

**DATA REGISTRATION CODE
(DRC)
GRID CODE MODIFICATION GC0156
DATED 21 NOVEMBER 2022**

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(This contents page does not form part of the Grid Code)

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DRC.1 **INTRODUCTION**

DRC.1.1 The **Data Registration Code** ("DRC") presents a unified listing of all data required by **The Company** from **Users** (including Restoration Service Providers where they are not already a User) and by **Users** (including Restoration Service Providers where they are not already a User) from **The Company**, from time to time under the **Grid Code**. The data which is specified in each section of the **Grid Code** is collated here in the **DRC**. Where there is any inconsistency in the data requirements under any particular section of the **Grid Code** and the **Data Registration Code** the provisions of the particular section of the **Grid Code** shall prevail.

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

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

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

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

DRC.1.6 For the purposes of this DRC, if a User is also a Restoration Service Provider they shall only need to submit the data once stating on their return that they are also a Restoration Service Provider. If a Restoration Service Provider does not have a CUSC Contract then the data required to be submitted shall be pursuant to the terms of the Anchor Plant Contract or Top Up Restoration Contract.

Commented [CA(P1): Might it be possible to clarify which return this is – Gcode ref?

Do we mean on their return re their role as a User?

Commented [CA(P2): Delete space

DRC.2 **OBJECTIVE**

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

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

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

DRC.3 **SCOPE**

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

- (a) **Generators** (including those undertaking **OTSDUW** and/or those who own and/or operate **DC Connected Power Park Modules**);
- (b) **Network Operators**;
- (c) **DC Converter Station** owners and **HVDC System Owners**;
- (d) **Suppliers**;
- (e) **Non-Embedded Customers**;
- (f) **Externally Interconnected System Operators**;
- (g) **Interconnector Users**;
- (h) **BM Participants**; and
- (i) **Pumped Storage Generators** and **Generators** in respect of **Electricity Storage Modules**.

(j) **Restoration Service Providers** which would be pursuant to the requirements of their **Anchor Restoration Contract** or **Top Up Restoration Contract**.

Commented [CA(P3): ...Providers (pursuant to the requirements of their **Restoration Contract**)

DRC.3.2 For the avoidance of doubt, the **DRC** applies to both **GB Code Users** and **EU Code Users**.

DRC.4	<u>DATA CATEGORIES AND STAGES IN REGISTRATION</u>
DRC.4.1.1	<p>Within the DRC each data item is allocated to one of the following three categories:</p> <ul style="list-style-type: none"> (a) Standard Planning Data (SPD) (b) Detailed Planning Data (DPD) (c) Operational Data
DRC.4.2	<u>Standard Planning Data (SPD)</u>
DRC.4.2.1	The Standard Planning Data listed and collated in this DRC is that data listed in Part 1 of the Appendix to the PC .
DRC.4.2.2	Standard Planning Data will be provided to The Company in accordance with PC.4.4 and PC.A.1.2.
DRC.4.3	<u>Detailed Planning Data (DPD)</u>
DRC.4.3.1	The Detailed Planning Data listed and collated in this DRC is categorised as DPD I and DPD II and is that data listed in Part 2 of the Appendix to the PC .
DRC.4.3.2	Detailed Planning Data will be provided to The Company in accordance with PC.4.4, PC.4.5 and PC.A.1.2.
DRC.4.4	<u>Operational Data</u>
DRC.4.4.1	Operational Data is data which is required by the Operating Codes and the Balancing Codes . Within the DRC , Operational Data is sub-categorised according to the Code under which it is required, namely OC1 , OC2 , BC1 or BC2 .
DRC.4.4.2	Operational Data is to be supplied in accordance with timetables set down in the relevant Operating Codes and Balancing Codes and repeated in tabular form in the schedules to the DRC .
DRC.5	<u>PROCEDURES AND RESPONSIBILITIES</u>
DRC.5.1	<p><u>Responsibility For Submission And Updating Of Data</u></p> <p>In accordance with the provisions of the various sections of the Grid Code, each User must submit data as summarised in DRC.6 and listed and collated in the attached schedules.</p>
DRC.5.2	<u>Methods Of Submitting Data</u>
DRC.5.2.1	Wherever possible, the data schedules to the DRC are structured to serve as standard formats for data submission and such format must be used for the written submission of data to The Company .
DRC.5.2.2	Data must be submitted to the Transmission Control Centre notified by The Company , or to such other department or address as The Company may from time to time advise. The name of the person at the User Site who is submitting each schedule of data must be included.
DRC.5.2.3	<p>Where a computer data link exists between a User and The Company, data may be submitted via this link. The Company will, in this situation, provide computer files for completion by the User containing all the data in the corresponding DRC schedule.</p> <p>Data submitted can be in an electronic format using a proforma to be supplied by The Company or other format to be agreed annually in advance with The Company. In all cases the data must be complete and relate to, and relate only to, what is required by the relevant section of the Grid Code.</p>
DRC.5.2.4	Other modes of data transfer, such as magnetic tape, may be utilised if The Company gives its prior written consent.

DRC.5.2.5

Generators, HVDC System Owners and DC Converter Station owners submitting data for a **Power Generating Module, Generating Unit, DC Converter, HVDC System, Power Park Module** (including **DC Connected Power Park Modules**) or **CCGT Module** before the issue of a **Final Operational Notification** should submit the **DRC** data schedules and compliance information required under the **CP** electronically using the **User Data File Structure** unless otherwise agreed with **The Company**. Data required from Restoration Service Providers where not already provided would be pursuant to the terms of the Anchor Restoration Contract or Top Up Restoration Contract.

Commented [CA(P4): ...their Restoration Contract.

DRC.5.3 Changes To User's Data

DRC.5.3.1 Whenever a **User** becomes aware of a change to an item of data which is registered with **The Company**, the **User** must notify **The Company** in accordance with each section of the Grid Code. The method and timing of the notification to **The Company** is set out in each section of the Grid Code. Data required from Restoration Service Providers where not already provided would be pursuant to the terms of the Anchor Restoration Contract or Top Up Restoration Contract.

Commented [CA(P5)]:their Restoration Contract.

DRC.5.4 Data Not Supplied

DRC.5.4.1 **Users** and **The Company** are obliged to supply data as set out in the individual sections of the **Grid Code** and repeated in the **DRC**. If a **User** fails to supply data when required by any section of the **Grid Code**, **The Company** will estimate such data if and when, in **The Company's** view, it is necessary to do so. If **The Company** fails to supply data when required by any section of the **Grid Code**, the **User** to whom that data ought to have been supplied, will estimate such data if and when, in that **User's** view, it is necessary to do so. Such estimates will, in each case, be based upon data supplied previously for the same **Plant** or **Apparatus** or upon corresponding data for similar **Plant** or **Apparatus** or upon such other information as **The Company** or that **User**, as the case may be, deems appropriate.

DRC.5.4.2 **The Company** will advise a **User** in writing of any estimated data it intends to use pursuant to DRC.5.4.1 relating directly to that **User's Plant** or **Apparatus** in the event of data not being supplied.

DRC.5.4.3 A **User** will advise **The Company** in writing of any estimated data it intends to use pursuant to DRC.5.4.1 in the event of data not being supplied.

DRC.5.4.4 Data requirements defined in DRC5.4.1 – DRC5.4.3 as applicable to a Restoration Service Provider where that Restoration Service Provider is not a User, would be pursuant to the terms of the Anchor Restoration Contract or Top Up Restoration Contract.

Commented [CA(P6)]: Is this needed as RSPs are defined as a User.

If it is then DRC5.4.1-5.4.3 don't relate to data requirements. How about:

Clauses DRC5.4.1 – DRC5.4.3 apply to a **Restoration Service Provider**.....

Commented [CA(P7)]: But as defined in DRC3.1 a Restoration Service Provider is a User....

Commented [CA(P8)]:their Restoration Contract.

DRC.5.5 Substituted Data

DRC.5.5.1 In the case of PC.A.4 only, if the data supplied by a **User** does not in **The Company's** reasonable opinion reflect the equivalent data recorded by **The Company**, **The Company** may estimate such data if and when, in the view of **The Company**, it is necessary to do so. Such estimates will, in each case, be based upon data supplied previously for the same **Plant** or **Apparatus** or upon corresponding data for similar **Plant** or **Apparatus** or upon such other information as **The Company** deems appropriate.

DRC.5.5.2 **The Company** will advise a **User** in writing of any estimated data it intends to use pursuant to DRC.5.5.1 relating directly to that **User's Plant** or **Apparatus** where it does not in **The Company's** reasonable opinion reflect the equivalent data recorded by **The Company**. Such estimated data will be used by **The Company** in place of the appropriate data submitted by the **User** pursuant to PC.A.4 and as such shall be deemed to accurately represent the **User's** submission until such time as the **User** provides data to **The Company's** reasonable satisfaction.

DRC.6 DATA TO BE REGISTERED

DRC.6.1 Schedules 1 to 20 attached cover the following data areas.

DRC.6.1.1 Schedule 1 – Power Generating Module, Generating Unit (or CCGT Module), Power Park Module (including DC Connected Power Park Module and Power Park Unit), HVDC System and DC Converter Technical Data.

Comprising **Power Generating Module, Generating Unit (and CCGT Module), Power Park Module (including DC Connected Power Park Module and Power Park Unit) and DC Converter** fixed electrical parameters. Any data required under DRC Schedule 1 from Restoration Service Providers where not already provided, would be pursuant to the terms of the Anchor Restoration Contract or Top Up Restoration Contract.

Commented [CA(P9)]:their Restoration Contract.

DRC.6.1.2 Schedule 2 - Generation Planning Parameters

DRC.6.1.3

Comprising ~~the~~ **Genset** parameters and data provided from Restoration Service Providers (if necessary) required for **Operational Planning** studies.

Schedule 3 - Large Power Station Outage Programmes, Output Usable and Inflexibility Information.

Comprising generation and storage outage ~~planning~~in respect of Large Power Stations, **Output Usable** and inflexibility information at timescales down to the daily **BM Unit Data** submission. In the case of Restoration Service Providers, this data needs to only to be provided where such a Resoration Service Provider has an Anchor Restoration Contract or Top Up Restoration Contract other than in respect of **Large Power Stations** where the data will already be required.

Commented [CA(P10)]: How would an RSP know if it was necessary?

Commented [CA(P11)]: Its not clear whether ths relates to **Genset** parameters and data provided only from RSPs OR if it is Genset parameters fromGenerators and RSPs

Can I confirm if all this data in schedule 2 is required from all RSPs who have embedded plant

Commented [CA(P12)]: space

Commented [CA(P13)]: bold

Commented [CA(P14)]: unbold

Commented [CA(P15)]: ...has a Restoration Contract.

Commented [CA(P16)]: Can I confirm if all this data in schedule 2 is required from all RSPs who have embedded plant

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

Commented [CA(P17)]: This needs to be consistent with OC2.2.2 which reads

Outages of **Plant** and **Apparatus** of **Restoration Service Providers** and key **Plant** and **Apparatus** of a **Network Operator's System** associated with a **Distribution Restoration Zone Plan** also need to be co-ordinated with outages on the **National Electricity Transmission System**.

Schedule 6 refers to User Systems.

Consistency would be good.

- DRC.6.1.18 Schedule 18 – Generators Undertaking OTSDUW Arrangements
Comprising electrical parameters relating to **OTSDUW Plant and Apparatus** between the **Offshore Grid Entry Point** and **Transmission Interface Point**.
- DRC.6.1.19 Schedule 19 – User Data File Structure
Comprising information relating to the **User Data File Structure**.
- DRC.6.1.20 Schedule 20 – Grid Forming Plant Data
Comprising information relating to **Grid Forming Plant**
- DRC.6.2 The **Schedules** applicable to each class of **User** are as follows:

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

Notes:

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

- (4) In the case of Schedule 2, **Generators, HVDC System Owners, DC Converter Station owners or Network Operators** in the case of **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** or **Embedded DC Converter Stations** not subject to a **Bilateral Agreement**, would only be expected to submit data in relation to **Standard Planning Data** as required by the **Planning Code**.
- (5) In the case of **Generators** undertaking **OTSDUW**, the **Generator** will need to supply **User** data in accordance with the requirements of **Large** or **Small Power Stations** (as defined in DRC.6.2) up to the **Offshore Grid Entry Point**. In addition, the **User** will also need to submit **Offshore Transmission System** data in between the **Interface Point** and its **Connection Points** in accordance with the requirements of Schedule 18.
- (6) In the case of **Restoration Service Providers**, data only needs to be provided by a **Restoration Service Provider** where such a **Restoration Service Provider** is not a **CUSC Party** and the data has not been submitted previously. In this case the data to be submitted would be would be pursuant to the the terms of the **Anchor Restoration Contract** or **Top Up Restoration Contract**.

Commented [CA(P18): Provider

Commented [CA(P19): This isn't about the timing of submissions (submitted previously) but the need to make a submission (even later) where there is an obligation to submit the data.

Commented [CA(P20):their **Restoration Contract**.

SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA

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ABBREVIATIONS:

SPD = Standard Planning Data

% on MVA = % on Rated MVA

% on 100 = % on 100 MVA

DPD = Detailed Planning Data

RC = Registered Capacity

MC = Maximum Capacity

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

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

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

Note:

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

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

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

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

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

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

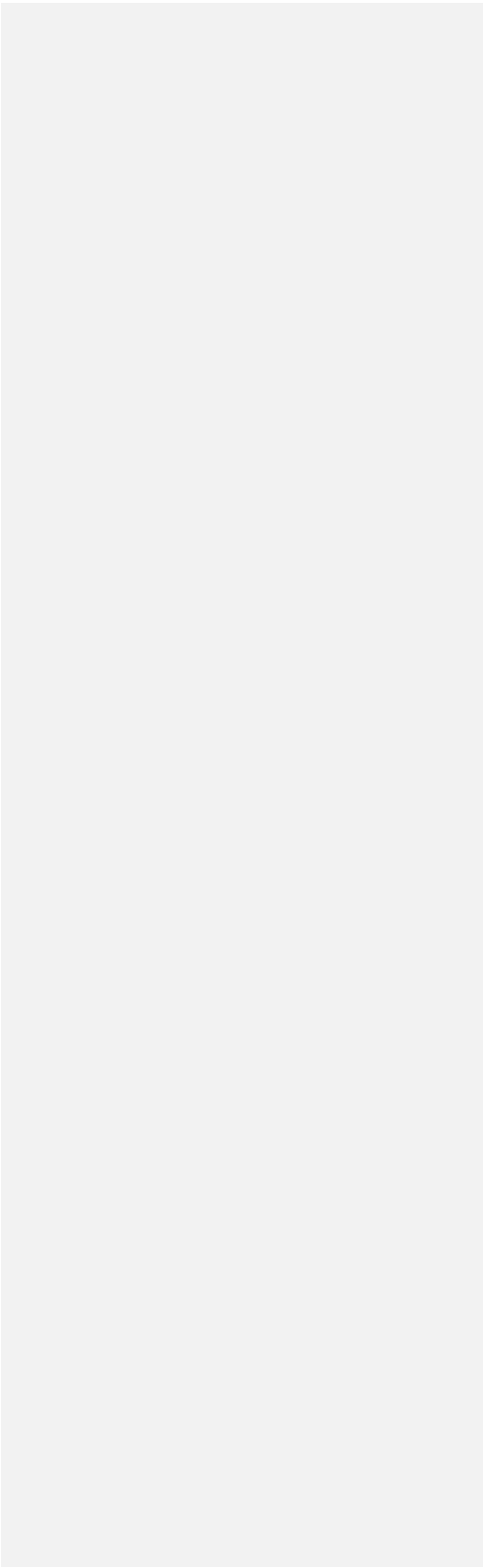
SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA
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POWER STATION NAME: _____

DATE: _____

DATA DESCRIPTION	UNITS	DATA to		DATA CAT.	GENERATING UNIT OR STATION DATA						
		RTL	CUSC		F.Yr.	F.Yr.	F.Yr.	F.Yr.	F.Yr.	F.Yr.	F.Yr.
		Cont	App.		0	1	2	3	4	5	6
		ract	Form								
GENERATING STATION DEMANDS: Demand associated with the Power Station supplied through the National Electricity Transmission System or the Generator's User System (PC.A.5.2) - The maximum Demand that could occur. - Demand at specified time of annual peak half hour of National Electricity Transmission System Demand at Annual ACS Conditions . - Demand at specified time of annual minimum half-hour of National Electricity Transmission System Demand . (Additional Demand supplied through the unit transformers to be provided below) <u>INDIVIDUAL GENERATING UNIT (OR AS THE CASE MAY BE, SYNCHRONOUS POWER GENERATING MODULE OR CCGT MODULE) DATA</u>	MW	<input type="checkbox"/>		DPD I							
	MVAr	<input type="checkbox"/>									
	MW	<input type="checkbox"/>		DPD II							
	MVAr	<input type="checkbox"/>		DPD II							
	MW	<input type="checkbox"/>		DPD II							
	MVAr	<input type="checkbox"/>		DPD II							
					G1	G2	G3	G4	G5	G6	STN
Point of connection to the National Electricity Transmission System (or the Total System if embedded) of the Generating Unit or Synchronous Power Generating Module (other than a CCGT Unit) or the CCGT Module , as the case may be in terms of geographical and electrical location and system voltage (PC.A.3.4.1)	Text	<input type="checkbox"/>	■	SPD							
If the busbars at the Connection Point are normally run in separate sections identify the section to which the Generating Unit (other than a CCGT Unit) or Synchronous Power Generating Module or CCGT Module , as the case may be is connected (PC.A.3.1.5)	Section Number	<input type="checkbox"/>	■	SPD							

Type of Unit (steam, Gas Turbine Combined Cycle Gas Turbine Unit , tidal, wind, storage type etc.) (PC.A.3.2.2 (h), PC.A.3.4.4)			□											
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SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA
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<div> <div>INDIVIDUAL SYNCHRONOUS POWER GENERATING MODULE</div> <div>GENERATING UNIT (OR AS THE CASE MAY BE, CCGT MODULE) DATA</div> </div>					G1	G2	G3	G4	G5	G6	STN
<div> <div>A list of the Generating Units and CCGT Units within a Synchronous Power Generating Module or CCGT Module, identifying each CCGT Unit, and the Power Generating Module or CCGT Module of which it forms part, unambiguously. In the case of a Range CCGT Module, details of the possible configurations should also be submitted. (PC.A.3.2.2 (g))</div> </div>	□	■	SPD								

SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA
PAGE 4 OF 19

DATA DESCRIPTION	UNITS	DATA to		DATA CAT.	GENERATING UNIT (OR CCGT MODULE, AS THE CASE MAY BE)						
		CUSC Cont ract	RTL CUSC App. Form		G1	G2	G3	G4	G5	G6	STN
Rated MVA (PC.A.3.3.1)	MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+							
Rated MW (PC.A.3.3.1)	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+							
Rated terminal voltage (PC.A.5.3.2.(a) & PC.A.5.4.2 (b))	kV	<input type="checkbox"/>		DPD I							
*Performance Chart at Onshore Synchronous Generating Unit stator terminals (PC.A.3.2.2(f)(i))				SPD	(see OC2 for specification)						
*Performance Chart of the Offshore Synchronous Generating Unit at the Offshore Grid Entry Point (PC.A.3.2.2(f)(ii))											
* Synchronous Generating Unit Performance Chart (PC.A.3.2.2(f))											
* Power Generating Module Performance Chart of the Synchronous Power Generating Module (PC.A.3.2.2(f))											
* Maximum terminal voltage set point (PC.A.5.3.2.(a) & PC.A.5.4.2 (b))	kV	<input type="checkbox"/>		DPD I							
* Terminal voltage set point step resolution – if not continuous (PC.A.5.3.2.(a) & PC.A.5.4.2 (b))	kV	<input type="checkbox"/>		DPD I							
*Output Usable (on a monthly basis) (PC.A.3.2.2(b))	MW			SPD	(except in relation to CCGT Modules when required on a unit basis under the Grid Code , this data item may be supplied under Schedule 3)						
Turbo-Generator inertia constant (for synchronous machines) (PC.A.5.3.2(a))	MW secs /MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+							
Short circuit ratio (synchronous machines) (PC.A.5.3.2(a))		<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+							
Normal auxiliary load supplied by the Generating Unit at rated MW output (PC.A.5.2.1)	MW	<input type="checkbox"/>		DPD II							
Rated field current at rated MW and MVA output and at rated terminal voltage (PC.A.5.3.2 (a))	MVA	<input type="checkbox"/>		DPD II							
Rated field current at rated MW and MVA output and at rated terminal voltage (PC.A.5.3.2 (a))	A	<input type="checkbox"/>		DPD II							
Field current open circuit saturation curve (as derived from appropriate manufacturers' test certificates): (PC.A.5.3.2 (a))											
120% rated terminal volts	A	<input type="checkbox"/>		DPD II							
110% rated terminal volts	A	<input type="checkbox"/>		DPD II							
100% rated terminal volts	A	<input type="checkbox"/>		DPD II							
90% rated terminal volts	A	<input type="checkbox"/>		DPD II							
80% rated terminal volts	A	<input type="checkbox"/>		DPD II							
70% rated terminal volts	A	<input type="checkbox"/>		DPD II							
60% rated terminal volts	A	<input type="checkbox"/>		DPD II							
50% rated terminal volts	A	<input type="checkbox"/>		DPD II							
IMPEDANCES:											
(Unsaturated)											
Direct axis synchronous reactance (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I							
Direct axis transient reactance (PC.A.3.3.1(a)& PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD+							
Direct axis sub-transient reactance (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I							
Quad axis synch reactance (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I							
Quad axis sub-transient reactance (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I							
Stator leakage reactance (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I							
Armature winding direct current resistance. (PC.A.5.3.2(a))	% on MVA	<input type="checkbox"/>		DPD I							

In Scotland, negative sequence resistance | % on MVA | □ | | | **DPD I** | | | | | | | | | |

Note:- the above data item relating to armature winding direct-current resistance need only be provided by **Generators** in relation to **Generating Units or Synchronous Generating Units** within **Power Generating Modules** commissioned after 1st March 1996 and in cases where, for whatever reason, the **Generator** is aware of the value of the data item.

SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA
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DATA DESCRIPTION	UNITS	DATA to		DATA CAT.	GENERATING UNIT OR STATION DATA						
		CUSC Contract	RTL CUSC App. Form		G1	G2	G3	G4	G5	G6	STN
TIME CONSTANTS (Short-circuit and Unsaturated) Direct axis transient time constant (PC.A.5.3.2(a)) Direct axis sub-transient time constant (PC.A.5.3.2(a)) Quadrature axis sub-transient time constant (PC.A.5.3.2(a)) Stator time constant (PC.A.5.3.2(a))	S	<input type="checkbox"/>		DPD I							
	S	<input type="checkbox"/>		DPD I							
	S	<input type="checkbox"/>		DPD I							
	S	<input type="checkbox"/>		DPD I							
MECHANICAL PARAMETERS (PC.A.5.3.2(a)) The number of turbine generator masses Diagram showing the Inertia and parameters for each turbine generator mass for the complete drive train Diagram showing Stiffness constants and parameters between each turbine generator mass for the complete drive train Number of poles Relative power applied to different parts of the turbine Torsional mode frequencies Modal damping decrement factors for the different mechanical modes	Kgm ²	<input type="checkbox"/>		DPD II							
		<input type="checkbox"/>		DPD II							
	Nm/rad	<input type="checkbox"/>		DPD II							
		<input type="checkbox"/>		DPD II							
	%	<input type="checkbox"/>		DPD II							
		<input type="checkbox"/>		DPD II							
	Hz	<input type="checkbox"/>		DPD II							
		<input type="checkbox"/>		DPD II							
GENERATING UNIT STEP-UP TRANSFORMER											
Rated MVA (PC.A.3.3.1 & PC.A.5.3.2)	MVA	<input type="checkbox"/>	■	SPD+							
Voltage Ratio (PC.A.5.3.2)	-	<input type="checkbox"/>		DPD I							
Positive sequence reactance: (PC.A.5.3.2)											
Max tap	% on MVA	<input type="checkbox"/>	■	SPD+							
Min tap	% on MVA	<input type="checkbox"/>	■	SPD+							
Nominal tap	% on MVA	<input type="checkbox"/>	■	SPD+							
Positive sequence resistance: (PC.A.5.3.2)											
Max tap	% on MVA	<input type="checkbox"/>		DPD II							
Min tap	% on MVA	<input type="checkbox"/>		DPD II							
Nominal tap	% on MVA	<input type="checkbox"/>		DPD II							
Zero phase sequence reactance (PC.A.5.3.2)	% on MVA	<input type="checkbox"/>		DPD II							
Tap change range (PC.A.5.3.2)	+% / -%	<input type="checkbox"/>		DPD II							
Tap change step size (PC.A.5.3.2)	%	<input type="checkbox"/>		DPD II							
Tap changer type: on-load or off-circuit (PC.A.5.3.2)	On/Off	<input type="checkbox"/>		DPD II							

SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA
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DATA DESCRIPTION	UNITS	DATA to		DATA CAT.	GENERATING UNIT OR STATION DATA						
		RTL CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN
EXCITATION:											
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 9 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 and Synchronous Power Generating Unit excitation control systems commissioned after the relevant date, those Generating Unit or Synchronous Power Generating Unit excitation control systems recommissioned for any reason such as refurbishment after the relevant date and Generating Unit or Synchronous Power Generating Unit excitation 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 or Synchronous Power Generating Unit .											
Option 1											
DC gain of Excitation Loop (PC.A.5.3.2(c))			<input type="checkbox"/>	DPD II							
Max field voltage (PC.A.5.3.2(c))	V		<input type="checkbox"/>	DPD II							
Min field voltage (PC.A.5.3.2(c))	V		<input type="checkbox"/>	DPD II							
Rated field voltage (PC.A.5.3.2(c))	V		<input type="checkbox"/>	DPD II							
Max rate of change of field volts: (PC.A.5.3.2(c))											
Rising	V/Sec		<input type="checkbox"/>	DPD II							
Falling	V/Sec		<input type="checkbox"/>	DPD II							
Details of Excitation Loop (PC.A.5.3.2(c)) Described in block diagram form showing transfer functions of individual elements	Diagram		<input type="checkbox"/>	DPD II	(please attach)						
Dynamic characteristics of over- excitation limiter (PC.A.5.3.2(c))			<input type="checkbox"/>	DPD II							
Dynamic characteristics of under-excitation limiter (PC.A.5.3.2(c))			<input type="checkbox"/>	DPD II							
Option 2											
Exciter category, e.g. Rotating Exciter , or Static Exciter etc (PC.A.5.3.2(c))	Text		<input type="checkbox"/>	■ SPD							
Excitation System Nominal Response (PC.A.5.3.2(c))	Sec ⁻¹		<input type="checkbox"/>	DPD II							
V_E											
Rated Field Voltage (PC.A.5.3.2(c)) U_{fN}	V		<input type="checkbox"/>	DPD II							
No-load Field Voltage (PC.A.5.3.2(c)) U_{f0}	V		<input type="checkbox"/>	DPD II							
Excitation System On-Load (PC.A.5.3.2(c))			<input type="checkbox"/>								
Positive Ceiling Voltage U_{pL+}	V		<input type="checkbox"/>	DPD II							
Excitation System No-Load (PC.A.5.3.2(c))			<input type="checkbox"/>								
Positive Ceiling Voltage U_{p0+}	V		<input type="checkbox"/>	DPD II							
Excitation System No-Load (PC.A.5.3.2(c))			<input type="checkbox"/>								
Negative Ceiling Voltage U_{p0-}	V		<input type="checkbox"/>	DPD II							
Power System Stabiliser (PSS) fitted (PC.A.3.4.2)	Yes/No		<input type="checkbox"/>	■ SPD							
Stator Current Limit (PC.A.5.3.2(c))	A		<input type="checkbox"/>	DPD II							
Details of Excitation System (PC.A.5.3.2(c)) (including PSS if fitted) described in block diagram form showing transfer functions of individual elements.	Diagram		<input type="checkbox"/>	DPD II							
Details of Over-excitation Limiter (PC.A.5.3.2(c)) described in block diagram form showing transfer functions of individual elements.	Diagram		<input type="checkbox"/>	DPD II							
Details of Under-excitation Limiter (PC.A.5.3.2(c)) described in block diagram form showing	Diagram		<input type="checkbox"/>	DPD II							

transfer functions of individual elements.

SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA
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DATA DESCRIPTION	UNITS	DATA TO		DATA CAT.	GENERATING UNIT OR STATION DATA							
		RTL CISC Contract	CISC App. Form		G1	G2	G3	G4	G5	G6	STN	
<u>GOVERNOR AND ASSOCIATED PRIME MOVER PARAMETERS</u>												
<u>Note:</u> The data items requested under Option 1 below may continue to be provided by Generators in relation to Generating Units on the System at 9 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 and Synchronous Power Generating Unit governor control systems commissioned after the relevant date, those Generating Unit and Synchronous Power Generating Unit governor control systems recommissioned for any reason such as refurbishment after the relevant date and Generating Unit and Synchronous Power 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 and Synchronous Power Generating Unit .												
Option 1												
<u>GOVERNOR PARAMETERS (REHEAT UNITS) (PC.A.5.3.2(d) – Option 1(i))</u>												
HP Governor average gain	MW/Hz	□			DPD II							
Speeder motor setting range	Hz	□			DPD II							
HP governor valve time constant	S	□			DPD II							
HP governor valve opening limits		□			DPD II							
HP governor valve rate limits		□			DPD II							
Re-heat time constant (stored Active Energy in reheater)	S	□			DPD II							
IP governor average gain	MW/Hz	□			DPD II							
IP governor setting range	Hz	□			DPD II							
IP governor time constant	S	□			DPD II							
IP governor valve opening limits		□			DPD II							
IP governor valve rate limits		□			DPD II							
Details of acceleration sensitive elements HP & IP in governor loop		□			DPD II	(please attach)						
Governor block diagram showing transfer functions of individual elements		□			DPD II	(please attach)						
<u>GOVERNOR</u> (Non-reheat steam and Gas Turbines) (PC.A.5.3.2(d) – Option 1(ii))												
Governor average gain	MW/Hz	□			DPD II							
Speeder motor setting range		□			DPD II							
Time constant of steam or fuel governor valve	S	□			DPD II							
Governor valve opening limits		□			DPD II							
Governor valve rate limits		□			DPD II							
Time constant of turbine	S	□			DPD II							
Governor block diagram		□			DPD II	(please attach)						

SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA
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DATA DESCRIPTION	UNITS	DATA to		DATA CAT.	GENERATING UNIT OR STATION DATA						
		CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN
(PC.A.5.3.2(d) – Option 1(iii))											
<u>BOILER & STEAM TURBINE DATA*</u>											
Boiler time constant (Stored Active Energy)	S			DPD II							
HP turbine response ratio: (Proportion of Primary Response arising from HP turbine)	%			DPD II							
HP turbine response ratio: (Proportion of High Frequency Response arising from HP turbine)	%			DPD II							
End of Option 1											
Option 2											
<u>All Generating Units and Synchronous Power Generating Units</u>											
Governor Block Diagram showing transfer function of individual elements including acceleration sensitive elements		□		DPD II							
Governor Time Constant (PC.A.5.3.2(d) – Option 2(i)) #Governor Deadband (PC.A.5.3.2(d) – Option 2(i))	Sec	□		DPD II							
- Maximum Setting	±Hz			DPD II							
- Normal Setting	±Hz			DPD II							
- Minimum Setting	±Hz			DPD II							
Speeder Motor Setting Range (PC.A.5.3.2(d) – Option 2(i))	%	□		DPD II							
Average Gain (PC.A.5.3.2(d) – Option 2(i))	MW/Hz	□		DPD II							
<u>Steam Units</u>											
(PC.A.5.3.2(d) – Option 2(ii))											
HP Valve Time Constant	sec	□		DPD II							
HP Valve Opening Limits	%	□		DPD II							
HP Valve Opening Rate Limits	%/sec	□		DPD II							
HP Valve Closing Rate Limits	%/sec	□		DPD II							
HP Turbine Time Constant (PC.A.5.3.2(d) – Option 2(ii))	sec	□		DPD II							
IP Valve Time Constant	sec	□		DPD II							
IP Valve Opening Limits	%	□		DPD II							
IP Valve Opening Rate Limits	%/sec	□		DPD II							
IP Valve Closing Rate Limits	%/sec	□		DPD II							
IP Turbine Time Constant (PC.A.5.3.2(d) – Option 2(ii))	sec	□		DPD II							
LP Valve Time Constant	sec	□		DPD II							
LP Valve Opening Limits	%	□		DPD II							
LP Valve Opening Rate Limits	%/sec	□		DPD II							
LP Valve Closing Rate Limits	%/sec	□		DPD II							
LP Turbine Time Constant (PC.A.5.3.2(d) – Option 2(ii))	sec	□		DPD II							
Reheater Time Constant	sec			DPD II							
Boiler Time Constant	sec			DPD II							
HP Power Fraction	%			DPD II							
IP Power Fraction	%			DPD II							

Where the generating unit or synchronous power generating unit governor does not have a selectable deadband facility, then the actual value of the deadband need only be provided.

SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA
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DATA DESCRIPTION	UNITS	DATA to		DATA CAT.	GENERATING UNIT OR STATION DATA						
		CUSC Contract	CUSC App. Form		G1	G2	G3	G4	G5	G6	STN
Gas Turbine Units (PC.A.5.3.2(d) – Option 2(iii))											
Inlet Guide Vane Time Constant	sec	<input type="checkbox"/>		DPD II							
Inlet Guide Vane Opening Limits	%	<input type="checkbox"/>		DPD II							
Inlet Guide Vane Opening Rate Limits	%/sec	<input type="checkbox"/>		DPD II							
Inlet Guide Vane Closing Rate Limits	%/sec	<input type="checkbox"/>		DPD II							
(PC.A.5.3.2(d) – Option 2(iii))											
Fuel Valve Time Constant	sec	<input type="checkbox"/>		DPD II							
Fuel Valve Opening Limits	%	<input type="checkbox"/>		DPD II							
Fuel Valve Opening Rate Limits	%/sec	<input type="checkbox"/>		DPD II							
Fuel Valve Closing Rate Limits	%/sec	<input type="checkbox"/>		DPD II							
(PC.A.5.3.2(d) – Option 2(iii))											
Waste Heat Recovery Boiler Time Constant											
Hydro Generating Units (PC.A.5.3.2(d) – Option 2(iv))											
Guide Vane Actuator Time Constant	sec	<input type="checkbox"/>		DPD II							
Guide Vane Opening Limits	%	<input type="checkbox"/>		DPD II							
Guide Vane Opening Rate Limits	%/sec	<input type="checkbox"/>		DPD II							
Guide Vane Closing Rate Limits	%/sec	<input type="checkbox"/>		DPD II							
Water Time Constant	sec	<input type="checkbox"/>		DPD II							
Synchronous Electricity Storage Units and Modules (PC.A.5.3.2(d) – Option 2(v))											
Valve Actuator Time Constant	sec	<input type="checkbox"/>		DPD II							
Valve Opening Limits	%	<input type="checkbox"/>		DPD II							
Valve Opening Rate Limits	%/sec	<input type="checkbox"/>		DPD II							
Valve Closing Rate Limits	%/sec	<input type="checkbox"/>		DPD II							
For Synchronous Electricity Storage Modules which are derived from compressed air energy storage systems the above 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.											
End of Option 2											
UNIT CONTROL OPTIONS* (PC.A.5.3.2(e))											
Maximum droop	%	<input type="checkbox"/>		DPD II							
Normal droop	%			DPD II							
Minimum droop	%			DPD II							
Maximum Governor Deadband				DPD II							
Normal Governor Deadband				DPD II							
Minimum Governor Deadband											
Maximum Frequency Response Deadband ¹	±Hz			DPD II							
Normal Frequency Response Deadband ¹	±Hz			DPD II							
Minimum Frequency Response Deadband ¹	±Hz			DPD II							
Maximum Frequency Response Insensitivity ¹	±Hz			DPDII							
Normal Frequency Response Insensitivity ¹	±Hz			DPDII							
Minimum Frequency Response Insensitivity ¹	±Hz			DPDII							

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SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA

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

SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA

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

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SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA

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

SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA
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HVDC SYSTEM AND DC CONVERTER STATION TECHNICAL DATA

HVDC SYSTEM OR DC CONVERTER STATION NAME _____

DATE: _____

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

Configuration 4	Diagram	<input type="checkbox"/>			
Configuration 5		<input type="checkbox"/>			
Configuration 6	Diagram	<input type="checkbox"/>			
Remote ac connection arrangement		<input type="checkbox"/>			

**SCHEDULE 1 – POWER PARK MODULE, GENERATING UNIT (OR CCGT MODULE),
POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM
AND DC CONVERTER TECHNICAL DATA**

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Data Description	Units	DATA to RTL		Data Category	Operating Configuration					
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6
DC CONVERTER STATION AND HVDC SYSTEM DATA (PC.A.3.3.1d)										
DC Converter or HVDC Converter Type (e.g. current or Voltage source)	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD						
Point of connection to the National Electricity Transmission System (or the Total System if Embedded) of the DC Converter Station or HVDC System configuration in terms of geographical and electrical location and system voltage	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD						
If the busbars at the Connection Point are normally run in separate sections identify the section to which the DC Converter Station or HVDC System configuration is connected	Section Number	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD						
	MW			SPD +						
Rated MW import per pole [PC.A.3.3.1]	MW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPD +						
Rated MW export per pole [PC.A.3.3.1]		<input type="checkbox"/>	<input checked="" type="checkbox"/>							

Data Description	Units	DATA to RTL		Data Category	Operating Configuration					
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6
ACTIVE POWER TRANSFER CAPABILITY (PC.A.3.2.2)										
Registered Capacity	MW	<input type="checkbox"/>	■	SPD						
Registered Import Capacity	MW	<input type="checkbox"/>	■							
Minimum Generation	MW	<input type="checkbox"/>	■	SPD						
Minimum Import Capacity	MW	<input type="checkbox"/>	■							
Maximum HVDC Active Power	MW									
Transmission Capacity	MW	<input type="checkbox"/>		SPD						
Minimum Active Power Transmission Capacity	MW	<input type="checkbox"/>		SPD						
Import MW available in excess of Registered Import Capacity and Maximum Active Power Transmission Capacity	MW	<input type="checkbox"/>		SPD						
Time duration for which MW in excess of Registered Import Capacity is available	Min	<input type="checkbox"/>		SPD						
Export MW available in excess of Registered Capacity and Maximum Active Power Transmission Capacity .	MW	<input type="checkbox"/>		SPD						
Time duration for which MW in excess of Registered Capacity is available	Min	<input type="checkbox"/>		SPD						

SCHEDULE 1 –POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA

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

**SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR
CCGT MODULE), DC CONNECTED POWER PARK MODULE, HVDC SYSTEM,
POWER PARK MODULE AND DC CONVERTER TECHNICAL DATA**
PAGE 17 OF 19

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

**SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT
MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE,
HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA**
PAGE 18 OF 19

Data Description	Units	DATA to RTL		Data Category	Operating configuration					
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6

CONTROL SYSTEMS [PC.A.5.4.3.2]									
Static $V_{DC} - P_{DC}$ (DC voltage – DC power) or Static $V_{DC} - I_{DC}$ (DC voltage – DC current) characteristic (as appropriate) when operating as –Rectifier –Inverter									
Details of rectifier mode control system, in block diagram form together with parameters showing transfer functions of individual elements.	Diagram Diagram	<input type="checkbox"/> <input type="checkbox"/>		DPD II DPD II					
Details of inverter mode control system, in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II					
Details of converter transformer tap changer control system in block diagram form showing transfer functions of individual elements including parameters. (Only required for DC Converters and HVDC Systems connected to the National Electricity Transmission System .)	Diagram	<input type="checkbox"/>		DPD II					
Details of AC filter and reactive compensation equipment control systems in block diagram form showing transfer functions of individual elements including parameters. (Only required for DC Converters and HVDC Systems connected to the National Electricity Transmission System .)	Diagram	<input type="checkbox"/>		DPD II					
Details of any frequency and/or load control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II					
Details of any large or small signal modulating controls, such as power oscillation damping controls or sub-synchronous oscillation damping controls, that have not been submitted as part of the above control system data.	Diagram	<input type="checkbox"/>		DPD II					
Details of HVDC Converter unit models and/or control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II					
Details of AC component models and/or control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/> <input type="checkbox"/>		DPD II					
Details of DC Grid models and/or control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II					
Details of Voltage and power controller and/or control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II					
Details of Special control features if applicable (e.g., power oscillation damping (POD) function, subsynchronous torsional interaction (SSTI) control and/or control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II					
Details of Multi terminal control, if applicable and/or control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II					
Details of HVDC System protection models as agreed between The Company the HVDC System Owner and/or control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II					
Transfer block diagram representation of the reactive power control at converter ends for a voltage source converter	Diagram	<input type="checkbox"/>		DPD II					
Transfer block diagram representation of the reactive power control at converter ends for a voltage source converter.		<input type="checkbox"/>							

Data Description	Units	DATA to RTL		Data Category	Operating configuration					
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6
		<input type="checkbox"/>								
		<input type="checkbox"/>								
		<input type="checkbox"/>								
		<input type="checkbox"/>								
		<input type="checkbox"/>								
		<input type="checkbox"/>								

SCHEDULE 1 – POWER GENERATING MODULE, GENERATING UNIT (OR CCGT MODULE), POWER PARK MODULE, DC CONNECTED POWER PARK MODULE, HVDC SYSTEM AND DC CONVERTER TECHNICAL DATA

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

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

SCHEDULE 2 - GENERATION PLANNING PARAMETERS

PAGE 1 OF 3

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

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

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

In the case of Restoration Service Providers, data only needs to be provided by a Restoration Service Provider where such a Restoration Service Provider is not a CUSC Party and the data has not been submitted previously. In this case the data to be submitted would be pursuant to the terms of the Anchor Restoration Contract or Top Up Restoration Contract if required.

Power Station: _____

Generation Planning Parameters

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

Commented [CA(P21)]: ...where they are not....

Commented [CA(P22)]: This isn't about the timing of submissions (submitted previously) but the need to make a submission (even later) where there is an obligation to submit the data.

Saturday – Sunday	hr/min	■		OC2							-
SYNCHRONISING PARAMETERS											
OC2.4.2.1(a)											
Notice to Deviate from Zero (NDZ) after 48 hour Shutdown	Mins	■		OC2							
Station Synchronising Intervals (SI) after 48 hour Shutdown	Mins	■			-	-	-	-	-	-	
Synchronising Group (if applicable)	1 to 4	■		OC2							-

SCHEDULE 2 - GENERATION PLANNING PARAMETERS

PAGE 2 OF 3

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

SCHEDULE 2 - GENERATION PLANNING PARAMETERS

PAGE 3 OF 3

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

NOTES:

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

SCHEDULE 3 - LARGE POWER STATION OUTAGE PROGRAMMES, OUTPUT
USABLE AND INFLEXIBILITY INFORMATION
PAGE 1 OF 1

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

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

In the case of Restoration Service Providers, data only needs to be provided by a Restoration Service Provider where such a Resoration Service Provider is not a CUSC Party and the data has not been submitted previously. In this case the data to be submitted would be would be purstant to the the terms of the Anchor Restoration Contract or Top Up Restoration Contract.

Commented [CA(P23)]: Ditto comment on Schedule 2

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

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

SCHEDULE 4 - LARGE POWER STATION DROOP AND RESPONSE DATA

PAGE 1 OF 1

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

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

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

Notes:

- The data provided in this Schedule 4 is not intended to constrain any **Ancillary Services Agreement**.
- Registered Capacity** or **Maximum Capacity** should be identical to that provided in Schedule 2.
- The Governor Droop should be provided for each **Generating Unit**(excluding **Power Park Units**), **Power Park Module**, **HVDC Converter** or **DC Converter**. The Response Capability should be provided for each **Genset** or **DC Converter**.
- Primary**, **Secondary** and **High Frequency Response** are defined in CC.A.3.2 or ECC.A.3.2 and are based on a frequency ramp of 0.5Hz over 10 seconds. **Primary Response** is the minimum value of response between 10s and 30s after the frequency ramp starts, **Secondary Response** between 30s and 30 minutes, and **High Frequency Response** is the minimum value after 10s on an indefinite basis.
- For plants which have not yet **Synchronised**, the data values of MLP1 to MLP6 should be as described above. For plants which have already **Synchronised**, the values of MLP1 to MLP6 can take any value between **Designed Operating Minimum Level** or **Minimum Regulating Level** and **Registered Capacity** or **Maximum Capacity**. If MLP1 is not provided at the **Designed Minimum Operating Level**, the value of the **Designed Minimum Operating Level** should be separately stated.
- For the avoidance of doubt **Transmission DC Converters** and **OTSDUW DC Converters** must be capable of providing a continuous signal indicating the real time frequency measured at the **Transmission Interface Point** to the **Offshore Grid Entry Point** (as detailed in CC.6.3.7(e)(vii) and CC.6.3.7(e)(viii) or ECC.6.3..3.1.1(f) to enable **Offshore Power Generating Modules**, **Offshore Generating Units**, **Offshore Power Park Modules** and/or **Offshore DC Converters** to satisfy the frequency response requirements of CC.6.3.7 or ECC.6.3.7.
- Alternative governor settings shall be supplied by **Generators**, **HVDC System Owners** and **DC Converter Owners** where operation is required as part of **System Restoration**- -Aas required in CC.6.3.5 and ECC.6.3.5.2 and ECC.6.3.5.5(vii)

Commented [CA(P24): ...or...

SCHEDULE 5 - USERS SYSTEM DATA

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

Table 5 (a)

DATA DESCRIPTION	UNITS	DATA to RTL		DATA CATEGORY
		CUSC Contract	CUSC App. Form	
USERS SYSTEM LAYOUT (PC.A.2.2)				
A Single Line Diagram showing all or part of the User's System is required. This diagram shall include:-				SPD
(a) all parts of the User's System , whether existing or proposed, operating at Supergrid Voltage , and in Scotland and Offshore , also all parts of the User System operating at 110kV and greater,		■	■	
(b) all parts of the User's System operating at a voltage of 50kV and greater, and in Scotland and Offshore greater than 30kV, or higher which can interconnect Connection Points , or split bus-bars at a single Connection Point ,		■	■	
(c) all parts of the User's System between Embedded Medium Power Stations or Large Power Stations or Offshore Transmission Systems connected to the User's Subtransmission System and the relevant Connection Point or Interface Point ,		■	■	
(d) all parts of the User's System at a Transmission Site .		■	■	
The Single Line Diagram may also include additional details of the User's Subtransmission System , and the transformers connecting the User's Subtransmission System to a lower voltage. With The Company's agreement, it may also include details of the User's System at a voltage below the voltage of the Subtransmission System .		■	■	
This Single Line Diagram shall depict the arrangement(s) of all of the existing and proposed load current carrying Apparatus relating to both existing and proposed Connection Points , showing electrical circuitry (i.e., overhead lines, underground cables, power transformers and similar equipment), operating voltages. In addition, for equipment operating at a Supergrid Voltage , and in Scotland and Offshore also at 110kV and greater, circuit breakers and phasing arrangements shall be shown.		■	■	

SCHEDULE 5 - USERS SYSTEM DATA

PAGE 2 OF 11

Table 5(b)

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

SCHEDULE 5 – USERS SYSTEM DATA

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Table 5 (c)

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

SCHEDULE 5 – USERS SYSTEM DATA
PAGE 4 OF 11

USER'S SYSTEM DATA

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

The data below is all Standard Planning Data. Details are to be given for all circuits shown on the Single Line Diagram
 Table 5 (d)

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

Notes

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

SCHEDULE 5 – USERS SYSTEM DATA
PAGE 5 OF 11

USERS SYSTEM DATA

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

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

Table 5 (e)

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

*If Resistance or Ractance please give impedance value

Notes

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

SCHEDULE 5 –USERS SYSTEM DATA
PAGE 6 OF 11

USER’S SYSTEM DATA

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

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

Table 5(f)

Years Valid	Connection Point	Switch No	Rated Voltage kV rms	Operating Votage kV rms	Rated short-circuit breaking current		Rated short-circuit peak making current		Rated rms continuous current (A)	DC time constant at testing of asymmetrical breaking ability (s)
					3 phase kA rms	1 phase ka rms	3 phase kA rms	1 phase ka rms		

Notes

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

SCHEDULE 5 –USERS SYSTEM DATA
PAGE 7 OF 11

Table 5(g)

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

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Commented [CA(P25)]: This is a bit vague. Would it be better t refer specifically to the relevant items (a) to (f) --- although its only (a) –(c) which actualt relate to settings.

As they are stated here are they not stated in the DRZP?

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

(g)	Rotor Underspeed,		▪		DPD II
(h)	Rotor Overspeed.		▪		DPD II

SCHEDULE 5 - USERS SYSTEM DATA

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

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

- (a) Busbar layout plan(s), including dimensions and geometry showing positioning of any current and voltage transformers, through bushings, support insulators, disconnectors, circuit breakers, surge arresters, etc. Electrical parameters of any associated current and voltage transformers, stray capacitances of wall bushings and support insulators, and grading capacitances of circuit breakers;
- (b) Electrical parameters and physical construction details of lines and cables connected at that busbar. Electrical parameters of all plant e.g., transformers (including neutral earthing impedance or zig-zag transformers if any), series reactors and shunt compensation equipment connected at that busbar (or to the tertiary of a transformer) or by lines or cables to that busbar;
- (c) Basic insulation levels (BIL) of all **Apparatus** connected directly, by lines or by cables to the busbar;
- (d) Characteristics of overvoltage **Protection** devices at the busbar and at the termination points of all lines, and all cables connected to the busbar;
- (e) Fault levels at the lower voltage terminals of each transformer connected directly or indirectly to the **National Electricity Transmission System** without intermediate transformation;
- (f) The following data is required on all transformers operating at **Supergrid Voltage** throughout **Great Britain** and, in Scotland and **Offshore**, also at greater than 110kV: three or five limb cores or single phase units to be specified, and operating peak flux density at nominal voltage.
- (g) An indication of which items of equipment may be out of service simultaneously during **Planned Outage** conditions.

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

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

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

SCHEDULE 5 – USERS SYSTEM DATA

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- (c) at the lower voltage points of those connecting transformers:
- Equivalent positive phase sequence susceptance
 - Connection voltage and MVA_r rating of any capacitor bank and component design parameters if configured as a filter
 - Equivalent positive phase sequence interconnection impedance with other lower voltage points
 - The minimum and maximum **Demand** (both MW and MVA_r) that could occur
 - Harmonic current injection sources in Amps at the Connection voltage points
 - Details of traction loads, e.g., connection phase pairs, continuous variation with time, etc.
- (d) an indication of which items of equipment may be out of service simultaneously during **Planned Outage** conditions

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

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

- (a) For all circuits of the **User's Subtransmission System**:
- Positive Phase Sequence Reactance
 - Positive Phase Sequence Resistance
 - Positive Phase Sequence Susceptance
 - MVA_r rating of any reactive compensation equipment
- (b) for all transformers connecting the **User's Subtransmission System** to a lower voltage:
- Rated MVA
 - Voltage Ratio
 - Positive phase sequence resistance
 - Positive Phase sequence reactance
 - Tap-changer range
 - Number of tap steps
 - Tap-changer type: on-load or off-circuit
 - AVC/tap-changer time delay to first tap movement
 - AVC/tap-changer inter-tap time delay

SCHEDULE 5 – USERS SYSTEM DATA

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

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

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

- (a) For all circuits of the **User's Subtransmission System**:
 - Positive phase sequence resistance
 - Positive phase sequence reactance
 - Positive phase sequence susceptance
 - Zero phase sequence resistance (both self and mutuals)
 - Zero phase sequence reactance (both self and mutuals)
 - Zero phase sequence susceptance (both self and mutuals)
- (b) for all transformers connecting the **User's Subtransmission System** to a lower voltage:
 - Rated MVA
 - Voltage Ratio
 - Positive phase sequence resistance (at max, min and nominal tap)
 - Positive phase sequence reactance (at max, min and nominal tap)
 - Zero phase sequence reactance (at nominal tap)
 - Tap changer range
 - Earthing method: direct, resistance or reactance
 - Impedance if not directly earthed
- (c) at the lower voltage points of those connecting transformers:-
 - The maximum **Demand** (in MW and MVA) that could occur
 - Short-circuit infeed data in accordance with PC.A.2.5.6(a) unless the **User's** lower voltage network runs in parallel with the **Subtransmission System**, when to prevent double counting in each node infeed data, a π equivalent comprising the data items of PC.A.2.5.6(a) for each node together with the positive phase sequence interconnection impedance between the nodes shall be submitted.

SCHEDULE 5 – USERS SYSTEM DATA

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Dynamic Models:(DPD II) (PC.A.6.7 ■ CUSC Contract)

The information listed below, both current and forecast, and where not already supplied under this Schedule 5, may be requested by **The Company** from each **EU Code User** or in respect of each **EU Grid Supply Point** with respect to any **Connection Site**

- (a) Dynamic model structure and block diagrams including parameters, transfer functions and individual elements (as applicable)
- (b) Power control functions and block diagrams including parameters, transfer functions and individual elements (as applicable)
- (c) Voltage control functions and block diagrams including parameters, transfer functions and individual elements (as applicable)
- (d) Converter control models and block diagrams including parameters, transfer functions and individual elements (as applicable)

SCHEDULE 6 – USERS OUTAGE INFORMATION

PAGE 1 OF 32

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

Commented [CA(P27)]: This needs to be consistent with OC2.2.2 which reads

Outages of **Plant** and **Apparatus** of **Restoration Service Providers** and key **Plant** and **Apparatus** of a **Network Operator's System** associated with a **Distribution Restoration Zone Plan** also need to be co-ordinated with outages on the **National Electricity Transmission System**.

Schedule 6 refers to User Systems.

See DRC6.1.6 as well

Consistency would be good.

Commented [CA(P28)]: This includes data....

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

SCHEDULE 6 – USERS OUTAGE INFORMATION

PAGE 2 OF 32

The data below is to be provided to **The Company** as required for compliance with the applicable **Retained EU Law** (Commission Regulation (EU) No 543/2013 (OC2.4.2.3)). Data provided under Article Numbers 7.1(a), 7.1(b), 15.1(a), 15.1(b), and 15.1(c) and 15.1(d) is to be provided using **MODIS**.

ECR ARTICLE No.	DATA DESCRIPTION	USERS PROVIDING DATA	FREQUENCY OF SUBMISSION
7.1(a)	Planned unavailability of the Apparatus belonging to a Non-Embedded Customer where OC2.4.7 (a) applies <ul style="list-style-type: none"> - Unavailable demand capacity during the event (MW) - Estimated start date and time (dd.mm.yy hh:mm) - Estimated end date and time (dd.mm.yy hh:mm) - Reason for unavailability from the list below: <ul style="list-style-type: none"> . Maintenance . Failure . Shutdown . Other 	Non-Embedded Customer	To be received by The Company as soon as reasonably possible but in any case, to facilitate publication of data no later than 1 hour after a decision has been made by the Non-Embedded Customer regarding the planned unavailability
7.1(b)	Changes in actual availability of the Apparatus belonging to a Non-Embedded Customer where OC2.4.7 (b) applies <ul style="list-style-type: none"> - Unavailable demand capacity during the event (MW) - Start date and time (dd.mm.yy hh:mm) - Estimated end date and time (dd.mm.yy hh:mm) - Reason for unavailability from the list below : <ul style="list-style-type: none"> . Maintenance . Failure . Shutdown . Other 	Non-Embedded Customer	To be received by The Company as soon as reasonably possible but in any case, to facilitate publication of data no later than 1 hour after the change in actual availability
8.1	Year Ahead Forecast Margin information as provided in accordance with OC2.4.1.2.2 <ul style="list-style-type: none"> - Output Usable 	Generator	In accordance with OC2.4.1.2.2
14.1(a)	Registered Capacity or Maximum Capacity for Generating Units or Power Generating Modules with greater than 1 MW Registered Capacity or Maximum Capacity provided in accordance with PC.4.3.1 and PC.A.3.4.3 or PC.A.3.1.4 <ul style="list-style-type: none"> - Registered Capacity or Maximum Capacity (MW) - Production type (from that listed under PC.A.3.4.3) 	Generator	Week 24
14.1(b)	Power Station Registered Capacity for units with equal or greater than 100 MW Registered Capacity provided in accordance with PC.4.3.1 and PC.A.3.4.3 <ul style="list-style-type: none"> - Power Station name - Location of Generating Unit - Production type (from that listed under PC.A.3.4.3) - Voltage connection levels - Registered Capacity or Maximum Capacity (MW) 	Generator	Week 24
14.1(c)	Estimated output of Active Power of a BM Unit or Generating Unit for each per Settlement Period of the next Operational Day provided in accordance with BC1.4.2 <ul style="list-style-type: none"> - Physical Notification 	Generator	In accordance with BC1.4.2

15.1(a)	Planned unavailability of a Generating Unit where OC2.4.7(c) applies - Power Station name - Generating Unit and/or Power Generating Module name - Location of Generating Unit and/or Power Generating Module - Generating Unit Registered Capacity (MW) - Production type (from that listed under PC.A.3.4.3) - Output Usable (MW) during the event - Start date and time (dd.mm.yy hh:mm) - Estimated end date and time (dd.mm.yy hh:mm) - Reason for unavailability from the list below: . Maintenance . Shutdown . Other	Generator	To be received by The Company as soon as reasonably possible but in any case, to facilitate publication of data no later than 1 hour after a decision has been made by the Generator regarding the planned unavailability
15.1(b)	Changes in availability of a Generating Unit and/or Power Generating Module where OC2.4.7 (d) applies - Power Station name - Generating Unit and/or Power Generating Module name - Location of Generating Unit and/or Power Generating Module - Generating Unit Registered Capacity and Power Generating Module Maximum Capacity (MW) - Production type (from that listed under PC.A.3.4.3) - Maximum Export Limit (MW) during the event - Start date and time (dd.mm.yy hh:mm) - Estimated end date and time (dd.mm.yy hh:mm) - Reason for unavailability from the list below: . Maintenance . Shutdown . Other	Generator	To be received by The Company as soon as reasonably possible but in any case, to facilitate publication of data no later than 1 hour after the change in actual availability
15.1(c)	Planned unavailability of a Power Station where OC2.4.7(e) applies - Power Station name - Location of Power Station - Power Station Registered Capacity (MW) - Production type (from that listed under PC.A.3.4.3) - Power Station aggregated Output Usable (MW) during the event - Start date and time (dd.mm.yy hh:mm) - Estimated end date and time (dd.mm.yy hh:mm) - Reason for unavailability from the list below: . Maintenance . Shutdown . Other	Generator	To be received by The Company as soon as reasonably possible but in any case, to facilitate publication of data no later than 1 hour after a decision has been made by the Generator regarding the planned unavailability
15.1(d)	Changes in actual availability of a Power Station where OC2.4.7 (f) applies - Power Station name - Location of Power Station - Power Station Registered Capacity (MW) - Production type (from that listed under PC.A.3.4.3) - Power Station aggregated Maximum Export Limit (MW) during the event - Start date and time (dd.mm.yy hh:mm) - Estimated end date and time (dd.mm.yy hh:mm) - Reason for unavailability from the list below: . Maintenance . Shutdown . Other	Generator	To be received by The Company as soon as reasonably possible but in any case, to facilitate publication of data no later than 1 hour after the change in actual availability

15.1(e)	Any outage data from a Network Operator or Restoration Service Provider (not already supplied) which would prevent the operation of a Restoration Plan .	Network Operators and Restoration Service Providers	In accordance with the requirements of OC2
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Commented [CA(P29)]: Is this the ECR Article reference?

Commented [CA(P30)]: This needs to be consistent with OC2.2.2 which reads

Outages of **Plant** and **Apparatus** of **Restoration Service Providers** and key **Plant** and **Apparatus** of a **Network Operator's System** associated with a **Distribution Restoration Zone Plan** also need to be co-ordinated with outages on the **National Electricity Transmission System**.

Schedule 6 refers to User Systems.

See DRC6.1.6 as well

Consistency would be good.

SCHEDULE 6 – DISTRIBUTION RESTORATION ZONE INFORMATION

PAGE 3 OF 3

DISTRIBUTION RESTORATION ZONE INFORMATION (PCA.5.7.2 – DPD)

Where a **Network Operator** has a **Distribution Restoration Zone Plan** in place, the following data specified shall be submitted by **Network Operators**, **Restoration Service Providers** party to a **Distribution Restoration Zone Plan**. **Restoration Service Providers** shall, where reasonably practicable, submit the relevant information to the **Network Operator** who shall then supply the relevant information to **The Company**.

Data Description (PCA.5.7.2)	Units	Data Category
The expected time for each Restoration Service Providers Plant to connect to the Network Operator's System following a Total Shutdown or Partial Shutdown . The assessment should include the Restoration Service Provider's ability to reconnect or re-synchronise all their Plant , if all were running immediately prior to the Total Shutdown or Partial Shutdown .		
Additionally, the data and supporting text should highlight any specific issues (eg those that would affect the time before which the Restoration Service Provider's Plant could be energised) that may arise as time progresses from Shutdown without external supplies being restored or the availability of primary fuel supplies such as gas supplies, coal stocks or water levels	Tabular or Graphical	DPD II
Block Loading Capability		
Provide estimated Block Loading Capability from 0MW to Registered Capacity and the time between each incremental step of each Restoration Service Provider's Plant and Apparatus being 'hot' (run prior to shutdown) and also 'cold' (not run for 48hrs or more prior to the shutdown). The Block Loading Capability should be valid for a frequency deviation of 49.5Hz – 50.5Hz. The data should identify any required 'hold' points.	Tabular or Graphical	DPD II

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Commented [CA(P36): This relates to PCA.5.7.1 (b)

Commented [CA(P37): Need to check this is a duplication of the text in PCA.5.7.1 – at the moment it isn't.

SCHEDULE 7 - LOAD CHARACTERISTICS AT GRID SUPPLY POINTS

PAGE 1 OF 1

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

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

SCHEDULE 8 - DATA SUPPLIED BY BM PARTICIPANTS
PAGE 1 OF 1

CODE	DESCRIPTION
BC1	Physical Notifications
BC1 & BC2	Export and Import Limits
BC1	Bid-Offer Data
BC1	Dynamic Parameters (Day Ahead)
BC2	Dynamic Parameters (For use in Balancing Mechanism)
BC1 & BC2	Other Relevant Data

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

SCHEDULE 9 - DATA SUPPLIED BY THE COMPANY TO USERS

PAGE 1 OF 1

(Example of data to be supplied)

CODE	DESCRIPTION
CC or ECC	Operation Diagram
CC or ECC	Site Responsibility Schedules
PC	Day of the peak National Electricity Transmission System Demand Day of the minimum National Electricity Transmission System Demand
OC1	<u>Under normal operational conditions, Demand data for each System Restoration Region on a daily basis and 60% and 100% National Demand forecasts that would feed into the System Restoration Region's targets.</u> <u>During a System Restoration event, a forecast of Demand made for each System Restoration Region and 60% and 100% daily National Demand forecasts necessary for the System Restoration Region's targets.</u>
OC2	Surpluses and Output Useable (OU) requirements for each Generator over varying timescales Equivalent networks to Users for Outage Planning Negative Reserve Active Power Margins (when necessary) Operating Reserve information
BC1	Demand Estimates, Indicated Margin and Indicated Imbalance , indicative Synchronising and Desynchronising times of Embedded Power Stations to Network Operators , special actions.
BC2	Bid-Offer Acceptances, Ancillary Services instructions to relevant Users , Emergency Instructions
BC3	Location, amount, and Low Frequency Relay settings of any Low Frequency Relay initiated Demand reduction for Demand which is Embedded .

Commented [CA(P38)]: See comments on OC1

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

- In respect of OC1, the data would also be supplied to Restoration Service Providers

DATA TO BE SUPPLIED BY THE COMPANY TO USERS

PURSUANT TO THE TRANSMISSION LICENCE

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

When a **User** is considering a development at a specific site, certain additional information may be required in relation to that site which is of such a level of detail that it is inappropriate to include it in the **Seven Year Statement**. In these circumstances, the **User** may contact **The Company**

who will be pleased to arrange a discussion and the provision of such additional information relevant to the site under consideration as the **User** may reasonably require.

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

PAGE 1 OF 2

[illegible]

SCHEDULE 10 - DEMAND PROFILES AND ACTIVE ENERGY DATA
PAGE 2 OF 2

DATA DESCRIPTION	Out-turn		F.Yr. 0	Update Time	Data Cat	DATA to RTL	
	Actual	Weather Corrected.				CUSC Contract	CUSC App. Form
(PC.A.4.3)							
<u>Active Energy Data</u>				Week 24	SPD	■	■
Total annual Active Energy requirements under average conditions of each Network Operator and each Non-Embedded Customer in the following categories of Customer Tariff:-						■	■
LV1						■	■
LV2						■	■
LV3						■	■
EHV						■	■
HV						■	■
Traction						■	■
Lighting						■	■
User System Losses						■	■
Active Energy from Embedded Small Power Stations and Embedded Medium Power Stations						■	■

NOTES:

- 'F. yr.' means '**Financial Year**'
- Demand and Active Energy Data (General)**

Demand and **Active Energy** data should relate to the point of connection to the **National Electricity Transmission System** and should be net of the output (as reasonably considered appropriate by the **User**) of all **Embedded Small Power Stations, Medium Power Stations** and **Customer Generating Plant**. Auxiliary demand of **Embedded Power Stations** should be included in the demand data submitted by the **User** at the **Connection Point**. **Users** should refer to the **PC** for a full definition of the **Demand** to be included.
- Demand** profiles and **Active Energy** data should be for the total **System** of the **Network Operator**, including all **Connection Points**, and for each **Non-Embedded Customer**. **Demand Profiles** should give the numerical maximum demand that in the **User's** opinion could reasonably be imposed on the **National Electricity Transmission System**.
- In addition the demand profile is to be supplied for such days as **The Company** may specify, but such a request is not to be made more than once per calendar year.

SCHEDULE 11 - CONNECTION POINT DATA

PAGE 1 OF 5

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

Table 11(a)

Connection Point:

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

[illegible]

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

[illegible]

Access Group:

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

[illegible]

SCHEDULE 11 - CONNECTION POINT DATA

PAGE 2 OF 5

Table 11(b)

Embedded Generation Data										
Connection Point:										
DATA DESCRIPTION	Output	F.Yr	F.Yr	F.Yr	F.Yr	F.Yr	F.Yr	F.Yr	F.Yr	DATA CAT
Weather Corrected		1	2	3	4	5	6	7	8	

[illegible][illegible]

SCHEDULE 11 - CONNECTION POINT DATA

PAGE 3 OF 5

Table 11(c)

[illegible]

SCHEDULE 11 - CONNECTION POINT DATA

PAGE 4 OF 5

NOTES:

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

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

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

SCHEDULE 11 - CONNECTION POINT DATA

PAGE 5 OF 5

Table 11 (d)**Embedded Small Power Stations <1MW**

Network Operator	
-----------------------------	--

Fuel Type	Aggregate Registered Capacity Total MW	Number of PGMs	Comments
Biomass			
Fossil brown coal/lignite			
Fossil coal-derived gas			
Fossil gas			
Fossil hard coal			
Fossil oil			
Fossil oil shale			
Fossil peat			
Geothermal			
Hydro pumped storage			
Hydro run-of-river and poundage			
Hydro water reservoir			
Marine			
Nuclear			
Other renewable			
Solar			
Waste			
Wind offshore			
Wind onshore			
<u>Other</u>			

SCHEDULE 12 - DEMAND CONTROL

PAGE 1 OF 2

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

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

SCHEDULE 12 - DEMAND CONTROL
PAGE 2 OF 2

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

--	--	--	--	--

Notes:

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

SCHEDULE 12A - AUTOMATIC LOW FREQUENCY DEMAND DISCONNECTION
PAGE 1 OF 1

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

Data Category: OC6

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

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

Network Operators may delay the submission until calendar week 28

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

SCHEDULE 13 - FAULT INFEEED DATA

PAGE 1 OF 2

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

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

SCHEDULE 13 - FAULT INFEEED DATA
PAGE 2 OF 2

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

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

PAGE 1 OF 5

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

Fault infeeds via **Unit Transformers**

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

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

**SCHEDULE 14 - FAULT INFEEED DATA (GENERATORS INCLUDING UNIT
TRANSFORMERS AND STATION TRANSFORMERS)**
PAGE 2 OF 5

Fault infeeds via Station Transformers

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

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

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

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

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

**SCHEDULE 14 - FAULT INFEED DATA (GENERATORS INCLUDING UNIT
TRANSFORMERS AND STATION TRANSFORMERS)**
PAGE 3 OF 5

Fault infeeds from **Power Park Modules**

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

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

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

**SCHEDULE 14 - FAULT INFEEED DATA (GENERATORS INCLUDING UNIT
TRANSFORMERS AND STATION TRANSFORMERS)**
PAGE 4 OF 5

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

**SCHEDULE 14 - FAULT INFEEED DATA (GENERATORS INCLUDING UNIT
TRANSFORMERS AND STATION TRANSFORMERS)**
PAGE 5 OF 5

DATA DESCRIPTION	UNITS	F.Yr. 0	F.Yr. 1	F.Yr. 2	F.Yr. 3	F.Yr. 4	F.Yr. 5	F.Yr. 6	F.Yr. 7	DATA to RTL	DATA DESCRIPTION
										CUSC Contract	CUSC App. Form
For Power Park Units that utilise a protective control, such as a crowbar circuit,											
- additional rotor resistance applied to the Power Park Unit under a fault situation	% on MVA									<input type="checkbox"/>	<input checked="" type="checkbox"/>
- additional rotor reactance applied to the Power Park Unit under a fault situation.	% on MVA									<input type="checkbox"/>	<input checked="" type="checkbox"/>
Positive sequence X/R ratio of the equivalent at time of fault at the Common Collection Busbar										<input type="checkbox"/>	<input checked="" type="checkbox"/>
Minimum zero sequence impedance of the equivalent at a Common Collection Busbar										<input type="checkbox"/>	<input checked="" type="checkbox"/>
Active Power generated pre-fault	MW									<input type="checkbox"/>	<input checked="" type="checkbox"/>
Number of Power Park Units in equivalent generator										<input type="checkbox"/>	<input checked="" type="checkbox"/>
Power Factor (lead or lag)										<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pre-fault voltage (if different from 1.0 pu) at fault point (See note 1)	pu									<input type="checkbox"/>	<input checked="" type="checkbox"/>
Items of reactive compensation switched in pre-fault										<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

SCHEDULE 15 – MOTHBALLED POWER GENERATING MODULE, MOTHBALLED GENERATING UNIT, MOTHBALLED POWER PARK MODULE (INCLUDING MOTHBALLED DC CONNECTED POWER PARK MODULES), MOTHBALLED HVDC SYSTEMS, MOTHBALLED HVDC CONVERTERS, MOTHBALLED DC CONVERTERS AT A DC CONVERTER STATION AND ALTERNATIVE FUEL DATA

PAGE 1 OF 3

MOTHBALLED POWER GENERATING MODULES, MOTHBALLED GENERATING UNIT, MOTHBALLED POWER PARK MODULE (INCLUDING MOTHBALLED DC CONNECTED POWER PARK MODULES), MOTHBALLED HVDC SYSTEMS, MOTHBALLED HVDC CONVERTERS OR MOTHBALLED DC CONVERTER AT A DC CONVERTER STATION AND ALTERNATIVE FUEL DATA
The following data items must be supplied with respect to each **Mothballed Power Generating Module, Mothballed Generating Unit, Mothballed Power Park Module (including Mothballed DC Connected Power Park Modules), Mothballed HVDC Systems, Mothballed HVDC Converters or Mothballed DC Converters at a DC Converter station**

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

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

Notes

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

**SCHEDULE 15 – MOTHBALLED POWER GENERATING MODULES, MOTHBALLED
GENERATING UNIT, MOTHBALLED POWER PARK MODULE (INCLUDING DC
CONNECTED POWER PARK MODULES), MOTHBALLED HVDC SYSTEMS,
MOTHBALLED HVDC CONVERTERS, MOTHBALLED DC CONVERTERS AT A DC
CONVERTER STATION AND ALTERNATIVE FUEL DATA**
PAGE 2 OF 3

ALTERNATIVE FUEL INFORMATION

The following data items for alternative fuels need only be supplied with respect to each **Generating Unit** whose primary fuel is gas including those which form part of a **Power Generating Module**.

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

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

**SCHEDULE 15 – MOTHBALLED POWER GENERATING MODULES, MOTHBALLED
GENERATING UNIT, MOTHBALLED POWER PARK MODULE (INCLUDING
MOTHBALLED DC CONNECTED POWER PARK MODULES), MOTHBALLED HVDC
SYSTEMS, MOTHBALLED HVDC CONVERTERS MOTHBALLED DC CONVERTERS
AT A DC CONVERTER STATION AND ALTERNATIVE FUEL DATA**

PAGE 3 OF 3

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

Notes

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

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

SCHEDULE 16 – ~~SYSTEM RESTORATION BLACK START~~ INFORMATION

PAGE 1 OF 2

PART I

BLACK START INFORMATION		
The following data/text items are required from each Generator for each BM Unit at a Large Power Station as detailed in PC.A.5.7. Data is not required for Generating Units that are contracted to provide Black Start Capability, Restoration Service Providers Plant and Apparatus or Electricity Storage Modules which have short cycle times. The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from The Company during a Black Start System Restoration .		
Data Description	Units	Data Category
(PC.A.5.7.1) (■ CUSC Contract)		
Assuming all BM Units were running immediately prior to the Total Shutdown or Partial Shutdown and in the event of loss of all external power supplies, provide the following information:		
a) Expected time for the first and subsequent BM Units to be Synchronised , from the restoration of external power supplies, assuming external power supplies are not available for up to <u>24hrs</u>	Tabular or Graphical	DPD II
b) Describe any likely issues that would have a significant impact on a BM Unit's time to be Synchronised arising as a direct consequence of the inherent design or operational practice of the Power Station and/or BM Unit , e.g. limited barring facilities, time from a Total Shutdown or Partial Shutdown at which batteries would be discharged <u>or the availability of primary fuel supplies such as gas supplies, coal stocks or water levels</u> .	Text	DPD II
Block Loading Capability:		
c) Provide estimated Block Loading Capability from 0MW to Registered Capacity <u>and the time between each incremental step</u> of each BM Unit based on the unit being 'hot' (run prior to shutdown) and also 'cold' (not run for 48hrs or more prior to the shutdown). The Block Loading Capability should be valid for a frequency deviation of 49.5Hz – 50.5Hz. The data should identify any required 'hold' points.	Tabular or Graphical	DPD II

Commented [CA(P39)]: System Restoration Information

Commented [CA(P40)]: Clarify that this info is not required from a RSP named in a DRZP which is covered in an earlier schedule.

Commented [CA(P41)]: Delete space

Commented [CA(P42)]: What does this mean

Commented [CA(P43)]: Need to check the text is a duplicate of the OCA

Commented [CA(P44)]: Is this not 72 hours – but this requirement should duplicate the PCA text.

Commented [CA(P45)]: This is PCA5.7.1 (a)

Commented [CA(P46)]: This is PCA5.7.1 (b)

Commented [CA(P47)]: Is this relevant for block loading?

SCHEDULE 16 – ~~SYSTEM RESTORATION~~BLACK START INFORMATION

PAGE 21 OF 2

PART II

Commented [CA(P48)]: Ditto comment son part I

BLACK STARTSYSTEM RESTORATION INFORMATION

The following data/text items are required from each **HVDC System Owner** or **DC Converter Station Owner** for each **HVDC System** and **DC Converter Station** as detailed in PC.A.5.7. Data is not required for ~~Restoration Service Providers Plant and Apparatus~~ **HVDC Systems and DC Converter Stations that are contracted to provide a Black Start Capability**. The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from **The Company** during a **Black StartSystem Restoration**.

Commented [CA(P49)]: bold

Commented [CA(P50)]: bold

Data Description	Units	Data Category
(PC.A.5.7.1) (■ CUSC Contract)		
Assuming all BM Units were running immediately prior to the Total Shutdown or Partial Shutdown and in the event of loss of all external power supplies, provide the following information:		
a) Expected time for the first and subsequent BM Units to be Synchronised , from the restoration of external power supplies, assuming external power supplies are not available for up to <u>24hrs</u>	Tabular or Graphical	DPD II
b) Describe any likely issues that would have a significant impact on a BM Units time to be Synchronised arising as a direct consequence of the inherent design or operational practice of the HVDC System or DC Converter Station and/or BM Unit , e.g. time from a Total Shutdown or Partial Shutdown at which batteries would be discharged.	Text	DPD II
Block Loading Capability:		
) Provide estimated incremental Active Power steps, from no load to Rated MW <u>and the time between each incremental step</u> which an HVDC System or DC Converter Station can instantaneously supply without causing it to trip or go outside the Frequency range of 47.5Hz – 52Hz (or an otherwise agreed Frequency range). The time between each incremental step shall also be provided. In addition data should be provided from 0MW to Registered Capacity of each BM Unit based on the HVDC System or DC Converter Station being (not run for 48hrs or more prior to the shutdown) or run immediately before the Partial Shutdown or Total Shutdown . The data supplied should be valid for a Frequency deviation of 49.5Hz – 50.5Hz and should identify any required 'hold' points.	Tabular or Graphical	DPD II

Commented [CA(P51)]: Is this not 72 hours – but thi s requirement should drePLICATE the PCA text.

SCHEDULE 17 - ACCESS PERIOD DATA
PAGE 1 OF 1

(PC.A.4 - CUSC Contract ■)

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

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

Comments

PAGE 1 OF 24

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

[illegible]

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

PAGE 2 OF 24

OTSDUW USERS SYSTEM DATA

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA
PAGE 3 OF 24

OFFSHORE TRANSMISSION SYSTEM DATA

Branch Data (PC.A.2.2.4)

Node 1	Node 2	Rated Voltage kV	Operating Voltage kV	Circuit	PPS PARAMETERS			ZPS PARAMETERS			Maximum Continuous Ratings			Length (km)
					R	X	B	R	X	B	R	X	B	

Notes

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA
PAGE 4 OF 24

OFFSHORE TRANSMISSION SYSTEM DATA

2 Winding Transformer Data (PC.A.2.2.5)

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

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

Notes

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA
PAGE 5 OF 24

USERS SYSTEM DATA (OTSUA)

Auto Transformer Data 3-Winding (PC.A.2.2.5)

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

HV Node	HV (kV)	LV Node	LV (kV)	PSS/E Circuit	Rating (MVA)	Transformer	Positive Phase Sequence Reactance % on 100MVA			Positive Phase Sequence Resistance % on 100MVA			Taps			Winding Arr	Earthing Impedance method							The Company Sheet	The Company Code
							Max Tap	Min Tap	Nom Tap	Max Tap	Min Tap	Nom Tap	Range +% to -%	Step size %	Type			ZOH		ZOL		ZOT Dflt X/R=20			
																		R _{OH} % 100 MVA	X _{OH} % 100 MVA	R _{OL} % 100 MVA	X _{OL} % 100 MVA	R _{OT} % 100 MVA	X _{OT} % 100 MVA		

Notes

1.For information STC Reference: STCP12-1: Part 3 - 2.4 Transformers

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

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

[illegible]

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

PAGE 7 OF 24

OFFSHORE TRANSMISSION SYSTEM DATA

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

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

Notes:

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

PC.A.2.4.1(e)	A mathematical representation in block diagram format to model the control of any dynamic compensation plant. The model should be suitable for RMS dynamic stability type studies in which the time constants used should not be less than 10ms.
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SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA
PAGE 8 OF 24

OFFSHORE TRANSMISSION SYSTEM DATA
REACTIVE COMPENSATION - SVC Modelling Data (PC.A.2.4.1(e)(iii))

HV node	LV Node	Control Node	Nominal Voltage (kV)	Target Voltage (kV)	Max MVar at HV	Min MVar at HV	Slope %	Voltage Dependent Q Limit	Normal Running Mode	R1 PPS_R	X1 PPS_X	R0 ZPS_R	Z0 ZPS_X	Trasnf Winding Type	Connection (Direct/ Tertiary)

Notes:

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

PAGE 9 OF 24

OFFSHORE TRANSMISSION SYSTEM DATA

Harmonic Filter Data (including OTSDUW DC Converter harmonic Filter Data)
(PC.A.5.4.3.1(d) and PC.A.6.4.2)

Site Name	SLD Reference	Point of Filter Connection		
Filter Description				
Manufacturer	Model	Filter Type	Filter connection type (Delta/Star, Grounded/ Ungrounded)	Notes
Bus Voltage	Rating	Q factor	Tuning Frequency	Notes
Component Parameters (as per SLD)				
	Parameter as applicable			
Filter Component (R, C or L)	Capacitance (micro-Farads)	Inductance (milli-Henrys)	Resistance (Ohms)	Notes
Filter frequency characteristics (graphs) detailing for frequency range up to 10kHz and higher				
1. Graph of impedance (ohm) against frequency (Hz) 2. Graph of angle (degree) against frequency (Hz) 3. Connection diagram of Filter & Elements				

Notes:

1. For information STC Reference: STCP12-1: Part 3 - 2.8 Harmonic Filter Data

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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

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

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

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

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

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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

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

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

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

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

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

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

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

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

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

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

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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

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

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

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

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

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

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

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

PAGE 13 OF 24

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

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

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

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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Thermal Ratings Data (PC.A.2.2.4)

Voltage		CIRCUIT RATING SCHEDULE		Issue Date	
132kV		Offshore TO Name			
CIRCUIT Name from Site A – Site B					

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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	6hr											
	20m											
	10m											
	5m											
	3m											
	6hr											
	20m											
	10m											
	5m											
	3m											
Notes or Restrictions Detailed												

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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Protection Policy (PC.A.6.3)

To include details of the protection policy

Protection Schedules(PC.A.6.3)

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

Protection, Intertrip Signalling & operating times
Intertripping and protection unstabilisation initiation
Synchronising facilities
Delayed Auto Reclose sequence schedules

Automatic Switching Scheme Schedules (PC.A.2.2.7)

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

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

Substation: _____

Details of Generator Intertrip Schemes:

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

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

Substation: _____

Details of Demand Intertrip Schemes:

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

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Specific Operating Requirements (CC.5.2.1 or ECC.5.2.1)

SUBSTATION OPERATIONAL GUIDE

Substation: _____

Location Details:

Postal Address:	Telephone Nos.	Map Ref.
Transmission Interface		
Generator Interface		

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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OTSDUW DC CONVERTER TECHNICAL DATA

OTSDUW DC CONVERTER NAME _____

DATE: _____

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

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[illegible]

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA

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

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA
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Data Description	Units	DATA to		Data Category	Operating configuration					
		CUSC Contract	RTL CUSC App. Form		1	2	3	4	5	6

OTSDUW DC CONVERTER CONTROL SYSTEMS (PC.A.5.4.3.2)										
Static $V_{DC} - P_{DC}$ (DC voltage – DC power) or Static $V_{DC} - I_{DC}$ (DC voltage – DC current) characteristic (as appropriate) when operating as –Rectifier –Inverter	Diagram Diagram Diagram	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		DPD II DPD II DPD II						
Details of rectifier mode control system, in block diagram form together with parameters showing transfer functions of individual elements.	Diagram	<input type="checkbox"/>		DPD II						
Details of inverter mode control system, in block diagram form showing transfer functions of individual elements including parameters (as applicable).	Diagram	<input type="checkbox"/>		DPD II						
Details of OTSDUW DC Converter transformer tap changer control system in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II						
Details of AC filter control systems in block diagram form showing transfer functions of individual elements including parameters	Diagram	<input type="checkbox"/>		DPD II						
Details of any frequency and/or load control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II						
Details of any large or small signal modulating controls, such as power oscillation damping controls or sub-synchronous oscillation damping controls, that have not been submitted as part of the above control system data.	Diagram Diagram	<input type="checkbox"/> <input type="checkbox"/>		DPD II DPD II						
Transfer block diagram representation of the reactive power control at converter ends for a voltage source converter.	Diagram	<input type="checkbox"/>		DPD II						
For Generators in respect of OTSDUW who are also EU Code Users details of OTSDUW DC Converter unit models and/or control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II						
For Generators in respect of OTSDUW who are also EU Code Users details of AC component models and/or control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/> <input type="checkbox"/>		DPD II						
For Generators in respect of OTSDUW who are also EU Code Users details of DC Grid models and/or control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II						
For Generators in respect of OTSDUW who are also EU Code Users details of Voltage and power controller and/or control systems in block diagram form showing transfer functions of individual elements including parameters.	Diagram	<input type="checkbox"/>		DPD II						
For Generators in respect of OTSDUW who are also EU Code Users details of Special control features if applicable (e.g. power oscillation damping (POD) function, subsynchronous	Diagram	<input type="checkbox"/>		DPD II						

Data Description	Units	DATA to RTL		Data Category	Operating configuration					
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6
<p>torsional interaction (SSTI) control and/or control systems in block diagram form showing transfer functions of individual elements including parameters.</p> <p>For Generators in respect of OTSDUW who are also EU Code Users details of Multi terminal control, if applicable and/or control systems in block diagram form showing transfer functions of individual elements including parameters.</p> <p>For Generators in respect of OTSDUW who are also EU Code Users details of OTSDUW DC Converter protection models as agreed between The Company and the Generator (in respect of OTSDW) and/or control systems in block diagram form showing transfer functions of individual elements including parameters.</p>	Diagram	□		DPD II						
	Diagram	□		DPD II						

SCHEDULE 18 - OFFSHORE TRANSMISSION SYSTEM DATA
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Data Description	Units	DATA to RTL		Data Category	Operating configuration					
		CUSC Contract	CUSC App. Form		1	2	3	4	5	6
LOADING PARAMETERS (PC.A.5.4.3.3)										
MW Export from the Offshore Grid Entry Point to the Transmission Interface Point	MW/s MW/s	<input type="checkbox"/> <input type="checkbox"/>		DPD I DPD I						
Nominal loading rate										
Maximum (emergency) loading rate										
Maximum recovery time, to 90% of pre-fault loading, following an AC system fault or severe voltage depression.	s	<input type="checkbox"/>		DPD II						
Maximum recovery time, to 90% of pre-fault loading, following a transient DC Network fault.	s	<input type="checkbox"/>		DPD II						

SCHEDULE 19 – USER DATA FILE STRUCTURE

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

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

SCHEDULE 19 – USER DATA FILE STRUCTURE

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Part 3: Generator Technical Data		
3.1	DRC Schedule 1	DRC Schedule 1 - Generating Unit, Power Generating Module, HVDC System and DC Converter Technical Data
3.2	DRC Schedule 2	DRC Schedule 2 - Generation Planning Data
3.3	DRC Schedule 4	DRC Schedule 4 – Frequency Droop & Response
3.4	DRC Schedule 14	DRC Schedule 14 – Fault Infeed Data – Generators
3.5	Special Generator Protection	Special Generator Protection e.g. Pole slipping; islanding
3.6	Compliance Tests	Compliance Tests & Evidence
3.7	Compliance Studies	Compliance Simulation Studies
3.8	Site Specific	Bilateral Connections Agreement Technical Data & Compliance
3.9	DRC Schedule 20	DRC Schedule 20 - Grid Forming Plant Data
Part 4: General DRC Schedules		
4.1	DRC Schedule 3	DRC Schedule 3 – Large Power Station Outage Information
4.2	DRC Schedule 6	DRC Schedule 6 – Users Outage Information
4.3	DRC Schedule 7	DRC Schedule 7 – Load Characteristics
4.4	DRC Schedule 8	DRC Schedule 8 – BM Unit Data (if applicable)
4.5	DRC Schedule 10	DRC Schedule 10 –Demand Profiles
4.6	DRC Schedule 11	DRC Schedule 11 – Connection Point Data
Part 5: OTSDUW Data and Information (if applicable and prior to OTSUA Transfer Time)		
		Diagrams Circuits Plant and Apparatus Circuit Parameters Protection Operation and Autoswitching Automatic Control Systems
		Mathematical model of dynamic compensation plant

SCHEDULE 20 – GRID FORMING PLANT CAPABILITY DATA

The following data need only be supplied by **Users** (be they a **GB Code User** or **EU Code User**) or **Non-CUSC Parties** who wish to offer a **Grid Forming Capability** as provided for ECC.6.3.19.3. Where such a **Grid Forming Capability** is provided then the following data items and models are to be supplied in respect of each **Grid Forming Plant**.

DATA DESCRIPTION		GRID FORMING PLANT DATA		
		1	2	3
Submission of Network Frequency Perturbation Plot and Nichols Chart for each GBGF-I (PC.A.5.8.1)	Graphs			
High level equivalent architecture diagram of Grid Forming Plant (PC.A.5.8.1)	Diagram			
GBGF-I Grid Forming Plant Block Diagram (Laplace Operator) in the general form shown in Figure PC.A.5.8.1 or as agreed with The Company . When submitting either Figure PC.A.5.8.1 (a) or Figure PC.A.5.8.1 (b), each User or Non-CUSC Party can use their own design, that may be very different to Figures PC.A.5.8.1 (a) or PC.A.5.8.1 (b), but should contain all relevant functions that can include simulation models and other equivalent data and documentation	Block Diagram (Laplace Operator)			
	Documentation			
Each User or Non-CUSC Party shall provide a model of their Grid Forming Plant which provides a true and accurate reflection of its Grid Forming Capability .	Model and documentation – format to be agreed with The Company			

In order to participate in the **Grid Forming Capability** market, **User's** and **Non-CUSC Parties** are required to provide data of their **GBGF-I** in accordance with Figures PC.A.5.8.1(a) and PC.A.5.8.1(b) **Users** and **Non-CUSC Parties** in respect of **Grid Forming Plants** should indicate if the data is submitted on a unit or aggregated basis. Table 1 below defines the notation used in Figure PC.5.8.1

Parameter	Symbol	Units
-----------	--------	-------

The primary reactance of the Grid Forming Unit , in pu.	X _{in} or X _{ts}	pu on MVA Rating of Grid Forming Unit
The additional reactance, in pu, between the terminals of the Grid Forming Unit and the Grid Entry Point or User System Entry Point (if Embedded).	X _{tr}	pu on MVA Rating of Grid Forming Unit
The rated angle between the Internal Voltage Source and the input terminals of the Grid Forming Unit .		radians
The rated angle between the Internal Voltage Source and Grid Entry Point or User System Entry Point (if Embedded).		radians
The rated voltage and phase of the Internal Voltage Source of the Grid Forming Unit .		Voltage - pu Phase - radians
The rated electrical angle between current and voltage at the input to the Grid transformer.		radians

Table 1

In order to participate in a **Grid Forming Capability** market, **User's** and **Non-CUSC Parties** are also required to provide the data of their **GBGF-I** in accordance with the Table below to **The Company**. The details and arrangements for **Users** and **Non-CUSC Parties** participating in this market shall be published on **The Company's Website**.

Quantity	Units	Range (where Applicable)	User Defined Parameter
Type of Grid form Plant (eg Generating Unit , Electricity Storage Module , Dynamic Reactive Compensation Equipment)	N/A		
Maximum Continuous Rating at Registered Capacity or Maximum Capacity	MVA		
Primary reactance X _{in} or X _{ts} (see Table 1)	pu on MVA		
Additional reactance X _{tr} (See Table 1)	pu on MVA		
Maximum Capacity	MW		

Active ROCOF Response Power (MW) supplied or absorbed at 1Hz/s System Frequency change (which is the maximum frequency change for linear operation of the Grid Forming Plant)	MW		
Phase Jump Angle Withstand	degrees		60 degrees specified
Phase Jump Angle limit	degrees		5 degrees recommended
Phase Jump Power (MW) at the rated angle	MW		
Defined Active Damping Power for a Grid Oscillation Value of 0.05 Hz peak to peak at 1 Hz	MW		
The cumulative energy delivered for a 1Hz/s System Frequency fall from 52 Hz to 47 Hz This is the total Active Power transient output of the Grid Forming Plant	MWs or MJ		
Inertia Constant (H) using equation 1 or declared in accordance with the simulation results of ECP.A.3.9.4	MWs/MVA		
Inertia Constant (He) using equation 2 or declared in accordance with the simulation results of ECP.A.3.9.4	MWs/MVA		
Continuous Overload Capability	% on MVA		
Short Term duration Overload capability			
Duration of Short Term Overload Capability	s		
Peak Current Rating	pu		
Nominal Grid Entry Point or User System Entry Point voltage	kV		
Grid Entry Point or User System Entry Point	- Location		
Continuous or defined time duration MVA Rating	MVA		
Continuous or defined time duration MW Rating	MW		

For a GBGF-I the inverters maximum Internal Voltage Source (IVS) for the worst case condition – for example operation at maximum exporting Reactive Power at the maximum AC System voltage	pu		
Maximum Three Phase Short Circuit Infeed at Grid Entry Point or User System Entry Point	kA		
Maximum Single Phase Short Circuit Infeed at Grid Entry Point or User System Entry Point	kA		
Will the Grid Forming Plant contribute to any other form of commercial service – for example Dynamic Containment, Firm Frequency Response,	Details to be provided		
Equivalent Damping Factor.	ζ		0.2 to 5.0 allowed

Table 2

$H = \text{Installed MWs} / \text{Rated installed MVA}$

(equation 1)

$H_e = (\text{Active ROCOF Response Power at 1 Hz} / s \times \text{System Frequency}) / (\text{Installed MVA} \times 2)$

(equation 2)

<END OF DATA REGISTRATION CODE>