4.1.3   Frequency Response

Introduction

4.1.3.1   Each applicable **User** is obliged to provide (for the avoidance of doubt, as determined by any direction in force from time to time and issued by the **Authority** relieving that **User** from the obligation under its **Licence** to comply with such part or parts of the **Grid Code** or any **Distribution Code** or, in the case of **The Company**, the **Transmission Licence**, as may be specified in such direction) the **Mandatory Ancillary Service** of **Frequency Response** referred to in **Grid Code CC** 8.1 by means of **Frequency** sensitive generation in accordance with the terms of this Paragraph 4.1.3 and a **Mandatory Services Agreement** but subject always to and in accordance with the relevant part or parts of the **Grid Code** applicable thereto.

Definitions

4.1.3.2   For the purposes of this Paragraph 4.1.3:

(i)   **"Frequency Response Service"** means the **Mandatory Ancillary Service** of **Frequency Response** and any **Commercial Ancillary Service** of **Frequency Response** as may be agreed to be provided by a **User** from time to time;

(ii)   the **Mandatory Ancillary Service** of **Frequency Response** shall constitute operation of a **BM Unit** in accordance with **Grid Code CC** 6.3.7 and **BC** 3.5 (with the exception of **BC** 3.5.2), including, without limitation, under normal operating conditions with the speed governor set so that it operates with an overall speed droop of between 3% and 5% so as to provide the applicable levels of **Response** referred to in Paragraph 4.1.3.7;

(iii)   the term "instruction" means a communication whether by telephone or automatic logging device or facsimile from **The Company** to the **User** instructing a **User** in accordance with **Grid Code BC** 2.8 and this Paragraph 4.1.3 to provide any **Frequency Response Service**, and derivations of the term shall be construed accordingly;

(iv)   the amendment of an existing instruction shall be deemed to be a new instruction;

(v)   an instruction will prevail until either it is countermanded by **The Company** or until the **BM Unit** to which the instruction relates is **De-synchronised** (whichever is first to occur).

The Company's Instructions to provide *Mode A Frequency Response*

4.1.3.3   For the purposes of instructions and calculation of payments, the **Mandatory Ancillary Service** of **Frequency Response** as described in this Paragraph 4.1.3 shall be referred to as "**Mode A Frequency Response**".

4.1.3.4   **The Company** may at any time instruct a **User** to operate any one or more **BM Unit(s)** so as to provide the following components of **Mode A Frequency Response**:-

(a)   **Primary Response**;

(b)   **Secondary Response**;

(c)   **High Frequency Response**,

in any of the permissible combinations set out in the relevant table in the **Mandatory Services Agreement**.

4.1.3.5   **The Company** shall not instruct a **User** to provide **Mode A Frequency Response** and any **Commercial Ancillary Service** of **Frequency Response** simultaneously.

4.1.3.6   In the event that any instruction to provide **Frequency Response** does not state whether the instruction is to provide **Mode A Frequency Response** or any **Commercial Ancillary Service** of **Frequency Response**, such instruction shall be deemed to be an instruction to provide **Mode A Frequency Response**.

User's Obligation to Provide *Response*

4.1.3.7   When a **User** is instructed in accordance with Paragraphs 4.1.3.4 and/or 4.1.3.6 to operate a **BM Unit** so as to provide any component(s) of **Mode A Frequency Response**, that **User** shall operate that **BM Unit** so as to provide, for any **Frequency Deviation** and at any level of **De-Load**, at least the amount of **Primary Response** and/or **Secondary**

Response and/or **High Frequency Response** set out respectively in the relevant **Frequency Response Capability Data** tables in the **Mandatory Services Agreement** (as such tables are to be interpreted in accordance with Paragraph 4.1.3.11).

4.1.3.7A   For the avoidance of doubt a **User** shall ensure that the **Transmission Entry Capacity**, and if relevant the **STTEC** and\or **LDTEC** and\or any **Temporary Received TEC** less any **Temporary Donated TEC**, for the relevant **Connection Site** shall be sufficient to enable it to comply with its obligations under Paragraph 4.1.3.7 above at all times and in respect of all **BM Units.**

Calculation of Payments

4.1.3.8   The payments to be made by **The Company** to a **User** hereunder in respect of the provision of any **Mode A Frequency Response** from a **BM Unit** shall be comprised of **Holding Payments** and **Response Energy Payments** and shall be determined in accordance with the formulae in, respectively, Paragraphs 4.1.3.9 and 4.1.3.9A and in accordance with Paragraphs 4.1.3.10 to 4.1.3.12 inclusive.

*Payment Formulae - **Holding Payments***

4.1.3.9   The **Holding Payments** for a **BM Unit** to be made by **The Company** to a **User** referred to in Paragraph 4.1.3.8 shall be calculated in accordance with the following formula:-

$$HP_M = P_M + H_M + S_M$$

Where:

HP_M is the **Holding Payment** to be made to the **User** calculated in £ per minute.

P_M is the payment per minute to be made by **The Company** to the **User** for the **Ancillary Service** of **Primary Response** provided by the **User** from the **BM Unit** concerned pursuant to an instruction from **The Company** to provide **Mode A Frequency Response**, and is calculated as follows:-

$$P_M = (P_{PR} \times P_{MW}(1 - SF_P)) \times K_T \times K_{GRC} \times \left[\frac{1}{60}\right]$$

H_M is the payment per minute to be made by **The Company** to the **User** for the **Ancillary Service** of **High Frequency Response** provided by the **User** from the **BM Unit** concerned pursuant to an instruction from **The Company** to provide **Mode A Frequency Response**, and is calculated as follows:-

$$H_M = (H_{PR} \times H_{MW}(1 - SF_H)) \times K_T \times K_{GRC} \times \left[\frac{1}{60}\right]$$

S_M is the payment per minute to be made by **The Company** to the **User** for the **Ancillary Service** of **Secondary Response** provided by the **User** from the **BM Unit** concerned pursuant to an instruction from **The Company** to provide **Mode A Frequency Response**, and is calculated as follows:-

$$S_M = (S_{PR} \times S_{MW}(1 - SF_S)) \times K_T \times K_{GRC} \times \left[\frac{1}{60}\right]$$

In this Paragraph 4.1.3.9, the following terms shall have the following meanings:-

P_{PR} = the appropriate payment rate for **Primary Response** determined in accordance with Paragraph 4.1.3.13;

P_{MW} = the **Primary Response** capability (expressed in MW) for the level of **De-Load** of the **BM Unit** concerned at the end of the minute in which the service is provided. In the case of **Power Park Modules** this component must not exceed the value of P_{CAP} as calculated in 4.1.3.9.1;

H_{PR} = the appropriate payment rate for **High Frequency Response** determined in accordance with Paragraph 4.1.3.13;

H_{MW} = the **High Frequency Response** capability (expressed in MW) for the level of **De-Load** of the **BM Unit** concerned at the end of the minute in which the service is provided. In the case of **Power Park Modules** this component must not exceed the value of H_{CAP} as calculated in 4.1.3.9.2;

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S_{PR} = the appropriate payment rate for **Secondary Response** determined in accordance with Paragraph 4.1.3.13;

S_{MW} = the **Secondary Response** capability (expressed in MW) for the level of **De-Load** of the **BM Unit** concerned at the end of the minute in which the service is provided. In the case of **Power Park Modules** this component must not exceed the value of S_{CAP} as calculated in 4.1.3.9.3;

K_T = the ambient temperature adjustment factor. **The Company** and each **User** acknowledge and agree, as between **The Company** and that **User**, that K_T shall be deemed to be 1 for the purposes of calculating payments until such time as they agree upon an appropriate formula and a suitable method of measuring the ambient temperature on a minute by minute basis which shall be set out in the **Mandatory Services Agreement**. In the event that any agreed method of measuring the ambient temperature on a minute by minute basis should fail following its implementation, then **The Company** and each **User** acknowledge and agree, as between **The Company** and that **User**, that K_T shall be deemed to be 1 until the method of measuring the ambient temperature on a minute by minute basis is restored;

K_{GRC} = where the **BM Unit** is a **CCGT Module**, the plant configuration adjustment factor set out in the relevant table in the **Mandatory Services Agreement** for the configuration of the **BM Unit** concerned at the time at which the capability to provide the service is carried, otherwise 1;

SF_P = 0, subject to Paragraph 4.1.3.21 (e);

SF_S = 0, subject to Paragraph 4.1.3.21 (e);

SF_H = 0, subject to Paragraph 4.1.3.21 (e).

4.1.3.9.1 Calculation of the Primary Response Cap for Power Park Modules

A cap on the level of Primary Response Capability is calculated as follows:

$$P_{CAP} = \frac{Current\ MEL}{Registered\ Capacity} \times Response\ Capability$$

Where Current MEL is the current **Maximum Export Limit** as submitted by the relevant **Generator** to **the Company**.

Where **Registered Capacity** is that as defined in CUSC Section 11 and GridCode as declared by the **Generator**.

Where Response Capability is that which is set out in the relevant **Frequency Response Capability Data** tables in the **Mandatory Services Agreement** for the applicable level of **De-load**.

4.1.3.9.2   Calculation of the High Response Cap for Power Park Modules

A cap on the level of High Response Capability is calculated as follows:

$$H_{CAP} = \frac{Current\ MEL}{Registered\ Capacity} \times Response\ Capability$$

Where Current MEL is the current **Maximum Export Limit** as submitted by the relevant **Generator** to **the Company**.

Where **Registered Capacity** is that as defined in CUSC Section 11 and GridCode as declared by the **Generator**.

Where Response Capability is that which is set out in the relevant **Frequency Response Capability Data** tables in the **Mandatory Services Agreement** for the applicable level of **De-load**.

4.1.3.9.3   Calculation of the Secondary Response Cap for Power Park Modules

A cap on the level of Primary Response Capability is calculated as follows:

$$S_{CAP} = \frac{Current\ MEL}{Registered\ Capacity} \times Response\ Capability$$

Where Current MEL is the current **Maximum Export Limit** as submitted by the relevant **Generator** to **the Company**.

Where **Registered Capacity** is that as defined in CUSC Section 11 and GridCode as declared by the **Generator**.

Where Response Capability is that which is set out in the relevant **Frequency Response Capability Data** tables in the **Mandatory Services Agreement** for the applicable level of **De-load**.