Data Validation, Consistency and Defaulting Rules** will be disregarded and the provisions of BC2.5.2 will not apply;
- (b) submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** will need to meet the requirements of BC2.5.1 and the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**.

BC2.5.5.2 In the event that a **BM Participant** in respect of a **BM Unit** with a **Demand Capacity** with a magnitude of 50MW or more in **NGET's Transmission Area** or 10MW or more in **SHETL's Transmission Area** or 30MW or more in **SPT's Transmission Area** or comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC2.2) and/or **Power Generating Modules** and/or **CCGT Modules** and/or **Power Park Modules** at a **Medium Power Station** or **Large Power Station** notifies **The Company** at least 30 days in advance that from a specified **Operational Day** it will:

- (a) no longer submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** no longer has to meet the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**; also, with effect from that **Operational Day**, any defaulted **Bid-Offer Data** in relation to that **BM Unit** arising from the **Data Validation, Consistency and Defaulting Rules** will be disregarded;
  - (b) submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** will need to meet the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**.
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## BC2.6.1

### Normal Communication With Control Points

- (a) With the exception of BC2.6.1(c) below, **Bid-Offer Acceptances** and, unless otherwise agreed with **The Company**, **Ancillary Service** instructions shall be given by automatic logging device and will be given to the **Control Point** for the **BM Unit** or in the case of **Type II Licence Exempt Embedded Medium Power Stations** will be given to the **Network Operator** who will then instruct the **Generator** at its **Control Point** in respect of its **Type II Licence Exempt Embedded Medium Power Station**. For all **Planned Maintenance Outages** the provisions of BC2.6.5 will apply. For **Generating Units** (including **DC Connected Power Park Modules** (if relevant)) communications under **BC2** shall be by telephone unless otherwise agreed by **The Company** and the **User**.
- (b) **Bid-Offer Acceptances** and **Ancillary Service** instructions must be formally acknowledged immediately by the **BM Participant** (or the relevant person on its behalf which would include **Network Operators** in the case of **Type II Licence Exempt Embedded Medium Power Stations**) via the **Control Point** for the **BM Unit** or **Generating Unit** in respect of that **BM Unit** or that **Generating Unit**. The acknowledgement and subsequent confirmation or rejection, within two minutes of receipt, is normally given electronically by automatic logging device. If no confirmation or rejection is received by **The Company** within two minutes of the issue of the **Bid- Offer Acceptance**, then **The Company** will contact the **Control Point** for the **BM Unit** by telephone (or relevant person on its behalf which would include **Network Operators** in the case of **Type II Licence Exempt Embedded Medium Power Stations**) to determine the reason for the lack of confirmation or rejection. Any rejection must be given in accordance with BC2.7.3 or BC2.8.3.
- (c) In the event of a failure of the logging device or **The Company** computer system outage, **Bid- Offer Acceptances** and instructions will be given, acknowledged, and confirmed or rejected by telephone. The provisions of BC2.9.7 are also applicable.
- (d) In the event that in carrying out the **Bid- Offer Acceptances** or providing the **Ancillary Services**, or when operating at the level of the **Final Physical Notification Data** as provided in BC2.5.1, an unforeseen problem arises, caused on safety grounds (relating to personnel or plant), **The Company** must be notified without delay by telephone.
- (e) The provisions of BC2.5.3 are also relevant.
- (f) Submissions of revised MVA capability may be made by facsimile transmission, using the format given in Appendix 3 to **BC2**.
- (g) Communication will normally be by telephone for any purpose other than **Bid- Offer Acceptances**, in relation to **Ancillary Services** or for revisions of MVA data.
- (h) Submissions of revised availability of **Frequency Sensitive Mode** may be made by facsimile transmission, using the format given in Appendix 4 to **BC2**. This process should only be used for technical restrictions to the availability of **Frequency Sensitive Mode**.

## BC2.6.2

### Communication With Control Points In Emergency Circumstances

**The Company** will issue **Emergency Instructions** direct to the **Control Point** for each **BM Unit** [or **Generating Unit**] in **Great Britain**. In the case of **Type II Licence Exempt Embedded Medium Power Stations** the **Emergency Instruction** will normally be issued by **The Company** to the **Network Operator** and the **Network Operator** shall then issue an instruction to the **Generator** in respect of that **Type II Licence Exempt Embedded Medium Power Station** without delay. **Emergency Instructions** to a **Control Point** will normally be given by telephone (and will include an exchange of operator names).

## BC2.6.3

### Communication With Network Operators In Emergency Circumstances

**The Company** will issue **Emergency Instructions** direct to the **Network Operator** at each **Control Centre** in relation to actions including special actions as set out in BC1.7, actions in the categories set out under BC2.9.3.3, **Embedded Generation Control** and **Demand Control actions**. **Emergency Instructions** to a **Network Operator** will normally be given by telephone (and will include an exchange of operator names). **OC6** contains further provisions relating to **Demand Control** instructions; **OC6B** contains further provisions relating to **Embedded Generation Control** instructions. In addition, and as provided for in BC2.6.2, **The Company** will issue **Emergency Instructions** to **Network Operator's** at their **Control Centre** in respect of relevant **Type II Licence Exempt Embedded Medium Power Stations** and the **Network Operator** shall then issue an instruction to the **Generator** in respect of that **Type II Licence Exempt Embedded Medium Power Station** without delay.

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BC2.7.4 Action Required From BM Participants

- (a) Each **BM Participant** in respect of its **BM Units** will comply in accordance with BC2.7.1 with all **Bid-Offer Acceptances** given by **The Company** with no more than the delay allowed for by the **Dynamic Parameters** unless the **BM Unit** has given notice to **The Company** under the provisions of BC2.7.3 regarding non-acceptance of a **Bid-Offer Acceptance**.
  - (b) Where a **BM Unit's** input or output changes in accordance with a **Bid-Offer Acceptance** issued under BC2.7.1, such variation does not need to be notified to **The Company** in accordance with BC2.5.1.
  - (c) In the event that while carrying out the **Bid-Offer Acceptance** an unforeseen problem arises caused by safety reasons (relating to personnel or plant), **The Company** must be notified immediately by telephone and this may lead to revision of **BM Unit Data** in accordance with BC2.5.3. **Generators** in respect of **Type II Licence Exempt Embedded Medium Power Stations** shall notify the relevant **Network Operator** who shall then notify **The Company** immediately.
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BC2.9.1.4 In the case of a **Network Operator** or an **Externally Interconnected System Operator**, **Emergency Instructions** will be issued to its **Control Centre** which would include instructions to **Network Operators** who in turn will instruct **Type II Licence Exempt Embedded Medium Power Stations**

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BC2.9.3.3 Instructions to **Network Operators** relating to the **Operational Day** may include:

- (a) a requirement for **Demand** reduction and disconnection or restoration pursuant to **OC6**;
- (b) an instruction to effect a load transfer between **Grid Supply Points**;
- (c) an instruction to switch in a **System to Demand Intertrip Scheme**;
- (d) an instruction to split a network;
- (e) an instruction to disconnect an item of **Plant** or **Apparatus** from the **System**.
- (f) a requirement for **Embedded Generation Control** or restoration pursuant to **OC6B**
- (g) an instruction in relation to a **Type II Licence Exempt Embedded Medium Power Station**.

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