SONI GRID CODE

24 April 2024

Demarcation of Requirements

Requirements in the **Grid Code** which are not marked by a symbol and border are applicable to all **Users** (which expression means all persons (other than the **TSO**) to whom any individual section of the **Grid Code** applies).

Requirements in the **Grid Code** which are marked by a symbol and border are applicable to the corresponding **Users** as per *Table 1: Demarcation of Requirements.*

Table 1: Demarcation of Requirements

Symbol	Applicable to
⊖	**Non-RfG Generation Units**
○	**RfG Generation Units**
⌂	**DCC Units**
⏢	**Non-DCC Units**
‖	**HVDC Units**
⫴	**Non- HVDC Units**

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INTRODUCTION

1. The **Grid Code** is designed to permit the development, maintenance and operation of an efficient, co-ordinated and economical **Transmission System**, to facilitate the **Transmission System** being made available to persons authorised to supply or generate electricity and in conjunction with the arrangements in place in the Republic of Ireland generally to facilitate competition in the generation and supply of electricity on the Island of Ireland and is conceived as a statement of what is optimal (particularly from a technical point of view) for all **Users** and the **Transmission System Operator (TSO)** itself in relation to the planning, operation and use of the **Transmission System**. It seeks to avoid any undue discrimination between **Users** and categories of **Users**.

2. The **TSO** has a number of licence conditions designed to achieve the objectives of the **Single Electricity Market (SEM)**. To comply with these conditions, the **TSO** is obliged to act in conjunction with the **Other TSO**. In addition, the **TSO** must also have in place and comply with new arrangements between the **TSO** and the **Transmission Owner (TO)**. The detailed arrangements are set out in two documents:

   (a) The **System Operator Agreement (SOA)** between the **TSO** and the **Other TSO**; and

   (b) The **Transmission Interface Agreement (TIA)** between the **TSO** and the **TO**.

3. Where a **Licence Condition**, or one of the above agreements, requires the **TSO** to assist, co-operate with or provide information to the **Other TSO**, the **TO** or the **DNO** then it is obliged to do so. This is likely to entail the exchange of data, some of which may have been received from **Users** including those connected to the **Distribution System**. The occasions where this may be necessary are identified in the relevant sections of the **Grid Code**.

4. The **Operating** procedures and principles governing the **TSO's** relationship with all **Users** under the **Grid Code**, be they the **DNO**, **Generators**, **Suppliers**, **Interconnector Users**, **Interconnector Owners**, **Generator Aggregators, Demand Side Unit Operator(s)** or **Large Demand Customers** are set out in the **Grid Code**. The **Grid Code** specifies day-to-day procedures for both planning and operational purposes and covers both normal and exceptional circumstances.

5. The **Grid Code** is divided into the following sections:

   (a) a **Planning Code** which provides generally for the supply of certain information by **Users** in order that the planning and development of the **Transmission System** may be undertaken. The **Planning Code** applies to:

      (i) **Generators** with respect to **Generating Units** connected to or seeking a new or modified connection to the **Transmission System**;

      (ii) **Generators** with respect to **CDGUs** and **Controllable PPMs** connected to or seeking a new or modified connection to the **Distribution System**;

      (iii) **Suppliers**;

      (iv) **Large Demand Customers**;

(v) **Aggregators**;

(vi) **Interconnector Owners**; and

(vii) the **DNO**;

(b) **Connection Conditions** which specify the minimum technical, design and certain operational criteria which must be complied with by **Users** connected to or seeking connection with the **Transmission System.** The **Connection Conditions** apply to:

(i) **Generators** with respect to **Generating Units** connected to or seeking a new or modified connection to the **Transmission System**;

(ii) **Generators** with respect to **CDGUs** and **Controllable PPMs** connected to or seeking a new or modified connection to the **Distribution System**;

(iii) **Suppliers**;

(iv) **Large Demand Customers**;

(v) **Aggregators**;

(vi) **Interconnector Owners**; and

(vii) the **DNO**;

(c) an **Operating Code** which is split into a number of sections and deals with:

(i) **Demand forecasting (OC1)**, which applies to:

(a) **Generators** with respect to **Generating Units** connected to the **Transmission System**;

(b) **Generators** with respect to **CDGUs** and **Controllable PPMs** connected to or seeking a new or modified connection to the **Distribution System**;

(c) **Generator Aggregators**;

(d) **Suppliers**; and

(e) the **DNO**;

(ii) the co-ordination of the **Outage** planning process in respect of **Generating Units** and **Power Station Equipment a**nd **Outages** of equipment on the **Transmission System** and **Distribution System** where relevant for construction, repair and maintenance (**OC2**). **OC2** applies to:

(a) **Generators** with respect to **Generating Units** connected to the **Transmission System**;

(b) **Generators** with respect to **CDGUs** and **Controllable PPMs** connected to or seeking a new or modified connection to the **Distribution System**;

(c) **Interconnector Owners**;

(d) **Large Demand Customer**s; and

(e) the **DNO**;

(iii) the specification of different types of reserve, which make up the **Operating Margin (OC3). OC3** applies to:

(a) **Generators** with respect to **Generating Units** connected to the **Transmission System**;

(b) **Generators** with respect to **CDGUs** and **Controllable PPMs** connected to or seeking a new or modified connection to the **Distribution System**; and

(c) **Interconnector Owners**;

(iv) different methods of reducing **Demand (OC4)**. **OC4** applies to:

(a) **Generators** with respect to **Generating Units** connected to the **Transmission System** or **Distribution System**;

(b) **Suppliers**; and

(c) the **DNO**;

(v) the reporting of scheduled and planned actions and unexpected occurrences such as faults between the **TSO** and **Users (OC5)**. **OC5** applies to:

(a) **Generators** with respect to **Generating Units** connected to the **Transmission System**;

(b) **Interconnector Owners**;

(c) **Large Demand Customers**; and

(d) the **DNO**;

(vi) the co-ordination, establishment and maintenance of **Isolation** and **Earthing** in order that work and/or testing can be carried out safely (**OC6**). **OC6** applies to:

(a) **Generators** with respect to **Generating Units** connected to the **Transmission System**;

(b) **Interconnector Owners**;

(c) the **DNO**; and

(d) the **TO**;

(vii) certain aspects of contingency planning (**OC7**). **OC7** applies to:

(a) **Generators** with respect to **Generating Units** connected to the **Transmission System**;

(b) **Generators** with respect to **CDGUs** and **Controllable PPMs** connected to or seeking a new or modified connection to the **Distribution System**;

(c) **Large Demand Customers**; and

(d) the **DNO**;

(viii) the provision of written reports on occurrences such as faults in certain circumstances (**OC8**). **OC8** applies to:

(a) **Generators** with respect to **Generating Units** connected to the **Transmission System**;

(b) **Interconnector Owners**;

(c) **Large Demand Customers**; and

(d) the **DNO**;

(ix) the procedures for determining the number and nomenclature of **Plant** and **Apparatus** at **Connection Sites** (**OC9**);

OC9 applies to:

(a) **Generators** with respect to **Generating Units** connected to the **Transmission System**;

(b) **Interconnector Owners**;

(c) **Large Demand Customers**; and

(d) the **DNO**;

(x) the procedures for the establishment of **System Tests** (**OC10**). **OC10** applies to:

(a) **Generators** with respect to **Generating Units** connected to the **Transmission System**;

(b) **Interconnector Owners**;

(c) **Large Demand Customers**;

(d) **Aggregators**; and

(e) the **DNO**;

(xi) **Monitoring, Testing and Investigations** in relation to **User's Plant** and **Apparatus** (**OC11**). **OC11** applies to:

(a) Generators with respect to Generating Units connected to the Transmission System;

(b) **Generators** with respect to **CDGUs** and **Controllable PPMs** connected to or seeking a new or modified connection to the **Distribution System**;

(c) **Aggregators**;

(d) **Interconnector Owners**;

(e) **Demand Side Unit Operator(s)**; and

(f) **Large Demand Customers.**

(d) a **Scheduling** and **Dispatch Code** which is split into three sections and deals with:

(i) **Scheduling** generally and the preparation of an **Indicative Operations Schedule** indicating which units may be instructed the following day (**SDC1**). SDC1 applies to:

(a) **Generators** with regard to **CDGUs** and **Controllable PPMs** connected to the **Transmission System** or **Distribution System**;

(b) **Pumped Storage Generators** with regard to their **Pumped Storage Demand**;

(c) **Energy Storage Generators** with regard to their **Energy Storage Demand**;

(d) **Interconnector Owners** with respect to their **Interconnectors**;

(e) **Interconnector Users** in respect of their **Interconnector Units**;

(f) **Demand Side Unit Operator(s)** in relation to their **Demand Side Unit(s)**;

(g) **Generator Aggregators** in respect of their **Aggregated Generating Units**.

(ii) the issue of **Dispatch Instructions** (**SDC2**). SDC2 applies to:

(a) **Generators** with regard to **CDGUs** connected to the **Transmission System** or **Distribution System**;

(b) **Pumped Storage Generators** with regard to their **Pumped Storage Demand**;

(c) **Energy Storage Generators** with regard to their **Energy Storage Demand**;

(d) **Interconnector Owners** with respect to their **Interconnectors**;

(e) **Demand Side Unit Operator(s)** in relation to their **Demand Side Unit(s)**; and

(f) **Generator Aggregators** in respect of their **Aggregated Generating Units**.

(iii) the procedures and requirements in relation to **Frequency Control** (**SCD3**). SDC3 applies to:

(a) **Generators** in respect of all **Generating Units** connected to the **Transmission System**;

(b) **Generators** in respect of **CDGUs** and **Controllable PPMs** connected to the **Distribution System**;

(c) **Suppliers**; and

(d) **Interconnector Owners**.

(e) a **Data Registration Code** which sets out a unified listing of all data required by the **TSO** from **Users**, and by **Users** from the **TSO**, under the **Grid Code**;

(f) **General Conditions** which are intended to ensure, so far as possible, that the various sections of the **Grid Code** work together and work in practice and which include provisions relating to the establishment of a **Grid Code Review Panel** and other provisions of a general nature; and

(g) a **Metering Code** which is split into a number of sections, which deal in particular with:

(i) the basic requirements for metering (**MC**);

(ii) specific requirements for tariff and operational metering (**Sub-Codes 1-3**)

(iii) procedure for the maintenance, testing, inspection and sealing of metering (**Agreed Procedure No 1**);

(iv) reconciliation procedures for metering (**Agreed Procedure No 2**);

(v) procedure for estimating settlement values in lieu of normal data collection methods (**Agreed Procedure No 3**); and

(viii) communication protocols (**Agreed Procedure No 4**).

6. This **Introduction** is provided to **Users** and to prospective **Users** for information only and does not constitute part of the **Grid Code**.

GLOSSARY AND DEFINITIONS (GD)

GD1. DEFINED TERMS

In the **Grid Code** the following words and expressions shall, unless the subject matter or the context otherwise requires or is inconsistent therewith, bear the following meanings:

ACS Conditions	Average cold spell conditions.
Active Power Control Set-Point Ramp Rate	The rate of increase or decrease of **Active Power Output** of a **PPM** in response to an **Active Power Dispatch Instruction** sent by the **TSO** via SCADA when the **PPM** is operating in an **Active Power** control mode. This ramp rate will be calculated by the **Generator** each time an **Active Power Dispatch Instruction** is sent by the **TSO** via SCADA based on the change in **Active Power** required and the time interval set point. The **Active Power Dispatch Instruction** shall be any **MW** value in the range 0 **MW** to **Registered Capacity** of the **PPM**. The time interval set point shall be any value in the range 1 to 30 minutes, as specified by the **TSO** via SCADA.
Active Power or MW	The product of the components of alternating current and voltage that equate to true power which is measured in units of watts and standard multiples thereof, for example: 1000 Watts = 1 kW; 1000 kW = 1 **MW**; 1000 **MW** = 1 GW.
Additional Conversion Factors	The factors referred to in PCA3.3.12.
Additional Grid Code Availability Notice	A notice submitted by a **User** to the **TSO** pursuant to SDC1.4.2 relating to additional data on **Availability**.
Additional Grid Code Characteristics Notice	A notice to be submitted to the **TSO** pursuant to SDC1.4.4.2 relating to additional technical data.

Aggregate Interconnector Ramp Rate	The maximum **Ramp Up Rate** for an **Interconnector** or maximum **Ramp Down Rate** as determined by the **TSO**.
Aggregated Demand Site	A group of **Individual Demand Sites** connected to the **Transmission** or **Distribution System** and represented by a **Demand Side Unit Operator**, which together are capable of a **Demand Side Unit MW Capacity** equal to or above 4 **MW** (and which is therefore subject to **Central Dispatch** from the **TSO**). Each **Individual Demand Site** comprising an **Aggregated Demand Site** shall be in one currency zone and shall have a **Demand Side Unit MW Capacity** of no greater than **10 MW**. Unless otherwise specified, information submitted in respect of an **Aggregated Demand Site** shall always be at an aggregated level.
Aggregated Generating Unit	A group of **Generating Unit**s connected to the **Transmission** or **Distribution System** and represented by a **Generator Aggregator**, each of which must not have a **Registered Capacity** greater than 10 **MW**. An **Aggregated Generating Unit** with a total **Registered Capacity** of 4 **MW** or more shall be subject to **Central Dispatch** (and shall therefore be a **CDGU**), but one with a total **Registered Capacity** of less than 4 **MW** may only be subject to **Central Dispatch** subject to agreement with the **TSO**. Unless otherwise specified by the **TSO** or otherwise in the **Grid Code**, information submitted in respect of an **Aggregated Generating Unit** shall always be at an aggregated level.
Aggregated Maximum Export Capacity	In the case of a **Generator Aggregator**, the aggregated value (in **MW,** MVA, kW and/or kVA) provided in each **Connection Agreement** (or connection agreement to the **Distribution System**, as the case may be) for the **Generating Units** for which the **Generator Aggregator** is responsible.
Aggregator	Either a **Generator Aggregator** or a **Demand Side Unit Operator** in respect of an **Aggregated Demand Site**.
Aggregator Systems	A system by which an **Aggregator** controls or operates the plant which is subject to aggregation.
Agreed Testing and Monitoring Procedures	The procedures and methodologies developed by the **TSO** for conducting certain **Tests** and undertaking certain **Monitoring** and which form part of the **Grid Code**.

All Island Networks	As defined in the **TSO Licence**
All Island Transmission Networks	As defined in the **TSO Licence**
Ancillary Service	Each of the following services, all of which **are** used to operate a stable and secure **Transmission System**: the provision of **Reactive Power, Operating Reserve and Black Start Capability**, each of which also constitutes a **System Support Service.**
Annual Maintenance Outage	A transmission outage that is scheduled with reasonable notice to the relevant **Generator(s)** in advance of the start of the outage for planned maintenance of equipment that is part of an **Outturn Availability Connection Asset**.
Apparatus	All equipment in which electrical conductors are used, supported or of which they may form a part.
Applicable Legislation	All present and future EU Regulations or UK domestic statutes having direct force of law in Northern Ireland which set the minimum standard for all users of the **NI System**.
Authority	The Northern Ireland Authority for Utility Regulation.
Automatic Load Shedding	A **Load** shedding scheme utilised by the **TSO** to prevent **Frequency** collapse or other problems and to restore the balance between generation output and **Demand** on the **NI System**.
Automatic Load Shedding Device	A device for initiating **Load** shedding automatically, such as a **Low Frequency Relay**.
Automatic Voltage Regulator or **AVR**	A continuously acting automatic excitation system to control the voltage of a **Generating Unit** as measured at the **Generator Terminals**.
Availability	In respect of any period (and, in the case of a **PPA CDGU**, in relation to a **Designated Fuel** and, in the case of a **CDGU** other than a **PPA CDGU**, in relation to a fuel), shall mean: (a) for any **CDGU** or **Controllable PPM** the figure (expressed in **MW** as at the **Connection Point** and at the direct connection with the **Distribution System**) stated in accordance with SDC1.4.1.1(a) to

be the capability of the **CDGU** or **Controllable PPM** to generate electricity during that period. In relation to all **CDGUs** including an **Open Cycle Gas Turbine CDGU** and/or a **CCGT Installation**, the **Availability** declared by a **Generator** shall correspond to the maximum generation of electricity which that **Generator's CDGU** can achieve during that period. In relation to all **CDGUs**, the **Availability** declared by a **Generator** shall correspond to the level of generation of electricity up to and including the **Contracted Capacity** (for **PPA CDGUs** other than **PPA Open Cycle Gas Turbines**) or **Contracted Capacity (Peak)** (for **PPA Open Cycle Gas Turbines**) or **Registered Capacity** (for non-**PPA** plant) which that **CDGU** can achieve during that period;

(b) for **Demand Side Units**, the **Demand Side Unit MW Capacity** (expressed in **MW** as at the **Connection Point** and at the direct connection with the **Distribution System**) stated in accordance with SDC1.4.1.1(a) to be the capability of the **Demand Side Unit** to reduce **Demand** during that period;

(c) for **Aggregated Generating Units**, the aggregated figures (expressed in **MW** as at the **Connection Points** of each individual **Aggregated Generating Unit**) stated in accordance with SDC1.4.1.1(a) to be the capability of the **Aggregated Generating Units** as a whole to generate electricity during that period;

(d) for an **Interconnector**, the figure (expressed in **MW** at Auchencrosh) stated in accordance with SDC1.4.1.1(a) to be the capability of the **Interconnector** to export or import electricity.

"Available" shall be construed accordingly.

Availability Notice — A notice to be submitted to the **TSO** pursuant to SDC1.4.1.1.

Availability Payments — A payment made to a **Generator** for making a **Generating Unit** available.

Average Cold Spell Demand — The forecast of peak daily **Demand** during average cold spell conditions.

Back-up Fuel	**Distillate** or heavy fuel oil.
Black Start	The procedure necessary for a recovery from a **Total Shutdown** or **Partial Shutdown**.
Black Start Capability	The capability of a **Power Station** where at least one of its **CDGUs** or **CCGT Modules** has the ability to **Start-Up** as provided in OC7.4.4.
Black Start Station	A **Power Station** identified pursuant to the relevant **Generator's Connection Agreement** as having the ability for at least one of its **CDGUs** or **CCGT Modules** to **Start-Up** as provided in OC7.4.4.
Business Day	Any day (other than a Saturday or a Sunday) on which banks are open for business in Belfast but excluding those days which the **TSO** may from time to time notify **Generators** as being days on which normal business will not be conducted at the **TSO's** premises.
Block Load	The level of output that a **Generating Unit** immediately produces following **Synchronisation.** For avoidance of doubt, **Block Load** can equal 0 **MW**.
Block Load Cold	**Block Load** during a **Cold Start**.
Block Load Hot	**Block Load** during a **Hot Start**.
Block Load Warm	**Block Load** during a **Warm Start**.
Bulk Supply Point	A point at which the **Distribution System** connects to the **Transmission System**.
Cancelled Start	A response by a **Generator** to an instruction from the **TSO** cancelling a previous instruction to **Synchronise** to the **NI System**.
Capacity Limit	The point calculated by the **PPM** control system where there is just enough energy storage or generation capacity, calculated in MWh, for the **ESPS** to change the **Active Power** to zero MW at the **Capacity Limited Ramp Rate**.
Capacity Limited Ramp Rate	The rate of increase or decrease of **Active Power** of an **ESPS** in response to reaching the **Capacity Limit**.

CCGT Installation	A collection of **CCGT Modules** (registered as a **CCGT Installation** under the PC) comprising one or more gas turbines and one or more steam turbines where, in normal operation, the waste heat from the **CCGT Modules** which are gas turbines is passed to the heat exchanger of the associated **CCGT Modules** which are steam turbines from which it is directly supplied to these steam turbines thereby contributing to the overall combined cycle efficiency of the **CCGT Installation**.
CCGT Installation Matrix	The matrix which must be submitted by a **Generator** under the **Planning Code** and which is used by the **TSOs** for **Scheduling** and **Dispatch** purposes under the **SDCs** as a "look up" table determining which **CCGT Module** will be operating at any given **MW Dispatch** level subject to any updated **Availability** information submitted by a **Generator** to a **TSO** under **SDC1**.
CCGT Module	A **Generating Unit** within a **CCGT Installation**.
Central Dispatch	The process of **Scheduling** and issuing **Dispatch Instructions** in relation to **CDGUs, Pumped Storage Plant Demand, Energy Storage Power Station Demand, Demand Side Units** and/or **Interconnectors** direct to a **Control Facility** by the **TSO** pursuant to the **Grid Code.** In particular: All **Dispatchable PPMs** shall be subject to **Central Dispatch**; All other **Power Stations** with a **Registered Capacity** of above 10 **MW** shall be subject to **Central Dispatch**; All other **Power Stations** with a **Registered Capacity** of 10 **MW** or less can agree with the **TSO** to be subject to **Central Dispatch**.
Centrally Dispatched Generating Unit (CDGU)	A **Generating Unit** within a **Power Station** subject to **Central Dispatch**, which comprises, unless specified otherwise in relation to a particular use of the term a **Thermal Plant** including a **CCGT Installation**, a **Dispatchable PPM**, **Hydro Unit** and **Pumped Storage Plant** in respect of its **Pumped Storage Generation**.

Charging Capacity	The maximum amount of **Energy** consumed by an **Energy Storage Power Station** when acting as an **Energy Storage Power Station Demand**.
Cold Start	Any **Synchronisation** of a **Generating Unit** that has previously not been **Synchronised** for a period of time longer than its submitted **Warm Cooling Boundary**.
Commercial Offer Data	The commercial offer data submitted to the **MO** pursuant to the **TSC**.
Commissioning/ Acceptance Test	Testing of a **CDGU**, **Controllable PPM, Pumped Storage Plant Demand**, **Energy Storage Power Station Demand**, **Demand Side Units**, **Aggregated Generating Units**, **Interconnector** or an item of **User's Equipment** required pursuant to the **Connection Conditions** prior to connection or re-connection in order to determine whether or not it is suitable for connection to the **System** and also to determine the new values of parameters to apply to it following a material alteration or modification of a **CDGU**, **Controllable PPM, Pumped Storage Plant Demand**, **Energy Storage Power Station Demand, Demand Side Units**, **Aggregated Generating Units**, **Interconnector** or of an item of **User's Equipment** and the term "**Commissioning/Acceptance Testing**" shall be construed accordingly.
Commissioning / Acceptance Test Panel	The panel made up of representatives from the TSO and DNO that will agree the compliance testing program, provide direction on technical requirements, assess the test results and decide if **Grid Code** and **Distribution Code** compliance has been achieved by the User.
Committed Project Planning Data	Has the meaning set out in PC6.4.3.
Competent Authority	The **Authority**, or any local, national or supranational agency, authority, department, inspectorate, minister, official, court, tribunal or public or statutory person (whether autonomous or not) of the United Kingdom (or the government thereof) or the European Communities which has jurisdiction over the **TSO** and the relevant **Generator** or the subject matter of a **Generating Unit Agreement** or a **Power Station Agreement** between **NIE Energy** and that **Generator**.
Confirmation Statement	As defined in the **Metering Code**.

Connection Agreement	In the case of a **User** other than the **DNO,** the bilateral agreement between the **TSO** and the **User**, which contains the detail specific to the **User**'s connection to the **Transmission System**.
Connection Conditions or **CC**	The part of the **Grid Code** which is identified as the **Connection Conditions**.
Connection Point	A **Bulk Supply Point** or a point at which a **User's Plant** and/or **Apparatus** connects to the **Transmission System**, which in the case of an **Interconnector** is the connection point specified in the relevant **Connection Agreement**.
Connection Site	A site containing a **Connection Point**.
Connection Charges	The **TSO's** charges to **Users** for connection to the **Transmission System**.
Constrained Group	A group of **Generating Units** located within a constrained part of the **System** as determined by the **TSO**.
Contingency Reserve	Has the meaning set out in OC3.
Contract Customer	A **Customer** whose terms of supply contain provisions enhancing its security of supply negotiated with **NIE Energy** in accordance with guidelines prepared by **NIE Energy** and approved by the **Authority** from time to time, insofar as such terms of supply include the right to be excluded, insofar as possible, from **Load** shedding.
Contracted Capacity	In relation to a **PPA CDGU**, the **NFL Capacity** of the **CDGU** which is set out in paragraph 2 of schedule 1 to the **Generating Unit Agreement** for that **CDGU** or in the relevant **System Support Services Agreement**, as that **NFL Capacity** may be amended from time to time in accordance with that **Generating Unit Agreement** or the relevant **Power Station Agreement** or **System Support Services Agreement**. In relation to a **PPA Open Cycle Gas Turbine CDGU** and/or a **CCGT Installation**, the **Contracted Capacity** figure is the lower figure set out in paragraph 2 of schedule 1 of the **Generating Unit Agreement** or paragraph 2 of schedule 1 of the relevant **System Support Services Agreement**, in each case being the higher of the two figures set out in paragraph 2 of Schedule 1.

Contracted Capacity (Coal)	In relation to a **PPA CDGU** which is capable of firing on two different **Designated Fuels**, the figure (expressed in **MW**) specified as such in paragraph 2 of schedule 1 to the relevant **Generating Unit Agreement** or in the relevant **System Support Services Agreement**.
Contracted Capacity (Peak)	In relation to a **PPA CDGU**, which is an **Open Cycle Gas Turbine CDGU** and/or a **CCGT Installation**, the figure (expressed in **MW**) specified as such (if any) in paragraph 2 of schedule 1 to the relevant **Generating Unit Agreement** (where it is the higher of the two figures set out in paragraph 2 of schedule 1) or in the relevant **System Support Services Agreement** (where it is the higher of the two figures set out in paragraph 2 of schedule 1).
Contracted Technical Parameters	In relation to a **PPA CDGU**, the values of Technical Parameters which are identical to those parameters set out in schedule 1 to the **Generating Unit Agreement** for that **CDGU**, which are there referred to as "**Contracted Operating Characteristics**", as those values are amended from time to time in accordance with that **Generating Unit Agreement**. In the case of a **CDGU** other than a **PPA CDGU**, the values of **Technical Parameters** which are identical to the parameters set out in the relevant **SSS Agreement** and referred to as "**SSS Parameters**", as those values are amended from time to time in accordance with that **SSS Agreement**.
Control Circuit Load Management	A direct **Load** management arrangement whereby certain separate domestic off peak **Loads** can be controlled by the **TSO** via radio teleswitch.
Control Facility	A location used for the purpose of **Monitoring**, control and operation of the **User's Plant** and **Apparatus** and for accepting **Dispatch Instructions** via **Electronic Interface**.
Control Person	The term used as an alternative to "**Safety Coordinator**" on the **Site Responsibility Schedule** only.
Control Phase	The **Control Phase** follows on from the **Programming Phase** and starts with the issue of the **Indicative Operations Schedule** for the next **Trading Day** and covers the period down to real time.

Controllable PPM (CPPM)	A **PPM** first connected to the **NI System** on or after 1 April 2005 whose generators comprise a **Registered Capacity** of 5 **MW** or more.
Conversion Factors	The terms referred to at PC.A3.3.11.
Customer	A person to whom electrical power is provided (whether or not he is the same person as the person who provides the electrical power).
Customer Demand Management	Has the meaning set out in OC4.4.2.
Customer Voltage Reduction	A 3 or 6 per cent reduction of voltage supplied to all or any group of **Customers** on a particular part of the **NI System**.
Cycle Operating Mode	The **Open Cycle Mode** or combine cycle **Operating Mode** of a **CCGT Installation** which may need to be specified pursuant to a **Dispatch Instruction** under SDC2.4.2.4(j).
Data Registration Code or **DRC**	The part of the **Grid Code** which is identified as the **Data Registration Code**.
Declared Fuel	A fuel having the characteristics described in schedule 3 of the relevant **Generating Unit Agreement**.
Delivery Point	Has the meaning ascribed to it in the relevant **Generating Unit Agreement** or, in the case of a **CDGU** other than a **PPA CDGU** or **Controllable PPM**, in the relevant **Connection Agreement**.
Deload Break Point	The point at which due to technical reason a **Generating Unit** may need to pause during its **MW Output** reduction process.
De-Loaded	The condition in which a **Generating Unit** or **CCGT Installation**, as the case may be, has reduced or is not delivering electrical power to the **System** to which it is **Synchronised** and the terms "**De-Loading**" and "**De-Load**" shall be construed accordingly.
De-Loading Rate	The rate at which a **Generation Unit** or **Generating Unit** (as the case may be) reduces **MW Output** from **Minimum Generation** to zero when it is instructed to cease output. There are up to two possible **De-Loading** rates, which are referred to as **De-Loading Rate 1** and **De-Loading Rate 2**.
Demand	The amount of electrical power consumed comprising of **Active** and **Reactive Power** unless otherwise stated.

Demand Forecasts	For operational purposes, a forecast of Demand made pursuant to OC1. For planning purposes, a forecast of Demand made pursuant to the Planning Code.
Demand Side Unit	An **Individual Demand Site** or **Aggregated Demand Site** with a **Demand Side Unit MW Capacity** of at least 4 **MW**. The **Demand Side Unit** shall be subject to **Central Dispatch**.
Demand Side Unit MW Availability	The forecasted change in **Active Power** which can be achieved in one currency zone by a **Demand Side Unit** for each **Imbalance Settlement Period Imbalance Settlement Period** in the following **Trading Day** period and which must be submitted by the **User** to the **TSO** in an **Availability Notice** under SDC1.4.1.2.
Demand Side Unit Best Correlated Profile	The four **Demand Side Unit Profiles** from one day to eighty-four days prior to the **Dispatch Instruction**, offset to minimise the average absolute error across all the **Meter** periods comprising the **Demand Side Unit Profile** when compared to the **Demand Side Unit Profile** which finishes with the **Dispatch** period, resulting in the four smallest average absolute errors, averaged.
Demand Side Unit Calculated MWh Response	The value of the half-hour **Demand Side Unit Performance Monitoring Baseline** less the sum of the half-hour **Meter** readings of all the **Individual Demand Sites** that comprise the **Demand Side Unit** aligned to a half-hour **Meter** period.
Demand Side Unit MW Capacity	The maximum change in **Active Power** that can be achieved by a **Demand Side Unit** on a sustained basis for the duration of the **Demand Side Unit's Maximum Down Time** by totalling the potential increase in on-site **Active Power Generation** and the potential decrease in on-site **Active Power Demand** at each **Individual Demand Site**.
Demand Side Unit MWh Response	The equivalent **Energy** in a half-hour **Meter** period of a **Demand Side Unit MW Response** requested in a **Dispatch Instruction**.
Demand Side Unit MW Response Time	The time as specified by the **Demand Side Unit Operator** in the **Technical Parameters** and is the time it takes for the **Demand Side Unit Operator** to be able to implement the **Demand Side Unit**

	MW Response from receipt of the **Dispatch Instruction** from the **TSO.**
Demand Side Unit Notice Time	The time as specified by the **Demand Side Unit Operator** in the **Technical Parameters** and is the time it takes for the **Demand Side Unit** to begin ramping to the **Demand Side Unit MW Response** from receipt of the **Dispatch Instruction** from the **TSO.**
Demand Side Unit Operator	A person who: 1) Operates a **Demand Side Unit,** with an aggregated **Demand Side MW Capacity** not less than 4 **MW** 2) Is in receipt of or has signed a **Demand Side Unit System Operator Interface Agreement**
Demand Side Unit Performance Monitoring Baseline	**An Energy** value for each half-hour **Meter** period while a **Demand Side Unit** is **Dispatched**. It is the **Demand Side Unit Best Correlated Profile** excluding the first twenty four half-hour **Meter** periods
Demand Side Unit Performance Monitoring Error	The absolute value of the **Demand Side Unit Calculated MWh Response** less the **Demand Side Unit MWh Response**.
Demand Side Unit Performance Monitoring Percentage Error	The absolute value of the **Demand Side Unit Calculated MWh Response** less the **Demand Side Unit MWh Response** divided by the **Demand Side Unit MWh Response**.
Demand Side Unit Profile	Consecutive aggregated **Meter** readings of all **Individual Demand Sites** that comprise a **Demand Side Unit** for each of the full half-hour **Meter** periods in a twelve-hour period plus the duration of **Dispatch**. If the **Demand Side Unit** was **Dispatched** during the period the **Demand Side Unit Calculated MWh Response** in the same half-hour **Meter** periods are added, except in the case of the **Dispatch** being monitored. In this case the accumulated **Energy** calculated from **Demand Side Unit MW Response** from **Generation** operating as a continuous **Synchronous Generating Unit** signal (CC.13.3 (a)) plus the **Demand Side Unit MW Response** from avoided **Demand** consumption and **Generation** operating in **DSU Short-term Synchronous Operating Mode** signal (CC.13.3 (c)) are added.

Demand Side Unit SCADA Error	The **Demand Side Unit Calculated MWh Response** less the accumulated **Energy** calculated from **Demand Side Unit MW Response** from **Generation** operating as a continuous **Synchronous Generating Unit** signal (CC.13.3 (a)) plus the **Demand Side Unit MW Response** from avoided **Demand** consumption and **Generation** in **DSU Short-term Synchronous Operating Mode** signal (CC.13.3 (c)) in the same half-hour **Meter** period.
Demand Side Unit SCADA Percentage Error	The **Demand Side Unit Calculated MWh Response** less the accumulated **Energy** calculated from **Demand Side Unit MW Response** from **Generation** operating as a continuous **Synchronous Generating Unit** signal (CC.13.3 (a)) plus the **Demand Side Unit MW Response** from avoided **Demand** consumption and **Generation** operating in **DSU Short-term Synchronous Operating Mode** signal (CC.13.3 (c)) divided by **Demand Side Unit Calculated MWh Response** the in the same half-hour **Meter** period.
Demand Side Unit System Operator Interface Agreement	The bilateral agreement between the **TSO** and the **Demand Side Unit Operator,** which contains the detail specific to the **Individual Demand Site(s)**
Demand Side Unit Ramp Time	The time it takes for a **Demand Side Unit** to ramp to the **Demand Side Unit MW Response.** It is equal to the **Demand Side Unit MW Response Time** less the **Demand Side Unit Notice Time.**
Department	The Department of Enterprise, Trade and Industry.
Design and Operating Requirement	In relation to the **Grid Code**, a **Nominated Generating Unit Agreement** (and/or **Nominated Power Station Agreement**), a **SSS Agreement** and a **Connection Agreement**: (a) an express requirement of one of those documents as to the installation or operational capability of a specified item of **Plant** and/or **Apparatus**; (b) a requirement of one of those documents for the existence of procedures necessary to give effect to the matters listed in (a) above; or

	(c) an express provision in one of those documents as to any other particular operational requirement.
Designated Fuel	A type of fuel specified in the relevant **Generating Unit Agreement** as being a type of fuel which the **TSO** may instruct a **Generator** to burn in relation to a **CDGU** which is capable of firing both on coal (which may include a mixture of coal and oil) and on oil or on Gas or Distillate, as the case may be.
De-Synchronising	The act of taking a **Generating Unit** off the **NI System**, to which it has been **Synchronised**, and like terms shall be construed accordingly.
Detailed Planning Data	Data specified in Part 2 of the Appendix to the **Planning Code**.
Development	A modification relating to a **User's Plant** and/or **Apparatus** already connected to the **Transmission System** or the **Distribution System**.
Disconnect	The act of electrically separating **Users**' (and **Customers**') equipment from the **Transmission System** or **Distribution System** where relevant, and the terms "**Disconnection**" and "**Disconnecting**" shall be construed accordingly.
Dispatch	The issue by the **TSO** of instructions to a **Generator, Pumped Storage Generator**, **Energy Storage Generator**, **Interconnector Owner**, **Demand Side Unit Operator** or **Generator Aggregator** in respect of its **CDGU**, **Pumped Storage Plant Demand**, **Energy Storage Power Station Demand**, **Demand Side Unit, Aggregated Generating Units** or **Interconnector** pursuant to SDC2 and the term "**Dispatched**" shall be construed accordingly."
Dispatch Characteristics	Those characteristics referred to in the relevant Table in the Appendix to Part A of OC11 or Part B of OC11 (as the context requires).
Dispatch Instruction	An instruction given by the **TSO** to a **CDGU**, **Demand Side Unit, Interconnector** and/or **Pumped Storage Plant Demand** and/or **Energy Storage Power Station Demand** to that **User's** approved **Control Facility** to change the output, fuel or manner of operation of the **CDGU**, **Demand Side Unit**, **Interconnector** and/or **Pumped Storage Plant Demand** and/or **Energy**

	Storage Power Station Demand. "**Instruct**" and "**Instructed**" shall be construed accordingly.
Dispatch Instruction Test Flag	The flag indicating that a **Dispatch Instruction** will not be deemed to be a **Dispatch Instruction** for settlement purposes, used when the **TSO** approves new or amended test proposals submitted by a **Generator** after **Gate Closure 2** (or there is insufficient time for the **TSO** to evaluate and approve the test proposal before **Gate Closure 2**) and as a result, the **Dispatch Instructions** issued by the **TSO** diverge from the **Final Physical Notifications**.
Dispatchable PPM (DPPM)	A **Controllable PPM** which must have a **Control Facility** in order to be dispatched via an **Electronic Interface** by the **TSO**.
Dispatched Fuel	The **Declared Fuel** which a **Generator** is instructed by the **TSO** in a **Dispatched Fuel Notice** or a **Dispatch Instruction** to use for the operation of a **CDGU** for the time being.
Distillate	Liquid fuel, as specified in the relevant schedule to a **Generating Unit Agreement**, or where there is no **Generating Unit Agreement**, as agreed with the **TSO**.
Distribution Code	The code in Northern Ireland of the same name.
Distribution Network Owner (DNO)	NIE acting in its capacity as owner of the **Distribution System**.
Distribution System	The electric lines within the Authorised Area, as defined in the licence held by the **DNO**, owned by the **Distribution Licensee** (but not, for the avoidance of doubt, any lines forming part of the transmission system or any **Interconnector**), and any other electric lines which the **Authority** may specify as forming part of the distribution system, together with (in each case) any **Plant** and **Apparatus** and/or meters owned or operated by the **DNO** used in connection with the distribution of electricity.
DNO Connection Agreement	The bilateral agreement between the DNO and the **DNO Demand Customer,** which contains the detail specific to the **DNO Demand Customer**'s connection to the **Distribution System.**
DNO Demand Customer	A person to whom electrical **Energy** is provided by means of a direct connection to the **Distribution System.**

DSU Short-term Synchronous Operating Mode	The operation of **Generating Unit**(s) at an **Individual Demand Site** of a **Demand Side Unit** where the **Generating Unit**(s) supplies **Demand Customer's** or **DNO Demand Customer's Load** while not **Synchronised** to the **Transmission System** or **Distribution System.** The **Generating Unit**(s) is (are) **Synchronised** to the **Transmission System** or **Distribution System** for short periods of time at **Start-Up** and **Shutdown** of the **Generating Unit**(s) to facilitate a smooth transfer of power.
Dwell Time Down	The duration for which the **Generating Unit** must remain at the **Dwell Time Down Trigger Point** during a change in its **MW Output** while ramping down between instructed **MW Output** and **Minimum Generation**.
Dwell Time Down Trigger Point	A constant **MW** level at which a **Generating Unit** must remain while ramping down between instructed **MW Output** and **Minimum Generation**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Dwell Time Up	The duration for which the **Generating Unit** must remain at the **Dwell Time Up Trigger Point** during a change in its **MW Output** while ramping up between **Minimum Generation** and instructed **MW Output.**
Dwell Time Up Trigger Point	A constant **MW** level at which a **Generating Unit** must remain while ramping up between **Minimum Generation** and instructed **MW Output.** There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Earthing	A way of providing a connection between conductors and earth by an **Earthing Device**.
Earthing Device	A means of providing a connection between a conductor and earth being of adequate strength and capability.
Electronic Interface	A system, in accordance with the requirements of the **TSO's** data system, at the **Control Facility**, providing an electronic interface between the **TSO** and a **User**, for issuing and receiving instructions, including **Dispatch Instructions**, as provided for in the **Grid Code** and established pursuant to an agreement between the **TSO** and the **User**.

Emergency Manual Disconnection	**Load** shedding carried out at short notice or no notice when a **Regulating Margin** cannot otherwise be achieved.
End of Restricted Range	The end point in **MW** of a **Forbidden Zone**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
End Point of Start Up Period	The time after which the rate of change of the **Generating Unit Output** is not dependent upon the initial **Warmth** of the **Generating Unit**.
Energy	The electrical energy produced, flowing or supplied by an electrical circuit during a time interval and being the integral with respect to time of the instantaneous power, measured in units of watt-hours or standard multiples thereof, for example: 1000Wh = 1kWh; 1000 kWh = 1 **MW**h; 1000 **MW**h = 1 GWh.
Energy Allowance	Has the meaning ascribed to that term in the relevant **Generator's Generating Unit Agreement**.
Energy Limit	The forecasted maximum amount of **Energy** that can be generated by an **Energy Limited Generating Unit** within the **Trading Day**.
Energy Limit Period	The period during which an **Energy Limited Generating Unit** will be **Available** to generate.
Energy Limited Generating Unit	A **Generating Unit** with a limit on the **Energy** it can deliver in a specified time period.
Energy Storage Power Station (ESPS)	A collection of one or more **ESU(s)** that can automatically act upon a remote signal from the **TSO** to change its **Active Power** output.
Energy Storage Power Station Generation	An **Energy Storage Power Station** in its operation of producing **Energy**.
Energy Storage Generator	A **Generator** which owns and/or operates any **Energy Storage Power Station**.
Energy Storage Power Station Demand	An **Energy Storage Power Station** in its operation of consuming **Energy**.
Energy Storage Unit (ESU)	A Generation Unit(s) using storage devices to generate and consume electricity as, or as part of, a **PPM**.
Event	Has the meaning set out in OC5.4.2.

Event Recorder	An electronic device that measures and records data at locations on the NI System, including but not limited to quality of supply, dynamic system behaviour and fault recording.
Externally Interconnected Party	The operator of an electrical transmission or distribution system outside Northern Ireland which is connected to the **Transmission System** by an **Interconnector**.
Failure to Follow Notice to Synchronise Instruction	An instruction given by the **TSO** to a **Generator** in respect of its **CDGU** confirming that it has failed to **Synchronise** more than 5 minutes after the time specified in the **Notice to Synchronise**.
Failure to Reach Minimum Generation Instruction	An instruction given by the **TSO** to a **Generator** in respect of its **CDGU** confirming that it has **De-Synchronised** where it has tripped before reaching **Minimum Generation**.
Fast Acting	With regards to **Frequency Control**, no time delays, such as moving average **Frequency** filters, other than those necessary inherent in the design of the **PPM** shall be introduced.
Final Outage Programme	The final **Outage** programme in respect of **CDGUs** and/or **Power Station Equipment** prepared by the **TSO** for Year 1 pursuant to OC2.6.3.
Final Physical Notification	In respect of an certain **Users** and the Physical Notification submitted in accordance with SDC1.4.4.6 for an **Imbalance Settlement Period**, the last **Physical Notification** received for that **Imbalance Settlement Period** before **Gate Closure 2** for that **Imbalance Settlement Period**.
Final Report	Has the meaning set out in OC10.A.4.
Flexible Planned Outage	A **Planned Outage** which can at the request of the **TSO** be deferred by a period or advanced by a period (and the period for which it is planned (and therefore excluding any overrun), including the periods for which it may be advanced or deferred, shall be known as the **Flexible Planned Outage Period**).
Forbidden Zone	A **MW** range within which a **Generator** cannot operate in a stable manner due to an inherent technical limitation of the machine.
Force Majeure	Has the meaning ascribed to that term in the relevant **Generating Unit Agreement**.

Forced Outage	An **Outage** of a **CDGU** (including, in the case of a **CCGT Installation**, one or more **CCGT Modules** within it) as provided in OC2 or item of **Power Station Equipment** of which no notice can be given by the **Generator** to the **TSO**.
Forecast Minimum Generation Profile	The **User's** forecast of the average level of **Minimum Generation** for the **User's Plant** for each **Imbalance Settlement Period** in the **Trading Day**.
Forecast Minimum Output Profile	The **User**'s forecast of the average level of minimum **MW Output** for a **Pumped Storage Plant** or **Energy Storage Power Station** for each **Imbalance Settlement Period** in the **Trading Day**.
Frequency	The number of alternating current cycles per second (expressed in Hertz) at which a **System** is running.
Frequency Control	The control of the **Frequency** on the **Total System**
Frequency Response Ramp Rate	The minimum rate of increase or decrease of **Active Power Output** of a **PPM** when providing **Frequency Control**.
Frequency Response Deadband	An interval used intentionally to make the **Frequency** control unresponsive.
Frequency Response Insensitivity	The inherent feature of the control system, specified as the minimum magnitude of change in the **Frequency** or input signal that results in a change of output power or output signal.
Frequency Sensitive Mode (FSM)	The operation of a **Generating Unit** whereby its **Active Power** output is varied automatically to compensate for variations in the **Frequency** of the **System** in such a way that it assists with the recovery to target frequency.
Frequency Transient	For the purposes of OC11 and the **Metering Code**, a period when the **NI System Frequency** is at or below 49.5 Hz.
Fuel Rate	Has the meaning ascribed to that term in the relevant **Generator's Generating Unit Agreement**.
Fuel Security Code	The Northern Ireland Fuel Security Code designated by the **Department** as a condition of licences granted under Article 10 of the **Order**.

Full Load	Maximum electrical output of a **Generating Unit** or **CCGT Installation** less any **Demand** associated solely with facilitating the operation of the **Generating Unit**, measured at the **Connection Point** or, in the case of a **Power Park Module**, the maximum electrical output of the **Power Park Module** at the power factor stated in the relevant **Connection Agreement** less any **Demand** associated solely with facilitating the operation of the **Generating Unit(s)**, measured as at the **Connection Point** of the **Power Park Module** and depending, in the case of a **Generating Unit** which is capable of firing on two different **Designated Fuels**, on which **Designated Fuel** is being used to operate the **Generating Unit** but excluding **Maximum Generation**. In respect of a **PPA CDGU**, the **TSO** may take into account the **Conversion Factors** when **Dispatching** such a **CDGU**.
Fully Available	In relation to a **CDGU** or **Controllable PPM** (as the case may be) means **Available** to the **CDGU's Contracted Capacity** / **Registered Capacity** (**PPA** plant / non-**PPA** plant respectively) (or full output in the case of a **Controllable PPM** or **Dispatchable PPM**). In relation to a **PPA Open Cycle Gas Turbine CDGU**, means **Available** to the **CDGU's Contracted Capacity (Peak)**.
Gas	The gas to be delivered in accordance with arrangements agreed between the **TSO** and the **Generator** from time to time or where there are no such arrangements, gas to fuel a **CCGT Installation**.
Gas Turbine Unit	A **Generating Unit** fuelled by **Gas** or distillate.
Gate Closure 1	In respect of a **Trading Day**, 13.30 hours on the **Trading Day** prior to that **Trading Day.**
Gate Closure 2	In respect of an **Imbalance Settlement Period**, one hour before that **Imbalance Settlement Period.**
General Conditions or **GC**	The part of the **Grid Code** which is identified as the **General Conditions**.
Generating Plant	A **Power Station** subject to **Central Dispatch**
Generating Unit	Other than in the case of **Wind Farm Power Stations**, a turbine generator within a **Power Station**, together with all **Plant** and **Apparatus** at that **Power Station** up to the high voltage bushings at the **Generator Transformer** which relate exclusively to the operation of that turbine

	generator (which in the case of a steam turbine will include the boiler and heat exchanger and in the case of a gas turbine will include the gas generator/combustion turbine). In the case of **Power Park Modules,** a generator within a **Power Park Module**, together with all **Plant** and **Apparatus** (including any step-up transformer) which relates exclusively to the operation of that generator. It will be either a **Synchronous Generating Unit** or a **Non-Synchronous Generating Unit**.
Generating Unit Agreement	An agreement between a **Generator** and **NIE Energy** pursuant to which **NIE Energy** amongst other matters, agrees to purchase from the **Generator** electricity generated by a **CDGU.**
Generation Licence	A licence to generate electricity granted pursuant to Article 10(1)(a) of the **Order**.
Generation Planning Parameters	Those parameters listed in Appendix 2 of OC2.
Generator	A **Power Station** or person who generates electricity under a **Licence** or exemption under the **Order** and who is subject to the **Grid Code** either by virtue of a **Licence** or exemption or pursuant to any agreement with the **TSO** or otherwise.
Generator Aggregator	A person who represents several **Generating Units**, each of which does not have a **Registered Capacity/Contracted Capacity** greater than 10 MW**MW** and the combined **Registered Capacity/Contracted Capacity** of which is equal to or greater than 4 **MW**, by in particular preparing notices under SDC1, in relation to those **Generating Units** and receiving **Dispatch Instructions** in relation to those **Generating Units** under SDC2. For the avoidance of doubt, a **Generator Aggregator** cannot aggregate a **Generating Unit** with an output equal to or above 10 **MW**.
Generator Performance Chart	A diagram which shows the **MW** and **Mvar** capability limits within which a **CDGU** or a **CCGT Module** within a **CCGT Installation** or a **Controllable PPM** or **Dispatchable PPM** will be expected to operate under steady state conditions in the formats set out in Appendix 1 to OC2, and which shows in addition, for a **WFPS**, wind speed and direction against electrical output in **MW**, in "rose" format.
Generator Terminal	The stator terminals of a **Generating Unit**.

Generator Transformer	The main transformer for a **CDGU** through which that power passes from the **Generator Terminals** to the **NI System**.
Governor Droop	In relation to the operation of the governor of a **Generating Unit**, the percentage drop in **NI System Frequency** which would cause the **Generating Unit** under free governor action to change its output from zero to **Full Load**.
Governor Droop Test	In relation to a **CDGU** or **CCGT Module** within a **CCGT Installation**, a test of the **Governor Droop**.
Grid Code	The **Grid Code** prepared pursuant to the **TSO's Licence**, as from time to time revised in accordance with the **TSO's Licence**.
Grid Code Compliance Agreement	An agreement that a **User** whose **Plant** and **Apparatus** is connected to the **Distribution System** is required to enter into with the **TSO** pursuant to its connection agreement with the **DNO**, such agreement being in the form set out in Schedule 4 of the **Transmission Interface Agreement**.
Grid Code Review Panel	The panel with the functions set out in GC6.
High Voltage or **HV**	A voltage exceeding 650 volts.
High Voltage Direct Current (HVDC) System	HVDC System means an electrical power system which transfers energy in the form of high voltage direct current between two or more alternating current (AC) buses and comprises at least two HVDC Converter Stations with DC transmission lines or cables between the HVDC Converter Stations.
Hot Cooling Boundary	The period of time, following **De-Synchronisation** of a **Generating Unit** after which the **Warmth State** transfers from being hot to being warm.
Hot Standby	In relation to a **Generating Unit**, a condition of readiness of the **Generating Unit's** boiler to enable the **Generating Unit** to be **Synchronised** to the **NI System** and attain an instructed output in a specified timescale.
Hot Start	Any **Synchronisation** of a **Generating Unit** that has previously not been **Synchronised** for a period of time shorter than or equal to its submitted **Hot Cooling Boundary**.

HV Apparatus	**High Voltage** electrical circuits forming part of a **System**.
HVDC Converter Station	Part of an **HVDC System** which consists of one or more HVDC converter units installed in a single location together with buildings, reactors, filters, reactive power devices, control, monitoring, protective, measuring and auxiliary equipment.
HVDC Interface Point	The point at which HVDC equipment is connected to an AC network, at which technical specifications affecting the performance of the equipment can be prescribed.
HVDC Registered Capacity	The maximum capacity, in either flow direction, expressed in whole MW, that an **HVDC System** can deliver on a sustained basis, without accelerated loss of equipment life, at the **Connection Point**. This figure shall include transmission power losses for the **HVDC System**.
HVDC Registered Export Capacity	The maximum capacity, expressed in whole MW that an **HVDC System** may export (transfer energy from the Power System to a remote network) on a sustained basis, without accelerated loss of equipment life, as registered with the TSO.
HVDC Registered Import Capacity	The maximum capacity, expressed in whole MW that an **HVDC System** may import (transfer energy from the Power System to a remote network) on a sustained basis, without accelerated loss of equipment life, as registered with the TSO
HVDC Unit	An **HVDC System** or **DC connected Controllable PPM** that is not a **Non-HVDC Unit**. In addition, HVDC Units, which are comprised of: (a) embedded **HVDC Systems** within one control area and connected to the Transmission System, and/or (b) embedded **HVDC Systems** within one control area and connected to the Distribution System when a cross-border impact is demonstrated to the TSO. The relevant TSO shall consider the long-term development of the network in this assessment shall not be subject to Grid Code clauses CC.17 and to CC.18 if one or more of the following conditions apply: 1) the **HVDC System** has at least one **HVDC System Converter Station** owned by the TSO; 2) the **HVDC System** is owned by an entity which exercises control over the TSO; or the **HVDC System** is owned by an entity directly or indirectly controlled by an entity which also exerci

Hydro Unit	A **Generating Unit** which generates electricity from the movement of water excluding **Pumped Storage Generation**.
Imbalance Settlement Period	A thirty minute period beginning on each hour or half hour.
Implementing Safety Co-ordinator	Has the meaning set out in OC6.4.2.6.
Incident Room	The focal point in the **TSO** or the **User**, as the case may be, for the communication of information between the **TSO** and the senior management representatives of **Users** relating to a **Joint System Incident**.
Independent Generating Plant	A **Power Station** which is not subject to **Central Dispatch** and is not a **Controllable PPM.**
Indicative Operations Schedule	A schedule prepared by the **TSO** in conjunction with the **Other TSO** pursuant to SDC1.4.8.1.
Individual Demand Site	A single premises of a **Large Demand Customer** connected to the **Transmission System** or a **DNO Demand Customer** connected to the **Distribution System** with a **Demand Side Unit MW Capacity**. Where the **Individual Demand Site** forms a **Demand Side Unit** or is part of an **Aggregated Demand Site** of which the **Demand Side Unit Operator** has entered into a **Demand Side Unit System Operator Interface Agreement** with the **TSO** with respect to that premise.
Inflexible Planned Outage	A **Planned Outage** the **Start Date** and **Start Time** of which cannot be moved by the **TSO** under OC2.6.4(d) and which accordingly is designated as an **Inflexible Planned Outage** in the relevant **Outage** programme produced pursuant to OC2 (and the period for which it is planned (and therefore excluding any overrun) shall be known as the **Inflexible Planned Outage Period**).
Interconnector	Electric lines and electric **Plant,** including HVDC Systems, used for conveying electricity or provision of **Reserves** from outside both of Northern Ireland and the Republic of Ireland directly to or from a substation or converter station in either Northern Ireland or the Republic of Ireland.
Interconnector Filter	A device within an HVDC **Interconnector** which prevents the transmission of harmonics to the **Transmission System** to which that **Interconnector** is connected and which also

	provides a means of controlling the **Mvar** flow to and from that HVDC **Interconnector**.
Interconnector Owner	A person who owns an **Interconnector**.
Interconnector Schedule Quantities	The quantities of **Active Power** which have been scheduled on an **Interconnector** as a result of trading in day ahead and/or intraday markets and submitted by a **Scheduling Agent**.
Interested User	As defined in the **Metering Code**.
Inter-jurisdictional Tie Line	The lines, facilities and equipment that connect the transmission system of the Republic of Ireland to the transmission system of Northern Ireland.
Intermediary	The person representing a **Generating Unit** for the purposes provided for in the **TSC**.
Intertripping	A method of tripping a circuit breaker on receipt of a signal initiated from protection at another location.
Investigation	An investigation carried out by the **TSO** pursuant to OC11.7 in relation to a **Power Station** containing **PPA CDGUs** or an investigation carried out by the **TSO** pursuant to OC11.12 in relation to any other **User Sites** (as the context may require).
Isolating Device	A device for the purpose of rendering **Plant** and **HV Apparatus** either **Isolated** or disabled so that electrical energy cannot pass from the **Apparatus** (or, in the case of **Plant**, from the associated **Apparatus**) to the **HV Apparatus**.
Isolation	The disconnection of **HV Apparatus** from the remainder of the **System** in which that **HV Apparatus** is situated by means either of an **Isolating Device(s)** in the isolating position or adequate physical separation or sufficient gap or the disablement (by means of switching or dismantling) of **Plant** and/or **Apparatus** so that electrical energy cannot pass from the **Apparatus** (or, in the case of **Plant**, from the associated **Apparatus**) to the **HV Apparatus**, other than by an **Isolating Device** and "**Isolated**" shall be construed accordingly.
Joint Grid Code Review Panel	The Panel with the functions set out in GC7.
Joint System Incident	Has the meaning set out in OC7.6.1.
Large Demand Customer	A **Customer** which is connected to the **Transmission System**.

Lease	A lease entered into between the **TO** and a **Generator** with **PPA CDGUs** in respect of a **Power Station** containing such **CDGUs**.
Licence	A licence granted under the **Order**.
Licence Standards	The standards set out or referred to in Condition 20 of the **TSO Licence**.
Limited Frequency Sensitive Mode - Overfrequency (LFSM-O)	A **Generating Unit** operating mode which will result in **Active Power** output reduction in response to a change in system frequency above a certain value (CC8.8.7.1).
Limited Frequency Sensitive Mode - Underfrequency (LFSM-U)	A **Generating Unit** operating mode which will result in **Active Power** output increase in response to a change in system frequency below a certain value (CC8.8.7.2).
Load	The **Active Power** or **Reactive Power**, as the context requires, generated, transmitted or distributed and all like terms shall be construed accordingly.
Load Management Arrangements	Arrangements made by agreement between a **Customer** and its **Supplier** whereby the **Customer** agrees to reduce the level of its **Demand** in accordance with that agreement.
Load Up Break Point Cold	The break point which defines the shared **MW** boundary between the two **Loading Rates Cold**. The first **Loading Rate Cold** applies from **Block Load** to the first **Load Up Break Point Cold**, the second **Loading Rate Cold** applies from the first **Load Up Break Point Cold** to the second **Load Up Break Point Cold**, the third **Loading Rate Cold** applies from the second **Load Up Break Point Cold** to the end point of the **Start-Up** period, which should be set equal to the **Minimum Generation**.
Load Up Break Point Hot	The break point which defines the shared **MW** boundary between the **Loading Rates Hot**. The first **Loading Rate Hot** applies from **Block Load** to the first **Load Up Break Point Hot**, the second **Loading Rate Hot** applies from the first **Load Up Break Point Hot** to the second **Load Up Break Point Hot,** the third **Loading Rate Hot** applies from the second **Load Up Break Point Hot** to the end point of the **Start-Up** period, which should be set equal to the **Minimum Generation**.

Load Up Break Point Warm	The break point which defines the shared **MW** boundary between the **Loading Rates Warm**. The first **Loading** rate applies from **Block Load** to the first **Load Up Break Point Warm**, the second **Loading Rate Warm** applies from the first **Load Up Break Point Warm** to the second **Load Up Break Point Warm**, the third **Loading Rate Warm** applies from the second **Load Up Break Point Warm** to the end point of the **Start-Up** period, which should be set equal to the **Minimum Generation**.
Loading Rate	The **Loading Rate Cold**, **Loading Rate Hot** or **Loading Rate Warm** as the case may be.
Loading Rate Cold	The rate at which a **Generating Unit** increases **Output** from **Block Load** to **Minimum Generation** when it is instructed to **Cold Start**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Loading Rate Hot	The rate at which a **Generating Unit** increases **Output** from **Block Load** to **Minimum Generation** when it is instructed to **Hot Start**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Loading Rate Warm	The rate at which a **Generating Unit** increases **Output** from **Block Load** to **Minimum Generation** when it is instructed to **Warm Start**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Local Safety Instructions	Instructions relating to each **TO Site** and each **User Site** approved by the relevant **TO** or **User's** Manager in accordance with OC6.4.1, setting down the methods of achieving the objectives of the **TO's** or the **User's** (as the case may be) **Safety Rules** to ensure the safety of personnel carrying out work or testing on **Plant** and/or **Apparatus** to which his **Safety Rules** apply and in the case of a **User**, any other document(s) on a **User Site** which contains rules with regard to maintaining or securing the isolating position of an **Isolating Device**, or maintaining a physical separation or sufficient gap, or the disablement (by means of switching or dismantling) of **Plant** and/or **Apparatus** so that electrical energy cannot pass from the **Apparatus** (or, in the case of **Plant**, from

	the associated **Apparatus**) to the **HV Apparatus**, other than by an **Isolating Device** or maintaining or securing the position of an **Earthing Device**.
Location	The electrical location on a **System**.
Low Frequency Relay	An electrical measuring relay intended to operate when its characteristic quantity **(Frequency)** reaches the relay settings by decrease in **Frequency**.
Low Voltage or **LV**	A voltage not exceeding 250 volts.
Margin	An appropriate **Operational Planning** margin, set by the **TSO**, of generating capacity over that required to meet **Demand**.
Market Operator	Shall have the meaning set out in the **TSC.**
Maximisation	An increase in **MW Output** above the **Contracted Capacity** (for **CDGU**s other than **Open Cycle Gas Turbines**) or **Contracted Capacity (Peak)** (for **PPA Open Cycle Gas Turbines**) or **Registered Capacity** (for non-**PPA** plant) up to the level of the **Short Term Maximisation Capability**, and the terms "**Maximise**" and "**Maximised**" shall be construed accordingly.
Maximisation Instruction	A **Dispatch** instruction issued by the **TSO** to the **Generator** to **Maximise** the **MW Output** of a **Generating Unit.**
Maximum Charge Capacity	The maximum amount of **Energy** that can be produced from the storage of an **Energy Storage Generator** for a **Trading Day.**
Maximum Down Time	The maximum period of time during which **Demand Side Unit MW Response** at a **Demand Side Unit** can be greater than zero.
Maximum Export Capacity	The value (in **MW,** MVA, kW and/or kVA) provided in accordance with the **User's Connection Agreement** or **DNO Demand Customer**'s **DNO Connection Agreement.**
Maximum Generation	The operation of a **CDGU** to provide an output in excess of **Contracted Capacity** (for **CDGUs** other than **Open Cycle Gas Turbines**) or **Contracted Capacity (Peak)** (for **Open Cycle Gas Turbines** and **PPA CCGTs**) or **Registered Capacity** (for non-**PPA** plant).
Maximum Import Capacity	The values (kW and/ or kVA) provided in accordance with the **User's Connection**

	Agreement or **DNO Demand Customer**'s **DNO Connection Agreement**.
Maximum On Time	The maximum time that a **Generating Unit** can run following **Start Up**.
Maximum Ramp Down Rate	The maximum **Ramp Down Rate** of a **Demand Side Unit**. In the case of a **Demand Side Unit** which consists of an **Aggregated Demand Site** this shall be the aggregated maximum **Ramp Down Rate** of the **Individual Demand Sites**.
Maximum Ramp Up Rate	The maximum **Ramp Up Rate** of a **Demand Side Unit**. In the case of a **Demand Side Unit** which consists of an **Aggregated Demand Site** this shall be the aggregated maximum **Ramp Up Rate** of the **Individual Demand Sites**.
Maximum Storage Capacity	The maximum amount of **Energy** that can be produced from the reservoir of a **Pumped Storage Generator** for a **Trading Day.**
Medium Voltage or **MV**	A voltage exceeding 250 volts but not exceeding 650 volts.
Merit Order	An order, compiled by the **TSO** in conjunction with the **Other TSO** pursuant to SDC 1, of **Commercial Offer Data sorted in price order**.
Meshed Transmission Station	A **Subsation** which is looped into the **Transmission System**.
Metering Code or **MC**	That part of the **Grid Code** identified as the **Metering Code**.
Minimum Charge Capacity	The minimum amount of **Energy** that must be produced from the storage of an **Energy Storage Generator** for a **Trading Day.**
Minimum Demand Regulation (MDR)	That minimum margin of **Active Power** to provide a sufficient regulating margin for adequate **Frequency Control**.
Minimum Down Time	The minimum period of time during which **Demand Side Unit MW Response** at a **Demand Side Unit** can be greater than zero.
Minimum Off Time	The minimum time that must elapse from the time of a **Generating Unit De-synchronises** before it can be instructed to **Start-Up.** In the case of **Demand Side Units,** the time that must elapse while the **Demand Side Unit MW Response** is at

	zero until the next delivery of **Demand Side Unit MW Response.**
Minimum On Time	The minimum time that must elapse from the time of a **Generating Unit Start-Up** before it can be instructed to **Shut Down**.
Minimum Storage Capacity	The minimum amount of **Energy** that must be produced from the reservoir of a **Pumped Storage Generator** for a **Trading Day.**
Minimum Generation	The minimum **MW Output** which a **Generating Unit** can generate continuously, registered with the **TSO** under SDC1 as a **Technical Parameter**.
Minor Test	An **Operational Test** with a total duration of less than 6 hours in any **Trading Day** or were the active energy produced during the total duration of the test is less than: (i) 3 times the **Active Energy** which would be produced by the **Test Proposer's Plant** during 1 hour of operation at the **Plant's Registered Capacity**; and (ii) 500 MWh.
Model	A dynamic representation of a **User's Plant** and **Apparatus** in a software format as specified by the **TSO**.
Monitoring	Monitoring of **PPA CDGUs** carried out by the **TSO** pursuant to OC11.5 or monitoring of other **User's Equipment** carried out by the **TSO** pursuant to OC11.10 (as the context requires).
Monitoring Notice	A notice issued by the **TSO** to a **Generator** in respect of a **PPA CDGU** pursuant to OC11.5.3, informing the **Generator** that the **TSO** is **Monitoring** one of its **CDGUs** or a notice issued by the **TSO** to a **User** pursuant to OC11.10.2.3 informing the **User** that the **TSO** is **Monitoring** its **Relevant Plant**.
Narrow Tolerance Bands	Those tolerance bands referred to in Column 4 of the relevant Table in the Appendix to Part A of OC11 or the Appendix to Part B of OC11 (as the context requires).
Network Codes	Commission Regulation (EU) 2015/1222, Commission Regulation (EU) 2017/2196, Commission Regulation (EU) 2017/2195, Commission Regulation (EU) 2016/1388, Commission Regulation (EU) 2016/631, Commission Regulation (EU) 2016/1447 and

	Commission Regulation (EU) 2017/1485, to the extent applicable to Northern Ireland.
NFL Capacity	The normal **Full Load** capability of a **CDGU** (expressed in **MW** and stated, where relevant, in relation to a **Designated Fuel**) to generate electricity (using, where relevant, that **Designated Fuel**), determined as at the **Connection Point**.
NI Demand	The **Demand** on the **NI System** less the output of **Independent Generating Plant**.
NI System	Together, the **Transmission System** and the **Distribution System.**
NIE Energy	NIE Energy Limited, a company incorporated under the laws of Northern Ireland with registered number NI 27394 whose registered office is situated at 120 Malone Road, Belfast and its successors and permitted assigns;
NIE plc	In relation to the period prior to 1 November 2007 in its then capacity as Transmission and Distribution System operator
No Load Cost	A price which forms part of **Commercial Offer Data** expressed in € or £/hour and which is invariant in the level of **MW Output** and which applies at all times when the level of **MW Output** is greater than zero.
Nominated Generating Unit Agreement	One of the following **Generating Unit Agreements** entered into between **NIE plc** (and subsequently transferred to **NIE Energy)** and the relevant **Generator** on the **Transfer Date** (which date was 1 April 1992), as amended from time to time: Agreements in respect of Kilroot Power Station: Gas Turbine Generating Unit GT1 Gas Turbine Generating Unit GT2 Agreements in respect of Ballylumford Power Station: Generating Unit No 4 CCGT Unit 10 CCGT Unit 20 Gas Turbine Generating Unit GT1 Gas Turbine Generating Unit GT2 Agreements in respect of Coolkeeragh Power Station: Gas Turbine Generating Unit GT8

Nominated Power Station Agreement	One of the following **Power Station Agreements** entered into between **NIE plc (**and subsequently transferred to **NIE Energy)** and the relevant **Generator** on the **Transfer Date** (which date was 1 April 1992), as amended from time to time: Kilroot Power Station Agreement Ballylumford Power Station Agreement Coolkeeragh Power Station Agreement
Non-Centrally Dispatched Generating Units (NCDGU)	A **Generating Unit** not subject to **Central Dispatch**.
Non-HVDC Unit	An HVDC System or DC connected PPM with a signed Connection Agreement: (a) Connected to the Network on or before the 15th September 2018; or (b) Whose owner has concluded a final and binding contract for the purchase of the main Plant on or before the 15th September 2018 and provides evidence of same, as acknowledged by the TSO, on or before 15th of March 2019. Such evidence shall at least contain the contract title, its date of signature and date of entry into force, and the specifications of the main Plant to be constructed, assembled, or purchased. A Non-HVDC that undergoes modernisation, refurbishment or replacement of equipment which drives a modification to its Connection Agreement, and had concluded a final and binding contract for the purchase of the Plant being modified after the 15th September 2018 will be deemed an HVDC Unit
Non-RfG Generation Unit	A **Generating Unit** with a signed **Connection Agreement**: **(a)** Connected to the Network before 27th April 2019; or **(b)** Whose owner has concluded a final and binding contract for the purchase of the main **Plant** on or before 17th May 2018 and provides evidence of same, as acknowledged by the **TSO**, on or before the 11th November 2018. Such evidence shall at least contain the contract title, its date of signature and date of entry into force, and the specifications of the main **Plant** to be connected, assembled or purchased; or

	(c) Is one of the exceptions to the applicability of the New Generation Unit requirements and is a **Generating Unit** as follows: (i) Installed to provide back-up power and operate in parallel with the **Network** for less than five minutes per calendar month while the system is in normal state; or (ii) No permanent **Connection Point** and is used by the **TSO** to temporarily provide power when normal system capacity is partly or completely unavailable; or (iii) **Energy Storage Units** except for **Pumped Storage Plant**. An existing **Generating Unit** that undergoes a substantial modification to its **Connection Agreement** and concludes a final and binding contract for the purchase of the **Plant** being modified after 27th April 2019 will be deemed a New Generating Unit, unless the **Plant** being modified is one of the exceptions listed in (c) above.
Non-Synchronous Generating Unit	A **Generating Unit** which is connected but not **Synchronised** to the **NI System** with or without electronic converters either direct or through a rectifier/inverter link.
Notice to Synchronise	A **Dispatch Instruction** given by the **TSO** to a **Generator** requiring a **CDGU** to **Synchronise** to the **NI System**.
Notified Unplanned Outage	An **Outage** which has not been planned in advance under OC2, but of which some notice can be given by the **Generator** to the **TSO**.
Open Cycle Gas Turbine Unit	A **Generating Unit** driven by a gas turbine other than a **CCGT Installation** or **CCGT Module**.
Open Cycle Mode	The mode of operation of a **CCGT Installation** where only the **Gas Turbine Unit** is operational (i.e. without operation of any associated **Steam Turbine Units**).
Operating Code or **OC**	That part of the **Grid Code** which is identified as the **Operating Code**.
Operating Margin	**Contingency Reserve** and **Operating Reserve**.
Operating Mode	An **Operating Mode** of a **Generating Unit** is a pre-defined method of operating that **Generating Unit**, as agreed between the **TSO** and the **User**.

Operating Reserve	The additional output from **Generating Plant** and/or the reduction in **Demand** which must be realisable in real time operation to respond in order to contribute to containing and correcting any **NI System Frequency** deviation to an acceptable level in the event of a loss of generation or a loss of import from an **Interconnector** or mismatch between generating output and **Demand**.
Operating Security Standard	The standard referred to in Condition 21 of the TSO **Licence**.
Operation	Has the meaning set out in OC5.4.1.
Operational Effect	Has the meaning set out in OC5.4.3.
Operational Metering	Has the meaning ascribed to it in the MC.
Operational Planning	The process carried out by the **TSO** in accordance with OC2 which involves planning through various timescales, the matching of generating capacity with forecast **NI Demand** together with a reserve of generation to provide the **Margin** taking into account **Outages** of **CDGUs** and **Power Station Equipment** and **Outages** of and constraints on parts of the **NI System,** and taking into account the output of **Independent Generating Plant** and **Interconnectors,** in order to maintain the security and integrity of the **NI System**.
Operational Planning Phase	The period from 1 week to the end of the third year ahead of real time operation.
Operational Procedures	Management instructions and procedures, both in support of the **Safety Rules** and for the local and remote operation of **Plant** and/or **Apparatus** at or from a **Connection Site**.
Order	The Electricity (Northern Ireland) Order 1992.
Other Authority	The Commission for Energy Regulation in the Republic of Ireland.
Other Grid Code	The code prepared by the **Other TSO** pursuant to section 33 of the Electricity Regulation Act 1999 of the Republic of Ireland, and approved by the relevant regulatory authority, as from time to time revised, amended, supplemented or replaced with the approval of or at the instance of the relevant regulatory authority.
Other Relevant Data	The data from a **User** referred to in SDC1.4.4.4.
Other Transmission System	The transmission system operated by the **Other TSO** in the Republic of Ireland.

Other TSO	The holder of a licence granted pursuant to Section 14 of the Electricity Regulation Act 1999 in the Republic of Ireland to operate a **Transmission System.**
Outage	In relation to a **Generating Unit**, a total or partial reduction in **Availability** in connection with the repair or maintenance of the **Generating Unit** or any associated **Power Station Equipment**, or resulting from a breakdown or failure of the **Generating Unit** or any associated **Power Station Equipment**. In relation to a **Demand Side Unit** or a **Large Demand Customer**'s site, a total or partial change in **Demand Side Unit MW Capacity** in connection with the repair or maintenance of the **Demand Side Unit** or **Large Demand Customer's** unit or any associated equipment or resulting from a breakdown or failure of the **Demand Side Unit** or **Large Demand Customer's** site or any associated equipment. In relation to the **TSO,** the removal for repair or maintenance, or as a result of failure or breakdown, of any part of the **Transmission System**. In relation to the **DNO**, the construction, the removal for repair or maintenance, or as a result of failure or breakdown, of any part of the distribution lines at 33kV on the **Distribution System**.
Outage Notice	A notice submitted by a **User** under OC2 notifying the **TSO** of an **Unplanned Notified Outage**.
Output	The actual **Active Power** output in **MW** of a **Generating Uni**t as at the **Connection Point** derived from data measured pursuant to the **Metering Code**. In respect of a **PPA CDGU**, the **TSO** may take into account the **Conversion Factors** when **Dispatching** such a **CDGU**.
Outturn Availability	The set of **Availability** data for the relevant **CDGU, Controllable PPM, Aggregated Generating Unit, Energy Storage Power Station, Pumped Storage Plant Demand** or **Demand Side Unit** as declared pursuant to SDC1.4 and submitted by the **TSO** to **SEM** after the end of the Trading Day.
Outturn Availability Connection Asset.	Any equipment that is part of the **Transmission System** between and including the **Connection Point** and the busbar clamps at the **Meshed Transmission Station** for which the **TSO** schedules outages.

Overburn Contracted Capacity	In relation to a **CDGU** which is capable of firing on two different **Designated Fuels**, the figure (expressed in **MW**, measured as at the **Connection Point**) identified in schedule 1 to the relevant **Generating Unit Agreement** as "**Overburn Contracted Capacity**".
Ownership Diagram	A diagram created pursuant to CC9.1.4 and prepared following the principles set out in Appendix 2 to the CC.
Partial Shutdown	The same as a **Total Shutdown** except that all generation has ceased in a separate part of the **Total System** and there is no electricity supply across any **Interconnector** or **Inter-jurisdictional Tie Line** or other parts of the **Total System** to that part of the **Total System** and, therefore, that part of the **Total System** is shutdown, with the result that it is not possible for that part of the **Total System** to begin to function again without the **TSO's** directions relating to a **Black Start**.
Physical Notifications	A declaration submitted by certain **Users** in accordance with SDC1.4.4.6 and the **TSC** indicating expected **MW Output** profile or **Active Power Demand** profile based on trading in day ahead and intraday markets.
Planned Manual Disconnection	**Load** shedding carried out when it is known in advance that a **Regulating Margin** cannot otherwise be achieved.
Planned Outage	An **Outage** which has been planned in advance of the year in which it is to be taken under **OC2** (and which does not therefore include any overrun of the **Outage**), which may be either a **Flexible Planned Outage** or an **Inflexible Planned Outage**.
Planning Code or **PC**	That part of the **Grid Code** which is identified as the **Planning Code**.
Plant	Fixed and movable items other than **Apparatus**.
Post Event Notice	A notice issued by the **TSO** pursuant to OC11, re-declaring the **Availability** or **Technical Parameters** of a **CDGU**.
Power Islands	Has the meaning set out in OC7.4.6.2.

Power Park Module (PPM)	A **Generating Unit** or ensemble of **Generating Units** generating electricity which: • Is connected to the **System** non synchronously or through power electronics, and • Has a single **Connection Point** onshore to a **Transmission System**, **Distribution System** or **HVDC System**
Power Procurement Manager	**NIE Energy** in its role as **Power Procurement Manager** in accordance with its **Supply Licence**.
Power Park Module Settings Schedule or PPM Settings Schedule	The document of that name setting out in accordance with CC.7.2 certain technical criteria that **Generators** must comply with in respect of their **Power Park Module.**
Power Station	An installation comprising one or more **Generating Units** (even where sited separately) owned and/or controlled by the same **Generator,** which may reasonably be considered as being managed as one power station or, as the case may be, one **Power Park Module**.
Power Station Agreement	An agreement so entitled between a **Generator** and **NIE Energy** relating to a **Power Station** of the **Generator** as a whole.
Power Station Equipment	Items of **Plant** in a **Power Station** which are integral to the operation of a **CDGU** and/or **Controllable PPM** but which are not used exclusively in the operation of such **CDGU** and/or **Controllable PPM**, the **Outage** of which will, or is likely to (when, for example, taken together with other **Power Station Equipment Outages**), reduce the level of **Availability** of a **CDGU** and/or **Controllable PPM.**
PPA CCGT Installation	A **CCGT Installation** which is subject to a **Nominated Generating Unit Agreement** which is an amendment to that at the **Transfer Date** to the extent it continues to be so subject, which agreement being made between **NIE Energy** on the one hand and Premier Power Limited on the other.
PPA CDGU	A **CDGU** which is subject to a **Nominated Generating Unit Agreement** as at the **Transfer Date** to the extent it continues to be so subject, which agreement being made between **NIE Energy** on the one hand and Kilroot Power Limited, Premier Power Limited or Coolkeeragh ESB Limited on the other.

PPA Generation	Includes **PPA CDGUs** and **PPA CCGT Installations**.
Preliminary Notice	Has the meaning ascribed to it in OC10.A.1.2.
Preliminary Project Planning Data	Has the meaning set out in PC6.4.2.
Price Quantity Pairs	Prices and their respective quantity ranges for **Generating Units**, **Demand Side Units** and **Aggregated Generating Units** as part of **Commercial Offer Data** indicating the price of dispatching away from the relevant **Physical Notifications** profile.
Price Sets	The **Price Quantity Pairs**, **Start-up Costs**, **Shutdown Costs** and **No Load Costs** submitted by a **User** under SDC1.
Primary Operating Reserve	The automatic response to **NI System Frequency** changes released increasingly from the time of **Frequency** change and fully available by 5 seconds, and, subject to the agreed **Unit Load Controller** adjustment where applicable, must be sustainable until at least 15 seconds from the time of **Frequency** change.
Priority Dispatch	The **Dispatch** given priority, as afforded under governing legislation in either jurisdiction.
Programming Phase	The period between the **Operational Planning Phase** and the **Control Phase**.
Proposal Notice	Has the meaning ascribed to it in OC10.4.1.2.
Protected Customer	A **Customer** other than a **Contract Customer** in relation to whom, in accordance with guidelines prepared by its **Supplier** and approved by the **Authority**, **Load Shedding** shall, so far as possible, not be exercised.
Protection	Equipment for detecting abnormal conditions on a **System** and initiating fault clearance and activating alarms and indications.
Provisional Outage Programme	The provisional **Outage** programme in respect of **CDGUs** and/or **Power Station Equipment** prepared by the **TSO** for Years 2 and 3 pursuant to OC2.6.2.
Prudent Operating Practice	In relation to a **User** or the **TSO**, the standard of practice attained by exercising that degree of skill, diligence, prudence and foresight which could reasonably be expected from a skilled and experienced operator engaged in the same type of undertaking under the same or similar circumstances.

Pumped Storage Generation	A **Pumped Storage Plant** in its operation of producing **Energy** by releasing water from an upper reservoir.
Pumped Storage Generator	A **Generator** which owns and/or operates any **Pumped Storage Plant**.
Pumped Storage Plant	A **Generation Plant** that produces **Active Energy** using water from an upper reservoir and consumes **Energy** by pumping water up to the same reservoir.
Pumped Storage Plant Demand	A **Pumped Storage Plant** in its operation of consuming **Energy** by pumping water to an upper reservoir.
Ramp Down Break Point	The **MW** level at which the **Ramp Down Rate** changes. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Ramp Down Rate	The maximum rate of decrease in a **Generating Unit'**s **Output**. The **Ramp Down Rate** applies over the output range from its **Contracted Capacity** (for **PPA CDGU**s other than **PPA Open Cycle Gas Turbines**) or **Contracted Capacity (Peak)** (for **PPA Open Cycle Gas Turbines**) or **Registered Capacity** (for non-**PPA** plant) to **Minimum Generation**. The rate of change may not depend upon the initial **Warmth** of the plant but may depend on the **MW Output**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Ramp Up Break Point	The **MW** level at which the **Ramp Up Rate** changes. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Ramp Up Rate	The maximum rate of increase in a **Generating Unit**'s **Output**. This rate of increase continues until the **Generating Unit** reaches the level of output instructed by the control room operator of its **Contracted Capacity** (for **PPA CDGU**s other than **PPA Open Cycle Gas Turbines**) or **Contracted Capacity (Peak)** (for **PPA Open Cycle Gas Turbines**) or **Registered Capacity** (for non-**PPA** plant). The rate of increase may not depend upon the initial **Warmth** of the plant but may depend on the **MW Output**. There may be circumstances where more than one parameter

	applies and this is indicated by adding a number at the end of the parameter.
Rate of Change of Frequency	The rate of increase or decrease of **Frequency** as measured at the **User**'s **Connection Point** over the time period as set out in CC5.3.3.
Reactive Power or **Mvar**	The product of voltage and current and the sine of the phase angle between them measured in units of volt-amperes reactive and standard multiples thereof, i.e.: 1000 var = 1 kvar 1000 kvar = 1 Mvar
Record of Inter-System Safety Precautions or RISSP	The procedures set out in OC6.4.3.
Re-declaration	Notification to the **TSO** by the **User** of any revisions to data, pursuant to SDC1.4.5.
Registered Capacity	The normal **Full Load** capacity of a **Generating Unit** in **MW** measured as at the **Connection Point** and in relation to a **Power Park Module,** the normal **Full Load** capacity of the collection of one or more **Generating Unit (s)** taken together in aggregate**,** in **MW** measured as at the **Connection Point** of the **Power Park Module**.
Registered Project Planning Data	Has the meaning set out in PC6.4.4.
Regulating Margin	The margin of generating capacity that is **Synchronised** over **Demand** which is required in order to maintain **Frequency Control**.
Replacement Reserve	The additional **MW** output (and/or reduction in **Demand** required compared to the pre-**Event** output (or **Demand)** which is fully available and sustainable from 20 minutes to 4 hours following an **Event**.
Requesting Safety Coordinator	Has the meaning set out in OC6.4.2.5.
Reserve Characteristics	The **MW** level of reserve available at any given **MW Output** of a **CDGU** as set out in the **Sustained Load Diagram**.
Resource Following Ramp Rate	**The maximum rate of increase of Active Power Output of a PPM in response to an increase in input resource or removal of any TSO action via SCADA which limits Active Power Output of the PPM.**

Responsible Engineer/Operator	A person nominated by a **User** to be responsible for control of the **User's System**.
Responsible Manager	A manager who has been duly authorised by a **User** or the **TSO** to sign **Site Responsibility Schedules** on behalf of that **User** or the **TSO**, as the case may be.
RfG Generation Unit	A **Generating Unit** that is not a **Non-Rfg Generation Unit**.
Re-Synchronisation	The act of achieving the state where the **Frequencies** and phase relationships of parts of the **Total System** are identical.
RISSP-A and **RISSP-B**	Have the meanings set out in OC6.4.3.2.
Rota Load Shedding	Planned **Disconnection** of **Customers** on a rota basis during circumstances when there is a significant shortfall of generation required to meet the total **Demand** for a protracted period.
RTS Notice	Has the meaning ascribed to it in OC2.6.8.1.
Safety Co-ordinator	Has the meaning set out in OC6.4.2.
Safety from the System	That condition which safeguards persons working or testing **HV Apparatus** from the dangers which are inherent in working on items of **HV Apparatus**.
Safety Precautions	Has the meaning set out in OC6.5.1.
Safety Rules	The rules and procedures (as amended or re-stated from time to time) of the **TSO** or a **User** to ensure **Safety From The System**.
Schedule Day	The period from 0000 hours until 2400 hours on the same day.
Schedule Week	The period from 0000 hours on Saturday of any week until 2400 hours on the next following Friday.
Scheduling	The process of compiling an **Indicative Operations Schedule** as set out in SDC1, and the term "**Scheduled**" and like terms shall be construed accordingly.
Scheduling Agent	In relation to an **Interconnector**, a person nominated to provide **Interconnector Schedule Quantities** to the **TSO**.
Scheduling and Dispatch Code (SDC)	The parts of the **Grid Code** which specify the **Scheduling** and **Dispatch** process.

Secondary Operating Reserve	The additional **MW Output** (and/or reduction in Demand) compared to the pre-incident **Output** (or **Demand**) which is fully available and sustainable over the period from 15 to 90 seconds following an **Event**.
Secretary of State	The Secretary of State for Business, Enterprise and Regulatory Reform.
Sections Under Common Governance	In order to support the efficient running of the **Single Electricity Market** certain sections of the **Grid Code** and the **Other Grid Code** are under common governance. Modifications and derogations to these sections of the **Grid Code** will effectively require agreement and direction from the **Authority** and the **Other Authority** and the **TSOs**. SDC1 and SDC2 are **Sections Under Common Governance**.
Short Term Maximisation Capability	The capability of a **Generating Unit** to deliver, for a limited duration of time, **MW Output** greater than its **Contracted Capacity** (for **PPA CDGU**s other than **Open Cycle Gas Turbines or CCGT**s) or **Contracted Capacity (Peak)** (for **PPA Open Cycle Gas Turbines** and **PPA CCGT**s) or **Registered Capacity** (for non-**PPA** plant).
Short Term Maximisation Time	The time that the **Short-Term Maximisation Capability** could be maintained.
Short Term Planned Maintenance Outage **STPM Outage**	An **Outage** designated as an **STPM Outage** in or accordance with OC2.6.4(e) (the duration of which shall not, unless the **TSO** in its absolute discretion agrees, exceed 72 hours) but not including any overrun of such **Outage**.
Shutdown	The condition of a **Generating Unit** where the generator rotor is at rest or on barring.
Shutdown Cost or **Shut Down Cost**	The costs associated with shutting down a **Demand Side Unit**.
Significant Incident	Has the meaning set out in OC5.4.6.3.
Significant Test	A **Test** with a total duration of equal to or greater than 6 hours, or where the **Active Energy** produced during the total duration of the test is equal to or greater than: (i) 3 times the **Active Energy** which would be produced by the **Test Proposer's**

	Plant during 1 hour of operation at the **Plant's Registered Capacity**; or (ii) 500 MWh
Single Electricity Market (SEM)	The wholesale all-island single electricity market established and governed pursuant to the relevant legislation and the **TSC**.
Site	A **User Site**, a **TSO Site** or a **TO Site**, as the case may be.
Site Responsibility Schedule	A schedule prepared by the **TSO** and the **TO** and signed by both parties detailing the division of responsibilities at **Connection Sites** towards the ownership, control, operation and maintenance of **Plant** and **Apparatus** and the safety of personnel at the **Connection Site**. The format, principles and basic procedure to be used in the preparation of **Site Responsibility Schedules** are set down in Appendix 1 to the CC.
Soak Time Cold	The duration of time for which the **Generating Unit** must remain at the **Soak Time Trigger Point Cold** during a **Cold Start**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Soak Time Hot	The duration of time for which the **Generating Unit** must remain at the **Soak Time Trigger Point Hot** during a **Hot Start**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Soak Time Trigger Point Cold	A constant **MW** level at which a **Generating Unit** must remain while loading up between **Block Load** and **Minimum Generation** after a **Cold Start**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Soak Time Trigger Point Hot	A constant **MW** level at which a **Generating Unit** must remain while loading up between **Block Load** and **Minimum Generation** after a **Hot Start**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.

Soak Time Trigger Point Warm	A constant **MW** level at which a **Generating Unit** must remain while loading up between **Block Load** and **Minimum Generation** after a **Warm Start**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Soak Time Warm	The duration of time for which the **Generating Unit** must remain at that **Soak Time Trigger Point Warm** during a **Warm Start**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Special Actions	Those actions referred to in SDC2.4.3.
Special Protection Scheme	A control or protection scheme to facilitate system operation by the intertripping of circuit breakers or other control actions.
Spinning Reserve	The operation of a **CDGU** whereby it lifts **Load** during and sustains it following a **Frequency Transient**.
Spinning Reserve Capability	The ability of a **CDGU** to provide **Spinning Reserve**.
Spinning Reserve Monitor	An on-line monitor which predicts the **Spinning Reserve Capability** of a **CDGU**.
Spinning Reserve Response	The increase in **MW Output** of a machine, with time, that results from its response to a decrease in **System Frequency**.
Standard Planning Data	Data specified in Part I of the Appendix to the **Planning Code**.
Standard Time	The time derived from the Caesium Atomic Clock at Anthorn, England.
Standing Instruction	An instruction for a specified action notified to a **Generator** in advance by the **TSO** whereby, when the specified circumstances arise (which will be capable of being known by the **Generator**), the **Generator** will take the specified action as though a valid instruction had been issued by the **TSO**.
Standing Technical Offer Data	Technical offer data provided on registration to the **TSC**, and updated in accordance with the **TSC**, by a **User** of each of its **Units** in accordance with the **TSC**.
Start Date	The date on which an **Outage** is to begin.

Start of Restricted Range	The start point in **MW** of a **Forbidden Zone**. There may be circumstances where more than one parameter applies and this is indicated by adding a number at the end of the parameter.
Start-Up	The action of bringing a **Generating Unit** from **Shutdown** to the speed required by the **Generating Unit** to enable it to be **Synchronised** to a **System**.
Start-Up Cost	The costs associated with **Start-Ups**.
Start Time	The time at which an **Outage** is to begin.
Steam Turbine Unit	A **Generating Unit** driven by a Steam Turbine.
Substation	An assemblage of equipment including any necessary housing for the conversion, transformation or control of electrical power.
Substitute Reserve	The additional **MW** output (and/or reduction in **Demand**) required compared to the pre-**Event** output (or **Demand**) which is fully available and sustainable from 4 hours to 24 hours following an **Event**.
Supplier	A holder of a **Supply Licence**.
Sustained Load Diagram	The diagram(s) setting out the reserve capability of a **CDGU** submitted to the **TSO** pursuant to the PC and, in the case of a **PPA CDGU** annexed to schedule 8 of the **Generating Unit Agreement** for that **CDGU and**, in the case of a non-**PPA CDGU** annexed to the **System Support Services Agreement** for that **CDGU.**
Sustained Response	Has the meaning set out in OC11.5.5.
Sustained Response Capability	Has the meaning set out in OC11.5.5.
Sustained Response Test	A test carried out by the **TSO** pursuant to the provisions of OC11.6.2.
Synchronised	The condition where an incoming **Generating Unit** or **System** is connected to another **System** so that the **Frequencies** and phase relationships of that **Generating Unit** or **System**, as the case may be, and the **System** to which it is connected are identical and all like terms shall be construed accordingly.

Synchronous Compensation	The operation of rotating synchronous **Apparatus** for the specific purpose of either the generation or absorption of **Reactive Power**.
Synchronous Generating Unit	A **Generating Unit** which is connected and **Synchronised** to the **NI System**.
Synchronous Start-Up Time Cold	The time taken to bring a **Generating Unit** to a **Synchronised** state from a **Cold** (**De-Synchronised**) state.
Synchronous Start-Up Time Hot	The time taken to bring a **Generating Unit** to a **Synchronised** state from a **Hot** (**De-Synchronised**) state.
Synchronous Start-Up Time Warm	The time taken to bring a **Generating Unit** to a **Synchronised** state from a **Warm** (**De-Synchronised**) state.
System	Any **User System** and/or the **NI System** as the case may be.
System Operator Agreement (SOA)	The agreement of the same name entered into by the **TSO** and the **Other TSO**.
System Outage Plan	As defined in OC2.8.
System Support Services	Has the meaning set out in Condition 1 of the **TSO Licence**.
System Support Services Agreement ("SSS Agreement")	An agreement between the **TSO** and a **Generator**, and in the case of **PPA CDGU**s between the **TSO** and **NIE Energy**, for the provision by a **Generator** of **System Support Services**, which includes **Ancillary Services**.
System Tests	Has the meaning set out in OC10.1.1.
Target Frequency	That **Frequency** determined by the **TSO**, in its reasonable opinion, as the desired operating **Frequency** of the **Total System**. This will normally be 50.00Hz plus or minus 0.05Hz, except in exceptional circumstances as determined by the **TSO**, in its reasonable opinion when this may be 49.90 or 50.10Hz.
Technical Parameters	Those parameters listed in Appendix A to SDC1.
Technical Parameters Notice	A notification as submitted under SDC1.4.4.1.

Tertiary Operating Reserve band 1	The additional **MW** output required compared to the pre-**Event** output which is fully available and sustainable from 90 seconds to 5 minutes following an **Event**.
Tertiary Operating Reserve band 2	The additional **MW** output required compared to the pre-**Event** output which is fully available and sustainable from 5 minutes to 20 minutes following an **Event**.
Test Co-ordinator	Has the meaning set out in OC10.A.1.1.
Test Panel	A panel, whose composition is detailed in the **Appendix** to OC10, which is responsible for various matters including considering a proposed **System Test** and preparing a **Test Programme**.
Test Programme	Has the meaning set out in OC10.4.4.1.
Test Proposer	Has the meaning set out in OC10.4.1.4.
Testing	Testing of **PPA CDGUs** carried out by the **TSO** pursuant to OC11.6 or testing of **User's Equipment** other than **PPA CDGUs** pursuant to OC11.11 (as the context requires) and the term "**Test**" shall be construed accordingly.
Thermal Plant	A **Generating Unit** that uses any source of thermal **Energy**.
TO Site	A site owned (or occupied pursuant to a lease, licence or other agreement) by the **TO** in which there is a **Connection Point**. For the avoidance of doubt a site owned by a **User** but occupied by the **TO** as aforesaid, is a **TO Site**.
Tolerance Band	The relevant tolerance allowed in **Monitoring** of **PPA CDGUs** under OC11.5 or the relevant tolerance allowed in **Monitoring** non-**PPA CDGUs** under OC11.10.2 (as the context requires) when determining whether **Dispatch Instructions** are being complied with, being either a **Wide Tolerance Band** or a **Narrow Tolerance Band.**
Total Shutdown	The situation existing when all generation has ceased and there is no electricity supply across any **Interconnector** and, therefore, the **Total System** has shutdown with the result that it is not possible for the **Total System** to begin to function again without the **TSO's** directions relating to a **Black Start**.

Total System	Together, the **NI System** and all **User Systems** in Northern Ireland.
Trading and Settlement Code (TSC)	The Single Electricity Market Trading and Settlement Code adopted by the **Market Operator** and approved by the by the **Authority** and the **Other Authority**.
Trading Day	Means the period commencing at 23.00 each day and ending at 23.00 the next day.
Transfer Date	Such date as may be appointed by the Department of Enterprise Trade and Investment by order under Article 69(3) of the **Order**.
Transmission System Capacity Statement	The statement in respect of the **Transmission System** which the **TSO** is required to prepare pursuant to paragraph 1, Condition 33, of the **TSO Licence**.
Transmission Interface Agreement (TIA)	The agreement of the same name entered into by the **TO** and the **TSO.**
Transmission Owner (TO)	Northern Ireland Electricity plc in its capacity as the owner of the **NI System**.
Transmission System	The **System** consisting (wholly or mainly) of high voltage electric lines and cables operated by the **TSO** for the purposes of transmission of electricity from one **Power Station** to a sub-station or to another **Power Station** or between sub-stations or to or from any **Interconnector** including any **Plant** and **Apparatus** and meters owned or operated by the **TSO** or **TO** in connection with the transmission of electricity.
Transmission System Operator (TSO)	The holder of the **Licence** granted pursuant to Article 10(1)(b) of the **Electricity (Northern Ireland) Order 1992** to operate a **Transmission System**.
Transmission Use of System Agreement	An agreement between the **TSO** and a **User** setting out the terms relating to use of the **All Island Transmission Networks**.
TSO Control Centre	A location used for the purpose of control and operation of the **Transmission System** which, as at the **Transfer Date**, is at Castlereagh House, but which may be moved. Notice will be given to relevant **Users** if a move should take place.

TSO Financial Year	For the purposes of OC1.4.1, means the period from 1st October in each year to 30th September in the next following year.
TSO Licence	A **Licence** authorising a **TSO** to carry out electricity transmission activities, granted either pursuant to Article 10(1)(b) of the Electricity (Northern Ireland) Order 1992 in Northern Ireland or pursuant to section 14 of the Electricity Regulation Act 1999 in the Republic of Ireland.
24 Hour Recall	An agreement between the **TSO** and a **Generator** whereby a **CDGU** subject to a **Notified Unplanned Outage** may be recalled by the **TSO** upon giving 24 hours notice to the **Generator**.
Unit Load Controller	A device which regulates the **Active Power** output when the **Generating Unit** is operating in **Frequency Sensitive Mode** to ensure (as far as possible) that it does not exceed or fall short of previously set limits.
Use of System Charges	The **TSO**'s charges to users for use of the **All Island Transmission Networks.**
User	A term utilised in various sections of the **Grid Code** to refer to the persons having to comply with a particular section of the **Grid Code**.
User Site	A site owned (or occupied pursuant to a lease, licence or other agreement) by a **User** (which in the case of an **Aggregator**, means the combination of the individual **Aggregated Generating Unit** or **Aggregated Demand Side Unit** sites as the case may be) in which there is a **Connection Point** or, where relevant, a connection to the **Distribution System.** For the avoidance of doubt, a site owned by **TSO** but occupied by a **User** as aforesaid, is a **User Site**.
User System	The **Distribution System** or a system owned or operated by a **User** comprising **Generating Units** together with **Plant** and/or **Apparatus** connecting **Generating Units** and/or **Large Demand Customers'** equipment to the **NI System**.
User's Equipment	The **Plant** and/or **Apparatus** owned and/or operated by a **User**.
Var	A single unit of **Reactive Power**.

Voltage Control	The retention of the voltage on the **System** within acceptable limits.
Warm Cooling Boundary	The period of time, which must be greater than that defined by the **Hot Cooling Boundary**, post **De-Synchronisation** of a **Generating Unit** after which the **Generating Unit's Warmth State** transfers from being warm to cold.
Warm Start	Any **Synchronisation** of a **Generating Unit** that has previously not been **Synchronised** for a period of time equal to or longer than its submitted **Hot Cooling Boundary** and shorter than or equal to its submitted **Warm Cooling Boundary**.
Warmth	The temperature related condition of a **CDGU** which changes according to the length of time since the **CDGU** was last **De-Synchronised**, expressed as various levels of warmth (for example "hot", "warm" and "cold") as may be specified (dependent upon the design of the **CDGU**) in the **Generating Unit Agreement** relating to that **CDGU**.
Warmth State	Either cold, warm or hot, as defined under the timeframes since last **De-Synchronisations** for **Cold Start**, **Warm Start** or **Hot Start** respectively.
Warning Notice	A notice issued by the **TSO** to a **Generator** in respect of a **PPA CDGU** pursuant to OC11.5.3, informing the **Generator** that it has failed to comply with a **Dispatch Instruction** or a notice issued by the **TSO** to a **User** pursuant to OC11.10.2.3 informing the **User** that it has failed to comply with a **Dispatch Instruction** (as the context requires).
Wide Tolerance Bands	Those tolerance bands referred to in Column 2 of the relevant Table in the Appendix to Part A of OC11 or the Appendix to Part B of OC11 (as the context requires).
Willans Line	For a throttle governed steam turbine **Generating Unit** the **Willans Line** is the straight line relationship between heat consumption and electrical output with its origin at the no load consumption. For a **CCGT Installation** the **Willans Line** is the composite of the heat consumption and electrical outputs of the several **CCGT Modules** dependent

	at any time on the operating mode of the **CCGT Installation**.
Wind Farm Power Station or WFPS	A collection of one or more wind turbines owned and/or operated by the same **Generator** and joined together by a **System** with a single **Connection Point** or connection to the **Distribution System.**
Wind Farm Power Station Settings Schedule or WFPS Settings Schedule	The document of that name setting out in accordance with CC.7.2 certain technical criteria that **Generators** must comply with in respect of their **Wind Farm Power Stations.**

GD2. CONSTRUCTION OF REFERENCES

In the **Grid Code**:

(i) the table of contents and headings are inserted for convenience only and shall be ignored in construing the **Grid Code**;

(ii) unless the context otherwise requires, all references to a particular paragraph, sub-paragraph, Appendix or Schedule shall be a reference to that paragraph, sub-paragraph Appendix or Schedule in or to that part of the **Grid Code** in which the reference is made;

(iii) unless the context otherwise requires, the singular shall include the plural and vice versa, references to any gender shall include all other genders and references to persons shall include any individual, body corporate, corporation, joint venture, trust, unincorporated association, organisation, firm or partnership and any other entity, in each case whether or not having a separate legal personality;

(iv) references to the words "include" or "including" are to be construed without limitation to the generality of the preceding words;

(v) unless there is something in the subject matter or the context which is inconsistent therewith, any reference to an Order in Council or an Act of Parliament or any section of or schedule to, or other provision of an Order in Council or an Act of Parliament shall be construed at the particular time, as including a reference to any modification, extension or re-enactment thereof then in force and to all instruments, orders and regulations then in force and made or deriving from the relevant Order in Council or Act of Parliament;

(vi) references to "in writing" or "written" include typewriting, printing, lithography and other modes of reproducing words in a legible and non-transitory form;

(vii) where the **Glossary and Definitions** refers to any word or term which is more particularly defined in a part of the **Grid Code**, the definition of that part of the **Grid Code** will prevail over the definition in the **Glossary & Definitions** in the event of any inconsistency;

(viii) a cross-reference to another document or part of the **Grid Code** shall not of itself impose any additional or further or co-existent obligation or confer any additional or further or co-existent right in the part of the text where such cross-reference is contained;

(ix) nothing in the **Grid Code** is intended to or shall derogate from the **TSO's** statutory or licence obligations;

(x) a "holding company" means, in relation to any person, a holding company of such person within the meaning of Section 736, 736A and 736B of the Companies Act 1985 as substituted by Section 144 of the Companies Act 1989;

(xi) a "subsidiary" means, in relation to any person, a subsidiary of such person within the meaning of Section 736, 736A and 736B of the Companies Act 1985 as substituted by Section 144 of the Companies Act 1989;

(xii) references to time are to Belfast time; and

(xiii) if any item (including any technical or operational parameter) is defined or determined by reference to a **Generating Unit Agreement**, then for the purposes of applying this **Grid Code** to a **CDGU** that is not the subject of a **Generating Unit Agreement**, the value of the item shall be taken to be:

(a) as set out in or determined under the **SSS Agreement** (for that **CDGU**);

(b) if paragraph (a) above does not apply, and where the **CDGU** was subject to any **Generating Unit Agreement** which is no longer in force, then as set out in or determined under that **Generating Unit Agreement** as if it were still in effect; and

(c) if paragraph (a) and (b) do not apply, then as agreed between the **TSO** and the **Generator** (both acting reasonably).

PLANNING CODE

PC1 INTRODUCTION

PC1.1 The Planning Code (the "PC") specifies the requirements for the supply of information by:

(a) persons (other than the **DNO**) connected or persons seeking new or modified connection to the **Transmission System** and/or use of the **All Island Transmission Networks**,

(b) **Generators** with **CDGUs** and **Controllable PPMs** connected to or seeking a new or modified connection to the **Distribution System**, and

(c) the **DNO** (in respect of information relating to **Independent Generating Plant** with a **Registered Capacity** of 5**MW** or more and in respect of **Demand** information at the **Bulk Supply Points**),

in order for the **TSO** to meet the **TSO Licence** obligations with respect to the planning and development of the **Transmission System** and, where required the co-ordinated planning and development of both the **Transmission System** and the **Other Transmission System** together with the **Other TSO**. It also specifies the technical and design criteria and procedures which will be applied in the planning and development of the **Transmission System** and which are to be taken into account by other persons connected or seeking connection to the **Transmission System** in the planning and development of their own **Plant** and **Systems**.

PC1.2 A requirement for reinforcement or extension of the **Transmission System** may arise for a number of reasons including, but not limited to:

(a) a development on a **User's System** (including the **Distribution System**) connected to the **Transmission System**;

(b) the introduction of a new, or a modification relating to an existing, **Connection Point** between a **User's System** and the **Transmission System**;

(c) changing requirements for electricity transmission facilities due to changes in factors such as **Demand, Generation**, technology, reliability requirements and/or environmental requirements;

(d) transient or steady-state stability considerations;

(e) the aggregate effect of **Customer** developments;

(f) a development affecting or modification to the **Other Transmission System**;

(g) the cumulative effect of any combination of the above.

PC1.3 Accordingly, the reinforcement or extension of the **Transmission System** may involve work:

(a) at the **Connection Point** between a **User's System** and the **Transmission System**;

(b) on transmission lines or substations or other facilities which join the **Connection Point** to the remainder of the **Transmission System**;

(c) at or between points on the **Transmission System** near to or remote from a **Connection Point**; and

(d) on transmission lines or substations or other facilities on the **Transmission System** as a result of a development affecting or modification to the **Other Transmission System**.

PC1.4 **System** developments must be planned with sufficient lead time to allow any necessary consents to be obtained and any necessary detailed engineering design/construction work to be completed. The **PC** and the relevant **Connection Agreement** and/or **Transmission Use of System Agreement** or **Grid Code Compliance Agreement** impose appropriate timescales on the exchange of information between the **TSO** and **Users** (other than the **DNO**) subject to all parties having regard, where appropriate, to the confidentiality of such information. With respect to the **DNO**, the timescales are specified in the PC. Additionally, the transmission interface arrangements between the **TSO** and **TO** and the system operator agreement between the **TSO** and the **Other TSO** require information to be passed on and exchanged between the **TSO** and the **TO** and between the **TSO** and the **Other TSO** subject to all parties having regard, where appropriate, to the confidentiality of such information.

PC1.5 As explained in the Glossary and Definitions section, references to the term "**User System**" shall be read as referring to the **Distribution System** with respect to provisions applicable to the **DNO**.

PC2 OBJECTIVES

PC2.1 The objectives of the **PC** are to:

(a) provide for the supply of information required by the **TSO** from **Users** in order for the development (including reinforcement and extension) of the **Transmission System** to be planned;

(b) provide for the supply of information required by the **TSO** from **Users** in order to enable the **TSO** (and the **TO**) to participate in the co-ordinated planning and development of both the **Transmission System** and the **Other Transmission System** where required;

(c) reflect the **Licence** requirements for the supply of information by the **TSO** as published annually in order to facilitate the identification and evaluation of available **Transmission System** capacity;

(d) set out the requirements for the supply of information in respect of any proposed development on a **User's System** which may impact on the performance of the **Transmission System** or the **Other Transmission System**; and

(e) specify the technical and design criteria and procedures which will be applied in the planning and development of the **Transmission System** and which are to be

taken into account by **Users** in the planning and development of their own **Systems**.

In addition, it briefly reflects the **Licence** provisions relating to the entering into, and modification, of connection and use of system agreements.

PC2.2 The **TSO** agrees with each **User** to procure that the **TO** shall plan and develop the **Transmission System** in accordance with the **TO Licence** and with the **Grid Code** subject to any derogations from time to time.

PC3 SCOPE

PC3.1 The **PC** applies to the **TSO** and to **Users**, which in the **PC** means:

(a) **Generators** with respect to **Generating Units** connected to or seeking a new or modified connection to the **Transmission System;**

(b) **Generators** with respect to **CDGUs** and **Controllable PPMs** connected to or seeking a new or modified connection to the **Distribution System**;

(c) **Suppliers;**

(d) **Large Demand Customers**;

(e) **Aggregators**,

(f) **Interconnector Owners**; and

(g) the **DNO**.

PC3.2 Persons other than the **DNO** whose prospective activities would place them in any of the above categories of **User** will, either pursuant to a **Licence** or as a result of the application procedure for a **Connection Agreement** and/or **Transmission Use of System Agreement** or pursuant to a **Grid Code Compliance Agreement**, become bound by the **PC** prior to their generating, supplying or consuming, as the case may be, and references to the various categories (or to the general category) of **User** should, therefore, be taken as referring to them in that prospective role as well as to **Users** actually connected.

PC4 PLANNING CRITERIA - TRANSMISSION SYSTEM

PC4.1 The **TSO** shall ensure that the relevant **Licence Standards** are applied in the planning and development of the **Transmission System** and these shall be taken into account by **Users** in the planning and development of their own plant and **Systems**.

PC5 TRANSMISSION SYSTEM CAPACITY STATEMENT

PC5.1 Development of the Transmission System

By way of information for **Users**, and generally without imposing any other or further obligation to that contained in the **TSO Licence**, the following section sets out a brief

description of the position regarding the provision by the **TSO** to **Users** of a **Transmission System Capacity Statement**.

PC5.2 Transmission System Capacity Statement

PC5.2.1 One of the means by which **Users** and intending **Users** are able to assess available **Transmission System** capacity is the **Transmission System Capacity Statement**, prepared by the **TSO** under the **TSO Licence** (to cover each of the seven succeeding financial years, to be revised at least once per year), showing future circuit capacity (and present circuit capacity), forecast power flows and loading on the **Transmission System** and fault levels for each network node covered by the statement.

PC5.2.2 A copy of the **Transmission System Capacity Statement** will, unless the **TSO** is relieved of the obligation by the **Authority** pursuant to the **TSO Licence**, be given or sent to any person who requests a copy of such statement. The **TSO** may make a charge for supplying such copy reflecting its reasonable costs of providing the statement which shall not exceed the maximum amount specified in directions issued by the **Authority** for the purpose from time to time.

PC5.2.3 The **TSO** may, with the prior consent of the **Authority**, omit from the **Transmission System Capacity Statement** any details as to circuit capacity, power flows, loading or other information, disclosure of which would, in the view of the **Authority**, seriously and prejudicially affect the commercial interests of the **TSO** or any third party or which would place the **TSO** in breach of any confidentiality conditions of the **Licence**, or any **Connection Agreement**, **Transmission Use of System Agreement** and/or **Grid Code Compliance Agreement**, any other agreement or code to which it is a party and any other matters provided for in the **TSO Licence**.

PC6 PLANNING DATA REQUIREMENTS FROM USERS

PC6.1 Requirement to provide Planning Data

PC6.1.1 **Users** must provide sufficient planning data annually as set out below, or as reasonably requested by the **TSO** from time to time, to enable the **TSO** to comply with the requirements under its **Licence** (including in relation to the interface arrangements with the **TO** and the **Other TSO**) and under the **Grid Code**. In the case of an **Interconnector Owner**, this obligation will be discharged by complying with the provisions of PCA3.4.3.

PC6.1.2 Planning data submissions must be in respect of each of the seven succeeding calendar years (other than in the case of **Registered Project Planning Data** which will reflect the current position).

PC6.1.3 Planning data submissions must be:

(a) provided by a **User** (and by proposed **Users** applying for a **Connection Agreement** and/or **Transmission Use of System Agreement** or who is subject to a **Grid Code Compliance Agreement**) in connection with applications for new or modified arrangements for connection or use of system;

(b) provided by a **User** at the time that it notifies the **TSO** of any significant changes to its **System** or operating regime; and

(c) provided by the categories of **Users** specified in PC6.3.3 and PC6.3.4 on a routine annual basis by the end of calendar week 9 of each year or such other annual date as the **TSO** may, upon not less than 6 months' notice, notify to such **Users** in writing.

In the case of submissions under paragraphs (a) and (b), the submission must be in respect of the remainder of the current year as well as in respect of the seven succeeding calendar years.

PC6.1.4 In the case of submission on a routine annual basis, where from the date of one annual submission to another there is no change in the data (or some of the data) to be submitted, instead of re-submitting the data a **User** may submit a written statement that there has been no change from the data (or the relevant data) submitted the previous time.

PC6.1.5 In the case of submissions under PC6.1.3 (a) and (b), the notification must include the time and date at which the change became, or is expected to become, effective. Notice must be given as soon as practicably possible in advance to enable the **TSO** to implement properly any necessary system modification. In the event of unplanned changes in a **User's System** or operating regime the **User** shall notify the **TSO** as soon as is practicably possible to ensure that any contingency measures, which the **TSO** considers necessary, can be implemented by the **TSO**.

PC6.1.6 Any **User** proposing to de-rate, close, retire, withdraw from service or otherwise cease to maintain and keep available for **Dispatch** in accordance with good industry practice any **Generating Unit(s)** or **Controllable PPMs** with **Registered Capacity** greater than 50 MW in aggregate shall give the **TSO** at least 36 calendar months' notice of such action and any **Generating Unit(s)** or **Controllable PPMs** with **Registered Capacity** less than or equal to 50 MW in aggregate shall give the **TSO** at least 24 calendar months' notice of such action.

PC6.2 Manner of provision by Users

PC6.2.1 All data to be supplied by **Users** to the **TSO** pursuant to this **PC** shall reflect the best possible estimate or measurement available to the **User** in the circumstances, shall be supplied in writing by the date specified for the purpose of the **PC** or, where no date is so specified, in a prompt and timely manner. The **TSO** shall be entitled to require any **User** to submit further information in the event that it considers any data supplied to it by such **User** to be unclear or incomplete.

PC6.2.2 Failure by a **User** to comply with its obligation under PC 6.2.1 may result in the **Transmission System,** and, in certain circumstances, the **Other Transmission System,** being planned in accordance with incorrect data and/or a delay in the offer of terms being made to the **User** by the **TSO** for connection and/or use of system.

PC6.3 Data to be provided

PC6.3.1 The planning data required under the **PC** from **Users** (other than the **DNO**) is allocated to one of two categories:

(a) **Standard Planning Data**; or

(b) **Detailed Planning Data**.

PC6.3.2 Listings of **Standard Planning Data**, required in every case and **Detailed Planning Data**, required in certain cases, are set out in Appendix A to this **PC** (in the case of **Users**, other than the **DNO**, connected to the **Transmission System**) and Appendix B to this **PC** (in the case of **Users** connected to the **Distribution System**) and Appendix D to this PC (in the case of **Users** as defined in PC.D2.1). Listings of planning data required from the **DNO** are set out in Appendix C to this **PC**. In either case, the data must be supplied in the format set out in the **Data Registration Code**.

PC6.3.3 In relation to the submission of data on a routine annual basis, **Standard Planning Data** in every case, and **Detailed Planning Data** if required by the **TSO**, by reasonable notice in advance of the submission ("reasonableness" being judged in this context by reference to the amount of time which it may take to collate the required data), shall (unless there has been no change from the data submitted the previous time, in which case the provisions of PC6.1.4 shall apply) be submitted to the **TSO** annually by **Users** in the following categories:

(a) **Generators** in respect of all transmission connected **Power Stations**;

(b) **Suppliers**;

(c) all **Large Demand Customers.**

(d) **Generators** in respect of **CDGUs** (including **Aggregated Generating Units)** and **Controllable PPMs** connected to the **Distribution System**.

(e) **Demand Side Unit Operators** in respect of their **Demand Side Units.**

(f) **HVDC Converter Station** owners.

(g) **HVDC System** Owners.

PC6.3.4 Planning data, by reasonable notice in advance of the submission ("reasonableness" being judged in this context by reference to the amount of time which it may take to collate the required data), shall (unless there has been no change from the data submitted the previous time, in which case the provisions of PC6.1.4 shall apply) be submitted to the **TSO** annually by the **DNO** in respect of **Independent Generating Plant** connected to the **Distribution System**.

PC6.3.5 **Standard Planning Data** shall be provided by **Users** (other than the **DNO**) at the time that they notify the **TSO** of any significant changes to their **System** or operating regime. **Detailed Planning Data** shall be provided by **Users** (other than the **DNO**) in these circumstances if required by the **TSO**.

PC6.3.6 PC7 deals with what is required pursuant to the **Grid Code** for applications for new or modified arrangements for connection to the **Transmission System** or use of the **All Island Transmission Networks**.

PC6.4 Status of Planning Data

As explained in PC6.4.1 to PC6.4.5, for **Planning Code** purposes, planning data supplied by **Users** applying for a **Connection Agreement** or **Transmission Use of System Agreement** is allocated to one of four status levels which provide a progression related to degrees of confidentiality, commitment and validation, as follows:

PC6.4.1 **Initial Data**

The following information shall be published on the **TSO** website:

(i) **User's** name (legal and project name);

(ii) **User's** contact details;

(iii) **User's** date of completed application;

(iv) Status of application, for example in progress or issued;

(v) Specific location, including grid co-ordinates; and

(vi) The capacity applied for the project; and

(vii) Interacting group where applicable.

PC6.4.2 **Preliminary Project Planning Data**

(a) Data supplied by a **User** in conjunction with an application for connection to the **Transmission System** and/or use of the **All Island Transmission Networks** shall be considered as **Preliminary Project Planning Data** until such time as a binding **Connection Agreement** and/or **Transmission Use of System Agreement** is established between the **TSO** and the **User**.

(b) Subject to PC6.4.2(c), this data shall not be disclosed by the **TSO** unless and until it becomes **Committed Project Planning Data** and/or **Registered Project Planning Data** whereupon the following applicable disclosure provisions of this PC6.4 will apply, except where it needs to be disclosed to the **TO** to enable the preparation of a connection or use of system offer or in relation to planning or development of the **Transmission System** or where it needs to be disclosed to the **DNO** for the purposes of discharging its planning obligations under the **Distribution Code** or the **DNO Licence**.

(c) The **TSO** may disclose **Preliminary Project Planning Data** to the **Other TSO** for the purposes of consideration of developments and consideration of other system development matters such as for example system reinforcement upgrading on the **Other Transmission System**.

Preliminary Project Planning Data will normally contain only **Standard Planning Data**, unless **Detailed Planning Data** is specifically requested by the **TSO** to permit more detailed **System** or **Other Transmission System** studies.

PC6.4.3 **Committed Project Planning Data**

When the offer for a **Connection Agreement** and/or **Transmission Use of System Agreement** is accepted, the data relating to the **User's** development submitted as **Preliminary Project Planning Data** and data required or received subsequently by the **TSO** under this PC shall have the status of **Committed Project Planning Data**. This data together with other data held by the **TSO** or the **TO** relating to the **Transmission System** (and in certain circumstances, the **Other Transmission System**) shall form the background against which new applications from **Users** shall be considered and against which planning of the **Transmission System** and, where required for the purposes of the **Single Electricity Market**, the participation of the **TSO** in the co-ordinated planning and development of both the **Transmission System** and the **Other Transmission System** in conjunction with the **Other TSO**, shall be undertaken. Accordingly, **Committed Project Planning Data** may be disclosed by the **TSO** to the extent that the **TSO:**

(a) needs to disclose it in **Transmission System Capacity Statements** and in any further information which the **TSO** is required to provide together with **Transmission System Capacity Statements**;

(b) needs to disclose it when considering and/or advising on applications (or possible applications) of **Users**, including disclosure of it or data from it both orally and in writing, to other **Users** making an application (or considering or discussing a possible application) which is, in the **TSO's** view, relevant to that application or possible application;

(c) needs to disclose it to the **TO** for the purposes of planning and/or development of the **Transmission System** and/or, to the **Other TSO** for the purposes of consideration of developments and consideration of other system development matters such as for example system reinforcement upgrading on the **Other Transmission System** or to the **DNO** for the purposes of discharging its planning obligations under the **Distribution Code** or the **DNO Licence**;

(d) needs to disclose it for operational purposes; or

(e) is obliged under the terms of an interconnection agreement with an **Externally Interconnected Party** to disclose it to such party as part of information on the **Transmission System.**

Committed Project Planning Data may contain both **Standard Planning Data** and **Detailed Planning Data**.

PC6.4.4 **Registered Project Planning Data**

The **Connection Conditions** require that, before an agreed connection to the **Transmission System** or **Distribution System** may be physically established, any estimated values contained within the **Committed Project Planning Data** shall be replaced, where practicable, by validated actual values and as appropriate by updated forecasts for future data items such as **Demand**. Data provided at this stage is termed **Registered Project Planning Data**.

Registered Project Planning Data may contain both **Standard Planning** and **Detailed Planning Data**.

PC6.4.5 **Registered Project Planning Data**, together with other data held by the **TSO** or the **TO** relating to the **Transmission System** (and, in certain circumstances the **Other Transmission System**), will form the background against which new applications by any **User** will be considered and against which planning of the **Transmission System** will be undertaken. Accordingly, **Registered Project Planning Data** may be disclosed by the **TSO** to the extent that the **TSO:**

(a) needs to disclose it in the preparation of **Transmission System Capacity Statements** and in any further information which the **TSO** is required to provide together with the **Transmission System Capacity Statement**;

(b) needs to disclose it when considering and/or advising on applications (or possible applications) of **Users**, including disclosure of it or data from it both orally and in writing, to other **Users** making an application (or considering or discussing a possible application) which is, in the **TSO's** view, relevant to that application or possible application;

(c) needs to disclose it to the **TO** for the purposes of planning and/or development of the **Transmission System** and/or, to the **Other TSO** for the purposes of consideration of developments and consideration of other system development matters such as for example system reinforcement upgrading on the **Other Transmission System** or to the **DNO** for the purposes of discharging its planning obligations under the **Distribution Code** or the **DNO Licence**;

(d) needs to disclose it for operational purposes; or

(e) is obliged under the terms of an interconnection agreement with an **Externally Interconnected Party** to disclose it to such party as part of information on the **Transmission System.**

PC6.4.6 **Planning Data** submitted by the **DNO** and by **Generators** with **Controllable PPM** connected to the **Distribution System** shall contribute to the background against which planning of the **Transmission System** will be undertaken. Such data may be disclosed by the **TSO** to the extent that the **TSO:**

(a) needs to disclose it in the preparation of **Transmission System Capacity Statements** and in any further information which the **TSO** is required to provide together with the **Transmission System Capacity Statement**;

(b) needs to disclose it when considering and/or advising on applications (or possible applications) of **Users**, including disclosure of it or data from it both orally and in writing, to other **Users** making an application (or considering or discussing a possible application) which is, in the **TSO's** view, relevant to that application or possible application;

(c) needs to disclose it to the **TO** for the purposes of planning and/or development of the **Transmission System** and/or, to the **Other TSO** for the purposes of consideration of developments and consideration of other system development matters such as for example system reinforcement upgrading on the **Other Transmission System** or to the **DNO** for the purposes of discharging its planning obligations under the **Distribution Code** or the **DNO Licence**; or

(d) needs to disclose it for operational purposes.

PC6.4.7 For the avoidance of doubt, the **TSO** may of course use the data supplied for the purposes referred to in this **PC**, in complying with the requirements of its **Licence** and for operational purposes and nothing herein shall limit the **TSO**'s rights to disclose information pursuant to any provisions relating to confidentiality in any **Connection Agreement**, **Transmission Use of System Agreement**, **Grid Code Compliance Agreement** or in the **TSO Licence**.

PC7 PROCEDURES FOR APPLICATIONS FOR CONNECTION AND TRANSMISSION USE OF SYSTEM AGREEMENTS

PC7.1 Application Procedure for New Connection and/or Transmission Use of System Agreements

Any person other than the **DNO** and **Controllable PPMs** with a **Registered Capacity** below 10**MW** seeking to establish a new or modified **Connection** to the **Transmission System** and/or seeking to apply for a **Transmission Use of System Agreement** pursuant to the **TSO Licence** must make application on the standard application form which is available from the **TSO** on request. The application shall include:

(a) a description of the **Plant** and/or **Apparatus** to be connected to the **Transmission System** or **Distribution System** (as may be required by the **TSO**) or, as the case may be, of the modification relating to the **User's Plant** and/or **Apparatus** already connected to the **Transmission System** or **Distribution System** (as may be required by the **TSO**) each of which shall be termed a **"Development"** in this PC (which shall be deemed to be "**Standard Planning Data**");

(b) the relevant **Standard Planning Data** as listed in Part 1 of Appendix A in the case of **Users** connected to the **Transmission System** or Part 1 of Appendix B in the case of **Users** connected to the **Distribution System**; and

(c) the desired completion date of the proposed **Development**.

PC7.2 Offer of Terms

PC7.2.1 (a) The **TSO** shall, in accordance with its **Licence**, offer terms upon which it is prepared to enter into an agreement with the applicant for establishment of the

proposed new or modified **Connection Agreement** and/or **Transmission Use of System Agreement.**

(b) The offer will be made as soon as is practicable after receipt of the application containing all such information as the **TSO** may reasonably require for the purposes of formulating an offer and (save where the **Authority** consents to a longer period) in any event not more than 28 days in the case of an application for use of system only or not more than 3 months in the case of an application for a connection.

(c) The offer shall specify, and the terms shall take account of, any works required for the extension or reinforcement of the **Transmission System,** and/or the **Other Transmission System**, necessitated by the applicant's proposed activities and for the obtaining of any consents necessary for such purposes.

(d) Where the offer is in respect of a modified connection, the terms shall take account of any further requirements contained in the relevant **Connection Agreement**.

PC7.2.2 Any offer made by the **TSO** in accordance with PC7.2.1 shall remain valid for 90 days or for such period as the **TSO** may agree with the applicant and, unless accepted before the expiry of such period, shall lapse thereafter. During the period of its validity the offer shall at all times be conditional upon the continuing availability of the necessary capacity within the **Transmission System** and within the **Other Transmission System.**

PC7.2.3 A **User** must, within 28 days after acceptance of an offer made by the **TSO** in accordance with PC7.2.1 (or such longer period as the **TSO** may reasonably agree in a particular case), supply (to the extent not already supplied) to the **TSO** the relevant **Detailed Planning Data** as listed in Part 2 of Appendix A in the case of **Users** connected to the **Transmission System** or Part 2 of Appendix B in the case of **Users** connected to the **Distribution System**.

PC7.3 Right to Reject an Application

The **TSO** shall be entitled to reject an application for connection to the **Transmission System** and/or use of the **All Island Transmission Networks**:

(a) if to do so would be likely to involve the **TSO** in a breach of its duties under the **Order**, or of any regulations (whether made under the **Order** or other enactment) relating to safety or standards applicable to the **TSO Business**, or any **Licence** conditions, or the **Grid Code**; or

(b) if the person making the application does not undertake to be bound, insofar as applicable, by the terms of the **Grid Code**.

PC7.4 Connection / Transmission Use of System Agreements

A **Connection Agreement** and/or **Transmission Use of System Agreement** (or the offer for a **Connection Agreement** and/or **Transmission Use of System Agreement**) will include, as appropriate, within its terms and conditions:

(a) a condition requiring both parties to comply with the **Grid Code**;

(b) details of **Connection** and/or **Use of System Charges**;

(c) details of any capital related payments arising from necessary reinforcement or extension of the **Transmission System** or the **Other Transmission System**;

(d) a **Site Responsibility Schedule**, detailing the divisions of responsibility at **Connection Sites** in relation to ownership, control, operation and maintenance of **Plant** and **Apparatus** and to safety of persons; and

(e) a condition requiring the **User** to supply **Detailed Planning Data** pertaining to the **User Development** as listed in Part 2 of Appendix A in the case of **Users** connected to the **Transmission System** or Part 2 of Appendix B in the case of **Users** connected to the **Distribution System** (to the extent not already supplied) within 28 days of acceptance of the offer (or such longer period as the **TSO** may agree in a particular case).

Condition 26 of the **TSO Licence** provides that if, after a period which in the **Authority's** opinion is a reasonable period for the purpose, the **TSO** has failed to enter into a **Connection Agreement** and/or **Transmission Use of System Agreement** pursuant to a request made pursuant to the **TSO Licence**, either party may apply to the **Authority** to settle any terms of the agreement which are in dispute.

PC7.5 Applications for Modifications

Any **User** seeking to establish modified arrangements for connection to the **Transmission System** and/or use of the **All Island Transmission Networks** must, in addition to the provisions set out above, apply to the **TSO** in accordance with the procedure set out in the relevant **Connection Agreement** and/or **Transmission Use of System Agreement**.

PC8 OFFERS CONDITIONAL ON CONSENTS AND STATUTORY OBLIGATIONS

PC8.1 An offer by the **TSO** to a **User** other than the **DNO** for connection to the **Transmission System** and/or use of the **All Island Transmission Networks** may be conditional upon the obtaining of or compliance with any necessary consents, approvals, permissions, wayleaves, or other external requirements (whether of a statutory, contractual or other nature).

PC8.2 A **User** whose **Development** requires the **TSO, TO** and/or **Other TSO** to obtain any of the consents, approvals, permissions and wayleaves or to comply with any other requirements referred to in PC8.1 shall:

(a) provide any necessary assistance, supporting information or evidence; and

(b) ensure attendance by such witness as the **TSO** may reasonably request.

PC8.3 If any planning or other consent or approval is granted, but is conditional upon a change in the design arrangements originally offered by the **TSO** (e.g. undergrounding), then the **TSO** shall make a revised offer to the **User**, including revised terms and timing. This revised offer shall form the basis of any **Connection Agreement** and/or **Transmission Use of System Agreement**. The provisions of PC7.2.2 shall apply to such revised offer.

PC8.4 The **Connection Agreement** and/or **Transmission Use of System Agreement** will deal with the consequences if any necessary consent is not granted.

APPENDIX A

PLANNING DATA REQUIREMENTS FOR USERS (OTHER THAN THE DNO) CONNECTED TO THE TRANSMISSION SYSTEM ONLY

PC.A1. INTRODUCTION

PC.A1.1 This Appendix specifies the **Standard** and **Detailed Planning Data** to be submitted to the **TSO** by **Users** (other than the **DNO**) connected to the **Transmission System** only pursuant to PC6 and PC7.

PART 1

PC.A2 STANDARD PLANNING DATA

PC.A2.1 CONNECTION SITE AND USER SYSTEM DATA

PC.A2.1.1 General

All **Users** shall provide the **TSO** with the details as specified in sub sections PC.A2.1.2 to PC.A2.1.4 relating to their **User System**.

PC.A2.1.2 **User System** Layout

Single line diagrams of existing and proposed arrangements of main connections and primary distribution systems showing equipment ratings and if available numbering and nomenclature.

PC.A2.1.3 Short Circuit Infeed

(a) The maximum 3-phase short circuit current infeed into the **Transmission System**.

(b) The minimum zero sequence impedance of the **User System** at the point of connection with the **Transmission System**.

PC.A2.1.4 Modelling Data

The **User** in respect of its **Plant** and **Apparatus** must submit modelling data to the **TSO** as specified by the **TSO** in **PC** Appendix D.

The modelling data submitted to the **TSO** is for **System** planning and operational purposes. It is not intended to restrict the scope of any **Ancillary Service** agreements which the **User** may enter into with the **TSO**.

PC.A2.2 DEMAND DATA

PC.A2.2.1 General

(a) All **Users** with **Demand** shall provide the **TSO** with the **Demand** data, both current and forecast, as specified in subsections PC.A2.2.2 to PC.A2.2.3.

(b) All forecast maximum **Demand** levels submitted to the **TSO** by **Users** shall be on the basis of **ACS Conditions**.

(c) So that the **TSO** is able to estimate the diversified total **Demand** at various times throughout the year each **User** shall provide such additional forecast **Demand** data as the **TSO** may reasonably request ("reasonableness" being judged in this context by reference to the level of forecast **Demand** data which may be required in order to estimate the diversified total **Demand** at various times throughout the year).

PC.A2.2.2 **Demand** (**Active** and **Reactive Power**) Data Requirements

(a) Forecast peak day **Demand** profile (**Active** and **Reactive**) and monthly peak **Demand** variations net of the output profile of all **Independent Generating Plant** in time marked half hours throughout the day.

(b) Type and electrical loading of equipment to be connected:
(i) number and size of motors;
(ii) types of drive and control arrangements; and
(iii) other large items of equipment.

(c) The sensitivity of the **Demand** to any variations in voltage and **Frequency** on the **Transmission System**.

(d) The maximum harmonic content which the **User** would expect its **Demand** to impose on the **Transmission System**.

(e) The average and maximum phase unbalance which the **User** would expect its **Demand** to impose on the **Transmission System**.

PC.A2.2.3 Fluctuating **Loads** > 5 MVA

(a) Details of the cyclic variation of **Demand** (**Active Power** and **Reactive Power**).

(b) The rates of change of **Demand** (**Active Power** and **Reactive Power**) both increasing and decreasing.

(c) The shortest repetitive time interval between fluctuations in **Demand** (**Active Power** and **Reactive Power**).

(d) The magnitude of the largest step changes in **Demand** (**Active Power** and **Reactive Power**), both increasing and decreasing.

(e) Maximum energy demanded per half hour by the fluctuating load cycle.

(f) Steady state residual **Demand** (**Active Power**) occurring between **Demand** fluctuations.

PC.A2.2.4 **User's** Abnormal **Loads**

Details should be provided on any individual **Loads** which have characteristics differing from the normal typical range of **Loads** in the domestic, commercial or industrial fields. In particular, details on arc furnaces, rolling mills, traction installations etc. which are liable to cause flicker problems.

PC.A2.3 GENERATING UNIT AND POWER STATION DATA

PC.A2.3.1 General

All **Generating Unit** and **Power Station** data submitted to the **TSO** shall be in the form of:

(a) one set of **Generating Unit** and **Power Station** data where it is connected to the **Transmission System** via a busbar arrangement which is not normally operated in a split configuration; and

(b) separate sets of **Generating Unit** and **Power Station** data where they are connected to the **Transmission System** via a busbar arrangement which is, or is expected to be, operated in a split configuration.

PC.A2.3.2 **Power Station** Data Requirements

(a) Point of connection to the **Transmission System** in terms of geographical and electrical location and system voltage.

(b) Capacity of **Power Station** (being an aggregate of all **Generating Units** in the **Power Station**) in **MW** sent out for **Registered Capacity, Minimum Generation** (which in the case of **PPMs** shall be assumed to be zero unless a different value is notified by the **User**) and, where relevant, **Maximum Generation.**

(c) In the case of **Wind Farm Power Stations**, a diagram that shows for the **Wind Farm Power Station** wind speed and direction against electrical output in **MW**, in "rose" format**.**

(d) In the case of **PPMs** that are not **WFPS**, an equivalent diagram to that in PC.A2.3.2(c), in relation to the input resource of that **PPM**.

(e) Maximum auxiliary **Demand** (**Active Power** and **Reactive Power**).

(f) Where **Generating Units** form part of a **User's System**, the output from these units is to be taken into account by the **User** in his **Demand** profile submissions to the **TSO**. In such cases the **User** must inform the **TSO** of the number of such **Generating Units** together with their total capacity. On receipt of such

data the **User** may be further required, at the **TSO's** discretion, to provide details of the **Generating Units** together with their energy output profile.

(g) Operating regime of **Generating Units** not subject to **Central Despatch** (e.g. continuous, intermittent, peak-lopping).

PC.A2.3.3 **Generating Unit** Data Requirements

In relation to **Generating Units** other than the generators comprised within a **PPM**:

(a) Prime mover type;

(b) **Generating Unit** type;

(c) **Generating Unit** rating and terminal voltage (MVA & kV);

(d) **Generating Unit** rated power factor;

(e) **Registered Capacity** sent out (**MW**);

(f) **Maximum Generation** and **Minimum Generation** capability sent out (**MW** sent out);

(g) **Reactive Power** capability (both leading and lagging) at the lower voltage terminals of the **Generator Transformers** for **Maximum Generation**, normal full **Load** and normal minimum **Load**;

(h) Maximum auxiliary **Demand** in **MW** and **MVAr**;

(i) Inertia constant (**MW** sec/MVA);

(j) Short circuit ratio;

(k) Direct axis transient reactance;

(l) Direct axis sub-transient time constant;

(m) **Generator Transformer** rated MVA, positive sequence reactance, and tap change range;

(n) **Sustained Load Diagram**; and

(o) a list of the **CCGT Modules** in the **CCGT Installation**, identifying each **CCGT Module**, and the **CCGT Installation** of which it forms part unambiguously, together with any other information which may be relevant in relation to the **CCGT Modules** and **CCGT Installations** and their operation.

In relation to the generators comprised within a **PPM**, such data equivalent to that listed in PC.A2.3.3(a) to PC.A2.3.3(n) as the **TSO** shall reasonably require.

PCA2.3.4 **CCGT Installation Matrix**

(a) A **CCGT Installation Matrix** in respect of its **CCGT Installations**. It must be prepared on a best estimate basis relating to how it is anticipated the **CCGT Installation** will be running and reasonably reflect the true operating characteristics of the **CCGT Installation**. It will be applied (unless revised under this PC) for planning purposes and in the SDCs in relation to the **CCGT Installation**. It must show the combination of **CCGT Modules** which would be running in relation to any given **Output**, in the format indicated in Appendix D. In the case of a **PPA CCGT Installation** it must reflect the requirements of the relevant **Generating Unit Agreement**.

(b) Any changes must be notified to the **TSO** promptly. **Generators** should note that amendments to the composition of the **CCGT Installation** may only be made in accordance with the principles set out in PC.A2.3.5 below. If in accordance with PC.A2.3.5 an amendment is made, an updated **CCGT Installation Matrix** must be immediately submitted to the **TSO** in accordance with this PCA2.3.4.

(c) The **CCGT Installation Matrix** submitted under the PC will be used by the **TSO** for planning purposes and will also be used by the **TSO** in connection with **Scheduling** and **Despatch** under the SDCs**,** as a look up table determining which **CCGT Modules** will be operating at any given **MW Despatch** level subject to any updated information on the individual **Availability** of **CCGT Modules** submitted by a **Generator** to the **TSO** in an **Availability Notice** under SDC1.

PC.A2.3.5 Notwithstanding any other provision of this PC, the **CCGT Modules** within a **CCGT Installation**, details of which are required under PC.A2.3.3 and PC.A2.3.4, can only be amended such that the **CCGT Installation** comprises different **CCGT Modules** if the **TSO** gives its prior consent in writing. Notice of the wish to amend the **CCGT Modules** within the **CCGT Installation** must be given at least 12 months (or less with agreement of the **TSO**) before it is wished for the amendments to take effect and be permitted under any other contractual and operational arrangement with the **TSO**.

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PCA2.3.6 **HVDC System** Data Requirements

In relation to **HVDC Systems** other than the **Generators** comprised within a **PPM**:

(a) **Single Line Diagram**;

(b) **HVDC System** type;

(c) **HVDC System** rating and terminal voltage (MVA & kV);

(d) **HVDC System** rated power factor;

(e) **HVDC System** Registered Capacity (MW);

(f) **HVDC System** Registered Export Capacity (MW);

(g) **HVDC System** Registered Import Capacity (MW);

(h) Inertia constant/provision capability (MW sec/MVA);

(i) Short circuit ratio;

(j) Converter Transformer type;

(k) Converter Transformer rated MVA, positive sequence reactance, winding type and tap change range;

(l) Number of poles and pole arrangement;

(m) Rated MW per pole for import and export;

(n) Rated DC voltage/pole (kV);

(o) Return path arrangement;

(p) Whether a Power System Stabiliser is fitted;

(q) Reactive compensation equipment:

(i) Connection arrangements;
(ii) Nominal Voltage (kV);
(iii) Maximum MVAr and Minimum MVAr;
(iv) Voltage dependant Q Limit; and (
(v) Positive and zero phase sequence resistance and reactance; and

(r) Harmonic filtering equipment:
(i) Total number of AC filter banks;
(ii) Type of equipment;
(iii) Single line diagram of filter arrangement and connections;

(iv) Reactive Power rating for each AC filter bank, capacitor bank or operating voltage; and

(v)Performance chart showing Reactive Power capability of the DC Converter and **HVDC System**, as a function of MW transfer, with all filters and reactive compensation plant, belonging to the DC Converter Station or **HVDC System** working correctly.

Notwithstanding any other provision of this PC the **TSO** may reasonably require information of **HVDC Systems** in accordance with the requirements set out in PC.A3 below.
In relation to the generators comprised within a DC Connected **Controllable PPM**, such data equivalent to that listed in PC.A2.3.3(a) to PC.A2.3.3(n) as the TSO shall reasonably require.

PART 2

PC.A3 DETAILED PLANNING DATA

PC.A3.1 CONNECTION SITE AND USER SYSTEM DATA

PC.A3.1.1 General

All **Users** shall provide the **TSO** with the details as specified in sub sections PC.A3.1.2 to PC.A3.1.11 (which comprises both **Standard** and **Detailed Planning Data**).

PC.A3.1.2 **User System** Layout

Single line diagrams of existing and proposed arrangements of main connections and primary distribution systems including:

(a) Busbar layouts

(b) Electrical circuitry (i.e. lines, cables, transformers, switchgear etc)

(c) Phasing arrangements

(d) Earthing arrangements

(e) Switching facilities and interlocking arrangements

(f) Operating voltages

(g) Numbering and nomenclature

PC.A3.1.3 Reactive Compensation Equipment

For all independently switched reactive compensation equipment on the **User's System** at 11kV and above, other than power factor correction equipment associated directly with the **User's Plant** and **Apparatus**, the following information is required:

(a) Type of equipment (e.g. fixed or variable);

(b) Capacitive and/or inductive rating or its operating range in **MVAr**;

(c) Details of any automatic control logic to enable operating characteristics to be determined;

(d) The point of connection to the **User's System** in terms of electrical location and voltage.

PC.A3.1.4 Short Circuit Infeed to the **Transmission System**

Each **User** is required to provide the total short circuit infeeds calculated in accordance with good industry practice into the **Transmission System** from its **User System** at the **Connection Point** as follows:

(a) the maximum 3-phase short circuit infeed including infeeds from any **Generating Units** forming part of the **User's System**;

(b) the additional maximum 3-phase short circuit infeed from induction motors on the **User's System**; and

(c) the minimum zero sequence impedance of the **User's System**.

PC.A3.1.5 Lumped System Susceptance

Details of equivalent lumped network susceptance of the **User's System** at normal **Frequency** at the **Connection Point**. This should include any shunt reactors which are an integrated part of a cable system and which are not normally in or out of service independent of the cable (i.e. they are regarded as part of the cable). It should not include:

(a) independent reactive compensation plant on the **User's System**; or

(b) any susceptance of the **User's System** inherent in the **Active** and **Reactive Power Demand** data given under subsection PC.A3.2**.**

PC.A3.1.6 Interconnection Impedance

For **User** interconnections that operate in parallel with the **Transmission System** an equivalent single impedance (resistance, reactance and shunt susceptance) of the parallel **User System**. If the impedance is, in the reasonable opinion of the **TSO**, low then more detailed information on the equivalent or active part of the parallel **User System** may be requested.

PC.A3.1.7 **Demand** Transfer Capability

Where the same **Demand** may be supplied from alternative points of supply, the proportion of **Demand** normally fed from each supply point and the arrangements (manual or automatic) for transfer under planned/fault **Outage** conditions shall be provided. Where the same **Demand** is supplied from different **User** supply points, then this information should be provided to all parties.

PC.A3.1.8 **System** Data

Each **User** with an existing or proposed **User System** connected at **High Voltage** shall provide the following details relating to that **High Voltage System**:

(a) Circuit parameters (for all circuits):

Rated voltage (kV)
Operating voltage (kV)
Positive phase sequence reactance
Positive phase sequence resistance
Positive phase sequence susceptance
Zero phase sequence reactance
Zero phase sequence resistance
Zero Phase sequence susceptance

(b) Interconnecting transformers between the **User's High Voltage** system and the **User's** primary voltage system:
Rated MVA
Voltage ratio
Winding arrangement
Positive sequence reactance
(max, min and nominal tap)
Positive sequence resistance
(max, min and nominal tap)
Zero sequence reactance
Tap changer range
Tap change step size
Tap changer type: on **Load** or off circuit

(c) Switchgear including circuit breakers, switch disconnecters and isolators on all circuits connected to the **Connection Point** including those at **Power Stations**:

Rated voltage (kV)	
Operating voltage (kV)	
Rated short-circuit breaking current,	3-phase (kA)
Rated short-circuit breaking current,	1-phase (kA)
Rated load-breaking current,	3-phase (kA)
Rated load-breaking current,	1-phase (kA)
Rated short-circuit making current,	3-phase (kA)
Rated short circuit making current,	1-phase (kA)

PC.A3.1.9 **Protection** Data

The information essential to the **TSO** relates only to **Protection** which can trip or intertrip or close any **Connection Point** circuit breaker or any circuit breaker on the **Transmission System**. The following information is required:

(a) a full description, including estimated settings, for all relays and protection systems installed or to be installed on the **User's System**;

(b) a full description of any auto-reclose facilities installed or to be installed on the **User's System**, including type and time delays;

(c) a full description, including estimated settings, for all relays and **Protection** systems installed or to be installed on the **Generating Unit**, **Generator Transformer**, station transformer and their associated connections;

(d) for **Generating Units** having (or intended to have) a circuit breaker on the circuit leading to the **Generator Terminals**, at the same voltage, clearance times for electrical faults within the **Generating Unit** zone;

(e) the most probable fault clearance time for electrical faults on the **User's System**.

PC.A3.1.10 Earthing Arrangements

Full details of the means of permanently connecting the **User System** to earth including impedance values.

PC.A3.1.11 Transient Overvoltage Assessment Data

When undertaking insulation co-ordination studies the **TSO** will need to conduct transient overvoltage assessments. When requested by the **TSO** each **User** is required to submit estimates of the surge impedance parameters present and forecast of its **User System** with respect to the **Connection Point** and to give details of the calculations carried out. The **TSO** may further request information on physical dimensions of electrical equipment and details of the specification of **Apparatus** directly connected to the **Connection Point** and its means of **Protection**.

PC.A3.2 DEMAND DATA

PC.A3.2.1 General

(a) All **Users** with **Demand** shall provide the **TSO** with the **Demand** data both current and forecast as specified in sub sections PC.A3.2.2 to PC.A3.2.3.

(b) All forecast maximum **Demand** levels submitted to the **TSO** by **Users** shall be on the basis of **ACS Conditions**.

(c) So that the **TSO** is able to estimate the diversified total **Demand** at various times throughout the year, each **User** shall provide such additional forecast **Demand** data as the **TSO** may reasonably request.

PC.A3.2.2 **User's System Demand** (**Active** and **Reactive Power**)

Forecast daily **Demand** profiles net of the output profile of all **Independent Generating Plant** directly connected to the **User's System** in time marked half hours throughout the day as follows:

(a) peak day on the **User's System**;

(b) day of peak **Transmission Demand** (**Active Power**); and

(c) day of minimum **Transmission Demand** (**Active Power**).

PC.A3.2.3 **User Customer Demand Management** Data

The potential reduction in **Demand** available from the **User** in **MW** and **MVAr**, the notice required to put such reduction into effect, the maximum acceptable duration of the reduction in hours and the permissible number of reductions per annum.

PC.A3.3 GENERATING UNIT AND POWER STATION DATA

PC.A3.3.1 General

All **Generators** with **Power Stations** shall provide the **TSO** with the details as specified in sub sections PC.A3.3.2 to PC.A3.3.10.

PC.A3.3.2 Auxiliary **Demand**

(a) The normal **Generating Unit**-supplied auxiliary **Load** is required for each **Generating Unit** at rated **MW** output.

(b) The **Power Station** auxiliary **Load**, if any, additional to the **Generating Unit** - supplied auxiliary **Load**, where the **Power Station** auxiliary **Load** is supplied from the **Transmission System**, is required for each **Power Station**.

PC.A3.3.3 **Generating Unit** Parameters

(a) Rated terminal voltage (kV);

(b) Rated MVA;

(c) Rated **MW**;

(d) **Minimum Generation** (**MW**);

(e) Short circuit ratio;

(f) Direct axis synchronous reactance;

(g) Direct axis transient reactance;

(h) Direct axis sub-transient reactance;

(i) Direct axis transient time constant;

(j) Direct axis sub-transient time constant;

(k) Quadrature axis synchronous reactance;

(l) Quadrature axis transient reactance;

(m) Quadrature axis sub-transient reactance;

(n) Quadrature axis transient time constant;

(o) Quadrature axis sub-transient time constant;

(p) Stator time constant;

(q) Stator resistance;

(r) Stator leakage reactance;

(s) Turbogenerator inertia constant (**MW**sec/MVA**)**, or, for generators comprised within a **PPM**, **Plant** inertia constant (**MW**sec/MVA);

(t) Other than for generators comprised within a **PPM**, rated field current; and

(u) Other than for generators comprised within a **PPM**, field current (amps) open circuit saturation curve for voltages at the **Generator Terminals** ranged from 50% to 120% of rated value in 10% steps as derived from appropriate manufacturers' test certificates.

PC.A3.3.4 Parameters for **Generating Unit** Step-Up Transformers

(a) Rated MVA

(b) Voltage ratio

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

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

(e) Zero phase sequence reactance

(f) Tap changer range

(g) Tap changer step size

(h) Tap changer type: on **Load** or off circuit

PC.A3.3.5 **Power Station** Transformer Parameters

(a) Rated MVA

(b) Voltage ratio

(c) Zero sequence reactance as seen from the higher voltage side

PC.A3.3.6 Excitation Control System Parameters (not for **PPMs**)

(a) DC gain of excitation loop

(b) Rated field voltage

(c) Maximum field voltage

(d) Minimum field voltage

(e) Maximum rate of change of field voltage (rising)

(f) Maximum rate of change of field voltage (falling)

(g) Details of excitation loop described in block diagram form showing transfer functions of individual elements

(h) Dynamic characteristics of over-excitation limiter

(i) Dynamic characteristics of under-excitation limiter

PC.A3.3.7 Governor Parameters (for Reheat **Steam Turbine Units**)

(a) HP governor average gain **MW**/Hz

(b) Speeder motor setting range

(c) HP governor valve time constant

(d) HP governor valve opening limits

(e) HP governor valve rate limits

(f) Reheater time constant (Active energy stored in reheater)

(g) IP governor average gain **MW**/Hz

(h) IP governor setting range

(i) IP governor valve time constant

(j) IP governor valve opening limits

(k) IP governor valve rate limits

(l) Details of acceleration sensitive elements in HP & IP governor loop

(m) A governor block diagram showing transfer functions of individual elements

PC.A3.3.8 Governor parameters (for Non-Reheat **Steam Turbine Units** and **Gas Turbine Units**)

(a) Governor average gain

(b) Speeder motor setting range

(c) Time constant of steam or fuel governor valve

(d) Governor valve opening limits

(e) Governor valve rate limits

(f) Time constant of turbine

(g) Governor block diagram

PC.A3.3.9 Governor parameters (for **PPMs**)

(a) Generator torque/speed controller(s) (if any)

(b) Generator blade angle controller(s) (if any)

(c) Generator power limitation function(s) (if any)

PC.A3.3.10 Plant Flexibility Performance

(a) Rate of **Loading** following weekend shutdown (**Generating Unit** and **Power Station**)

(b) Rate of **Loading** following an overnight shutdown (**Generating Unit** and **Power Station**)

(c) Block **Load** following **Synchronising**, or, in the case of **PPMs**, generating whilst connected to the **Transmission System**.

(d) Rate of **De-loading** from normal rated **MW**

(e) Regulating range

(f) **Load** rejection capability while still **Synchronised**, or, in the case of **PPMs,** while still connected to the **Transmission System** and generating, and able to supply **Load**.

PC.A3.3.11 **Conversion Factor** Data

The figures described as "fixed unit load" and "unit load scalar" under the **TSC** (together referred to in the Grid Code as the "**Conversion Factors**"), which are the figures submitted by the **Generator** or an **Intermediary** on its behalf pursuant to the "net output function" provisions of the **TSC**. If these figures change, then the **User** must update them as if it were a change under PC6.1.3(b).

PC.A3.3.12 **Additional Conversion Factor** Data

The following information in respect of Kilroot **Power Station**, Ballylumford **Power Station** and Coolkeeragh **Power Station** (to be submitted by the **Generators** at Kilroot **Power Station**, Ballylumford **Power Station** and Coolkeeragh **Power Station**, as the case may be): the different configurations at which the **Power Stations** may operate and which can affect the **Conversion Factors**, such configurations being in the form of a matrix based upon the outline matrix set out below, as agreed with the **TSO**. If the

configurations submitted by a **Generator** change, then the **Generator** must update them as if it were a change under PC6.1.3(b).

The above information shall be provided where required for the **Grid Code** or where required for the purposes of settlement in the **Generating Unit Agreements** or **System Support Services Agreements**, and such information may include data for the purposes of conversions at different temperature, pressure and humidity levels.

PC.A3.4 ADDITIONAL / ALTERNATIVE DATA

PC.A3.4.1 General

Notwithstanding the **Standard Planning Data** and **Detailed Planning Data** set out in this Appendix; the **TSO** may reasonably require additional data from **Users** to represent correctly the performance of **Plant** and **Apparatus** on the **Transmission System** where the present data submissions would, in the **TSO's** reasonable opinion, prove insufficient for the purpose of producing meaningful system studies for the relevant parties.

PC.A3.4.2 **Generator Aggregators**

Aggregators shall, upon request by the **TSO**, provide to the **TSO** any **Connection Site** and **User System** data which the **TSO** may reasonably deem necessary.

PC.A3.4.3 **Demand Side Unit Operators**

For each **Demand Side Unit Operator,** the following information shall be provided:

(a) General Details
- (i) name of **Demand Side Unit;**
- (ii) address of **Demand Side Unit Control Facility;**
- (iii) address of each **Individual Demand Site(s)** comprising the **Demand Side Unit;**
- (iv) Irish Grid Co-ordinates of the **Connection Point** of each **Individual Demand Site** comprising the **Demand Side Unit;**
- (v) **Meter Point Reference Number** for each **Individual Demand Site** comprising the **Demand Side Unit;**
- (vi) single line diagram for each **Individual Demand Site;**
- (vii) details of the operating regime of each **Individual Demand Site** comprising the **Demand Side Unit,** e.g. avoided **Demand** consumption and operation of **Generating Units,** operation of **Generating Units** only or other;
- (viii) details of the operating mode of **Generating Units** where the **Generating Units** form part of the **Individual Demand Sites** operating regime, e.g. **Non-Synchronous Generating Unit,** short term **Synchronous Generating Unit,** continuous **Synchronous Generating Unit** or other;

(ix) details of all **Generating Units** used as part of the **Demand Side Unit,** including the make, model, capacity, MVA rating, fuel type, protection settings and whether it will be used as a standby plant;

(x) whether a change is required to the **Maximum Export Capacity** or **Maximum Import Capacity** of **Individual Demand Sites** comprising the **Demand Side Unit;**

(xi) details of the current operation of **Protection** installed to disconnect **Generating Units** from the **Distribution System** during abnormal system conditions;

(xii) details of all **Demand** loads with **Demand** reduction capability of 5 **MW** or greater, including size in **MW** and **Demand** reduction capability from load;

(xiii) **Maximum Import Capacity** of each **Individual Demand Site** comprising the **Demand Side Unit (MW);**

(xiv) **Maximum Export Capacity** of each **Individual Demand Site** comprising the **Demand Side Unit (MW);**

(xv) details of restrictions to the **Operation** of **Individual Demand Sites** comprising the **Demand Side Unit** (e.g. Northern Ireland Environmental Agency Licence or planning conditions);

(xvi) whether each **Individual Demand Site** comprising the **Demand Side Unit** is currently participating as or part of an **Aggregated Generator Unit,** other **Demand Side Unit** or any other demand side management scheme;

(xvii) proposed effective date in **Single Electricity Market** for first-time applicants;

(b) Technical Details

(i) total **Demand Side Unit MW Capacity (MW)** of the **Demand Side Unit;**

(ii) **Demand Side Unit MW Capacity (MW)** of each **Individual Demand Site** comprising the **Demand Side Unit;**

(iii) total **Demand Side Unit MW Capacity** of the **Demand Side Unit** available from on-site generation **(MW)** operating as a continuous **Synchronous Generating Unit**;**;**

(iv) **Demand Side Unit MW Capacity** of each **Individual Demand Site** comprising the **Demand Side Unit** available from on-site generation **(MW)**operating as a continuous **Synchronous Generating Unit;**

(v) Total **Demand Side Unit MW Capacity** of the **Demand Side Unit** available from avoided **Demand** consumption **(MW)** and on-site generation **MW** operating in **DSU Short-term Synchronous Operating Mode;**

(vi) **Demand Side Unit MW Capacity** of each **Individual Demand Site** comprising the **Demand Side Unit** available from avoided **Demand** consumption **(MW)** or on-site generation **(MW)** operated as a **Non-Synchronous Generating Unit** or as a short term **Synchronous Generating Unit;**

(vii) **Demand Side Unit MW Response Time** of the **Demand Side Unit;**

(viii) **Demand Side Unit Notice Time** of the **Demand Side Unit;**

(ix) **Minimum Down Time** of the **Demand Side Unit;**

(x) **Maximum Down Time** of the **Demand Side Unit;**

(xi) **Minimum Off Time** of the **Demand Side Unit;**

(xii) **Maximum Ramp Up Rate** of the **Demand Side Unit;**
(xiii) **Maximum Ramp Down Rate** of the **Demand Side Unit;**

PC.A3.4.4 **Interconnector Owners**

Interconnector Owners shall submit to the **TSO Planning Data** of the nature required from other **Users** under the **Planning Code**. This obligation shall be satisfied as at 1 November 2007 by the **Planning Data** already submitted as at that date by the **Interconnector Owner**. This PC.A3.4.4 will be superseded once the **Planning Code** has been updated to include specific data requirements from **Interconnector Owners**.

ll PC.A3.4.5 When several **HVDC Converter Stations** or other plant and equipment are in close electrical proximity, the **TSO** may specify control interaction studies on a site specific basis with defined scope and extent in order to demonstrate no adverse interaction effect. The control interaction study shall identify possible mitigation actions to be implemented if adverse control interaction is identified.

PC.A3.4.6 The **TSO** shall identify all relevant parties to participate in the control interaction and subsynchronous torsional interaction studies referred to in PC.A3.4.5 and PC.A3.4.10. The interaction studies shall be carried out by the connecting **HVDC System**. The **TSO** shall obtain all the relevant data from all identified parties including **TSO** system dynamic data and shall pass this to the **HVDC System** carrying out the studies.

PC.A3.4.7 The **TSO** shall assess the results of the control interaction and subsynchronous torsional interaction studies and, may request further studies in line with the scope and extent specified. The **TSO** may also review or replicate some of the control interaction and subsynchronous torsional interaction studies and in such a case, the **HVDC System** owner shall provide all relevant data and models to the **TSO** to allow such study to be performed.

PC.A3.4.8 Any mitigating actions identified as part of the control interaction and subsynchronous torsional interaction studies and reviewed by the **TSO** shall be undertaken by the **HVDC System** owner as part of the connection of the new **HVDC Converter Station**. These mitigating actions shall be in accordance with the requirements of the relevant **Connection Agreement**.

PC.A3.4.9 The **TSO** may specify transient levels of performance associated with events for the induvial **HVDC System** or collectively across commonly impacted **HVDC Systems** in order to protect the integrity of both **TSO** equipment and that of grid users.

PC.A3.4.10 A **HVDC System** shall be capable of contributing to electrical damping of torsional frequencies. The **TSO** shall specify on a case by case basis the necessary extent of subsynchronous torsional interaction studies. Subsynchronous torsional interaction studies shall identify conditions, if any, where torsional interaction exists and propose mitigation action. These mitigating actions shall be in accordance with the requirements of the relevant **Connection Agreement**.

PC.A3.4.11 A **HVDC System** in accordance with the requirements of the relevant **Connection Agreement** shall be capable of operating within the range of short circuit power and network characteristics specified by the **TSO**. The **TSO** will publish pre-fault and post-

fault conditions for the calculation of at least the minimum and maximum short circuit power at the connection points. The **TSO** will publish this data in the Transmission Forecast Statement which will be made publicly available via the **TSO's** website.

APPENDIX B

PLANNING DATA REQUIREMENTS FOR USERS CONNECTED TO THE DISTRIBUTION SYSTEM

PC.B1. INTRODUCTION

PC.B1.1 This Appendix specifies the **Standard** and **Detailed Planning Data** to be submitted to the **TSO** by **Generators** pursuant to PC6 and PC7 in respect of **CDGUs** and **Controllable PPMs** connected to the **Distribution System** and, with respect to PC.B3.3.2, **Aggregators** with respect to **Generating Units** connected to the **Distribution System**.

PART 1

PC.B.2 STANDARD PLANNING DATA

PC.B2.1 CONNECTION SITE AND USER SYSTEM DATA

PC.B2.1.1 General

All **Users** shall provide the **TSO** with the details as specified in sub section PC.B2.1.2 and PC.B2.1.3 relating to their **User System**.

PC.B2.1.2 Short Circuit Infeed

(a) The maximum 3-phase short circuit current infeed into the **Distribution System**.

(b) The minimum zero sequence impedance of the **User System** at the point of connection with the **Distribution System**.

PC.B2.1.3 Modelling Data

The **User** in respect of its **Plant** and **Apparatus** must submit modelling data to the **TSO** as specified by the **TSO** in **PC** Appendix D.

The modelling data submitted to the **TSO** is for **System** planning and operational purposes. It is not intended to restrict the scope of any **Ancillary Service** agreements which the **User** may enter into with the **TSO**.

PC.B2.2 GENERATING UNIT AND POWER STATION DATA

PC.B2.2.1 **Power Station** Data Requirements

(a) Capacity of **Power Station** (being an aggregate of all **Generating Units** in the **Power Station**) in **MW** sent out for **Registered Capacity, Minimum Generation** (which in the case of **PPMs** shall be assumed to be zero unless a

different value is notified by the **User**) and, where relevant, **Maximum Generation.**

(b) In the case of **Wind Farm Power Stations**, a diagram that shows for the **Wind Farm Power Station** wind speed and direction against electrical output in **MW**, in "rose" format**.**

(c) In the case of **PPMs** that are not **WFPS**, a diagram equivalent to that in (b), in relation to the input resource of that **PPM.**

(d) Maximum auxiliary **Demand** (**Active Power** and **Reactive Power**).

(e) Operating regime of **Generating Units** not subject to **Central Despatch** (e.g. continuous, intermittent, peak-lopping).

PC.B2.2.2 **Generating Unit** Data Requirements

In relation to **Generating Units** other than the generators comprised within a **PPM**:

(a) Prime mover type;

(b) **Generating Unit** type;

(c) **Generating Unit** rating and terminal voltage (MVA & kV);

(d) **Generating Unit** rated power factor;

(e) **Registered Capacity** sent out (**MW**);

(f) **Maximum Generation** and **Minimum Generation** capability sent out (**MW** sent out);

(g) **Reactive Power** capability (both leading and lagging) at the lower voltage terminals of the **Generator Transformers** for **Maximum Generation**, normal full **Load** and normal minimum **Load**;

(h) Maximum auxiliary **Demand** in **MW** and **MVAr**;

(i) Inertia constant (**MW** sec/MVA);

(j) Short circuit ratio;

(k) Direct axis transient reactance;

(l) Direct axis sub-transient time constant;

(m) **Generator Transformer** rated MVA, positive sequence reactance, and tap change range;

(n) **Sustained Load Diagram**; and

(o) a list of the **CCGT Modules** in the **CCGT Installation**, identifying each **CCGT Module**, and the **CCGT Installation** of which it forms part

unambiguously, together with any other information which may be relevant in relation to the **CCGT Modules** and **CCGT Installations** and their operation.

In relation to the generators comprised within a **PPM**, such data equivalent to that listed in PC.B2.2.2(a) to PC.B2.2.2(n) as the **TSO** shall reasonably require.

PCB2.2.3 **CCGT Installation Matrix**

(a) A **CCGT Installation Matrix** in respect of its **CCGT Installations**. It must be prepared on a best estimate basis relating to how it is anticipated the **CCGT Installation** will be running and reasonably reflect the true operating characteristics of the **CCGT Installation**. It will be applied (unless revised under this PC) for planning purposes and in the SDCs in relation to the **CCGT Installation**. It must show the combination of **CCGT Modules** which would be running in relation to any given **Output**, in the format indicated in Appendix D. In the case of a **PPA CCGT Installation** it must reflect the requirements of the relevant **Generating Unit Agreement**.

(b) Any changes must be notified to the **TSO** promptly. **Generators** should note that amendments to the composition of the **CCGT Installation** may only be made in accordance with the principles set out in PC.B2.2.4 below. If in accordance with PC.B2.2.4 an amendment is made, an updated **CCGT Installation Matrix** must be immediately submitted to the **TSO** in accordance with this PCB2.2.3.

(c) The **CCGT Installation Matrix** submitted under the PC will be used by the **TSO** for planning purposes and will also be used by the **TSO** in connection with **Scheduling** and **Despatch** under the SDCs**,** as a look up table determining which **CCGT Modules** will be operating at any given **MW Despatch** level subject to any updated information on the individual **Availability** of **CCGT Modules** submitted by a **Generator** to the **TSO** in an **Availability Notice** under SDC1.

PC.B2.2.4 Notwithstanding any other provision of this PC, the **CCGT Modules** within a **CCGT Installation**, details of which are required under PC.B2.2.2 and PC.B2.2.3, can only be amended such that the **CCGT Installation** comprises different **CCGT Modules** if the **TSO** gives its prior consent in writing. Notice of the wish to amend the **CCGT Modules** within the **CCGT Installation** must be given at least 12 months (or less with agreement of the **TSO**) before it is wished for the amendments to take effect and be permitted under any other contractual and operational arrangement with the **TSO**.

PART 2

PC.B3 DETAILED PLANNING DATA

PC.B3.1 CONNECTION SITE AND USER SYSTEM DATA

PC.B3.1.1 General

All **Users** shall provide the **TSO** with the details as specified in sub sections PC.B3.1.2 to PC.B3.1.7 (which comprises both **Standard** and **Detailed Planning Data**).

PC.B3.1.2 **User System** Layout

Single line diagrams of existing and proposed arrangements of main connections and primary distribution systems including operating voltages.

PC.B3.1.3 Reactive Compensation Equipment

For all independently switched reactive compensation equipment on the **User's System** at 11kV and above, other than power factor correction equipment associated directly with the **User's Plant** and **Apparatus**, the following information is required:

(a) Type of equipment (e.g. fixed or variable);

(b) Capacitive and/or inductive rating or its operating range in **MVAr**;

(c) Details of any automatic control logic to enable operating characteristics to be determined;

(d) The point of connection to the **User's System** in terms of electrical location and voltage.

PC.B3.1.4 Short Circuit Infeed to the **Distribution System**

Each **User** is required to provide the total short circuit infeeds calculated in accordance with good industry practice into the **Distribution System** from its **User System** at the point of connection with the **Distribution System** as follows:

(a) the maximum 3-phase short circuit infeed including infeeds from any **Generating Units** forming part of the **User's System**;

(b) the additional maximum 3-phase short circuit infeed from induction motors on the **User's System**; and

(c) the minimum zero sequence impedance of the **User's System**.

PC.B3.1.5 Lumped System Susceptance

Details of equivalent lumped network susceptance of the **User's System** at normal **Frequency** at the point of connection with the **Distribution System**. This should include any shunt reactors which are an integrated part of a cable system and which are not normally in or out of service independent of the cable (i.e. they are regarded as part of the cable). It should not include independent reactive compensation plant on the **User's System**.

PC.B3.1.6 Interconnection Impedance

For **User** interconnections that operate in parallel with the **Distribution System** an equivalent single impedance (resistance, reactance and shunt susceptance) of the parallel **User System**. If the impedance is, in the reasonable opinion of the **TSO**, low then more detailed information on the equivalent or active part of the parallel **User System** may be requested.

PC.B3.1.7 **System** Data

Each **User** with an existing or proposed **User System** shall provide the following details relating to that **System**:

(a) Circuit parameters (for all circuits):
Rated voltage (kV)
Operating voltage (kV)
Positive phase sequence reactance
Positive phase sequence resistance
Positive phase sequence susceptance
Zero phase sequence reactance
Zero phase sequence resistance
Zero Phase sequence susceptance

(b) Interconnecting transformers between the **User's High Voltage** system and the **User's** primary voltage system:
Rated MVA
Voltage ratio
Winding arrangement
Positive sequence reactance
(max, min and nominal tap)
Positive sequence resistance
(max, min and nominal tap)
Zero sequence reactance
Tap changer range
Tap change step size
Tap changer type: on **Load** or off circuit

PC.B3.2 GENERATING UNIT AND POWER STATION DATA

PC.B3.2.1 General

All **Generators** shall provide the **TSO** with the details as specified in sub sections PC.B3.2.2 to PC.B3.2.10.

PC.B3.2.2 Auxiliary **Demand**

(a) The normal **Generating Unit**-supplied auxiliary **Load** is required for each **Generating Unit** at rated **MW** output.

(b) The **Power Station** auxiliary **Load**, if any, additional to the **Generating Unit** - supplied auxiliary **Load**, where the **Power Station** auxiliary **Load** is supplied from the **Distribution System**, is required for each **Power Station**.

PC.B3.2.3 **Generating Unit** Parameters

(a) Rated terminal voltage (kV);

(b) Rated MVA;

(c) Rated **MW**;

(d) **Minimum Generation** (**MW**);

(e) Short circuit ratio;

(f) Direct axis synchronous reactance;

(g) Direct axis transient reactance;

(h) Direct axis sub-transient reactance;

(i) Direct axis transient time constant;

(j) Direct axis sub-transient time constant;

(k) Quadrature axis synchronous reactance;

(l) Quadrature axis transient reactance;

(m) Quadrature axis sub-transient reactance;

(n) Quadrature axis transient time constant;

(o) Quadrature axis sub-transient time constant;

(p) Stator time constant;

(q) Stator resistance;

(r) Stator leakage reactance;

(s) Turbogenerator inertia constant (**MW**sec/MVA**)**, or, for generators comprised within a **PPM**, **Plant** inertia constant (**MW**sec/MVA);

(t) Other than for generators comprised within a **PPM**, rated field current; and

(u) Other than for generators comprised within a **PPM**, field current (amps) open circuit saturation curve for voltages at the **Generator Terminals** ranged from 50% to 120% of rated value in 10% steps as derived from appropriate manufacturers' test certificates.

PC.B3.2.4 Parameters for **Generating Unit** Step-Up Transformers

(a) Rated MVA

(b) Voltage ratio

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

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

(e) Zero phase sequence reactance

(f) Tap changer range

(g) Tap changer step size

(h) Tap changer type: on **Load** or off circuit

PC.B3.2.5 **Power Station** Transformer Parameters

(a) Rated MVA

(b) Voltage ratio

(c) Zero sequence reactance as seen from the higher voltage side

PC.B3.2.6 Excitation Control System Parameters (not for **PPMs**)

(a) DC gain of excitation loop

(b) Rated field voltage

(c) Maximum field voltage

(d) Minimum field voltage

(e) Maximum rate of change of field voltage (rising)

(f) Maximum rate of change of field voltage (falling)

(g) Details of excitation loop described in block diagram form showing transfer functions of individual elements

(h) Dynamic characteristics of over-excitation limiter

(i) Dynamic characteristics of under-excitation limiter

PC.B3.2.7 Governor Parameters (for Reheat **Steam Turbine Units**)

(a) HP governor average gain **MW**/Hz

(b) Speeder motor setting range

(c) HP governor valve time constant

(d) HP governor valve opening limits

(e) HP governor valve rate limits

(f) Reheater time constant (Active energy stored in reheater)

(g) IP governor average gain **MW**/Hz

(h) IP governor setting range

(i) IP governor valve time constant

(j) IP governor valve opening limits

(k) IP governor valve rate limits

(l) Details of acceleration sensitive elements in HP & IP governor loop

(m) A governor block diagram showing transfer functions of individual elements

PC.B3.2.8 Governor parameters (for Non-Reheat **Steam Turbine Units** and **Gas Turbine Units**)

(a) Governor average gain

(b) Speeder motor setting range

(c) Time constant of steam or fuel governor valve

(d) Governor valve opening limits

(e) Governor valve rate limits

(f) Time constant of turbine

(g) Governor block diagram

PC.B3.2.9 Governor parameters (for **PPMs**)

(a) Generator torque/speed controller(s) (if any)

(b) Generator blade angle controller(s) (if any)

(c) Generator power limitation function(s) (if any)

PC.B3.2.10 Plant Flexibility Performance

(a) Rate of **Loading** following weekend shutdown (**Generating Unit** and **Power Station**)

(b) Rate of **Loading** following an overnight shutdown (**Generating Unit** and **Power Station**)

(c) Block **Load** following **Synchronising**, or, in the case of **PPMs**, generating whilst connected to the **Distribution System**.

(d) Rate of **De-loading** from normal rated **MW**

(e) Regulating range

(f) **Load** rejection capability while still **Synchronised**, or, in the case of **PPMs,** while still connected to the **Distribution System** and generating, and able to supply **Load**.

PC.B3.3 ADDITIONAL / ALTERNATIVE DATA

PC.B3.3.1 General

Notwithstanding the **Standard Planning Data** and **Detailed Planning Data** set out in this Appendix; the **TSO** may reasonably require additional data from **Generators** to represent correctly the performance of **Plant** and **Apparatus** on the **Distribution System** where the present data submissions would, in the **TSO's** reasonable opinion, prove insufficient for the purpose of producing meaningful system studies for the relevant parties.

PC.B3.3.2 **Generator Aggregators**

Aggregators shall, upon request by the **TSO**, provide to the **TSO** any connection site and **User System** data which the **TSO** may reasonably deem necessary.

PC.B3.3.3 **Demand Side Unit Operators**

For each **Demand Side Unit Operator,** the following information shall be provided for each **Individual Demand Site** connected to the **Distribution System**:

(a) General Details

(i) name of **Demand Side Unit;**

(ii) address of **Demand Side Unit Control Facility;**

(iii) address of each **Individual Demand Site**(s) comprising the **Demand Side Unit;**

(iv) Irish Grid Co-ordinates of the **Connection Point** of each **Individual Demand Site** comprising the **Demand Side Unit;**

(v) **Meter Point Reference Number** for each **Individual Demand Site** comprising the **Demand Side Unit;**

(vi) the name of the **Bulk Supply Point**(s) to which each **Individual Demand Site** comprising the **Demand Side Unit** is/are normally connected;

(vii) single line diagram for each **Individual Demand Site;**

(viii) details of the operating regime of each **Individual Demand Site** comprising the **Demand Side Unit,** e.g. avoided **Demand** consumption only, combination of avoided **Demand** consumption and operation of **Generating Units,** operation of **Generating Units** only or other;

(ix) details of the operating mode of the **Generating Units** where the **Generating Units** form part of the **Individual Demand Site**'s operating regime, e.g. **Non-Synchronous Generating Unit,** short term **Synchronous Generating Unit,** continuous **Synchronous Generating Unit** or other;

(x) details of all **Generating Units** used as part of the **Demand Side Unit,** including the make, model, capacity, MVA rating, fuel type, **Protection** settings and whether it will be used as a standby plant;

(xi) whether a change is required to the **Maximum Export Capacity** or **Maximum Import Capacity** of **Individual Demand Sites** comprising the **Demand Side Unit;**

(xii) details of the current operation of **Protection** installed to disconnect **Generating Units** from the **Distribution System** during abnormal system conditions;

(xiii) details of all **Demand** loads with **Demand** reduction capability of 5 **MW** or greater, including size in **MW** and **Demand** reduction capability from load;

(xiv) **Maximum Import Capacity** of each **Individual Demand Site** comprising the **Demand Side Unit (MW);**

(xv) **Maximum Export Capacity** of each **Individual Demand Site** comprising the **Demand Side Unit (MW);**

(xvi) proof of a valid **Connection Agreement** for each **Demand Customer** and proof of a valid **DNO Connection Agreement** for each **DNO Demand Customer** that comprises the **Demand Side Unit** clearly showing **Maximum Import Capacity** and **Maximum Export Capacity** (if applicable);

(xvii) whether the **Distribution Network Owner** has been informed about the intention of the **Demand Side Unit Operator** to operate a **Demand Side Unit** (the **Demand Side Unit Operator** is obliged to inform the **Distribution Network Owner);**

(xviii) details of any special operating or network limitations placed by the **Distribution Network Owner** on the **Demand Side Unit;**

(xix) details of restrictions to the **Operation** of **Individual Demand Sites** comprising the **Demand Side Unit** (e.g. Northern Ireland Environmental Agency Licence or planning conditions);

(xx) whether each **Individual Demand Site** comprising the **Demand Side Unit** is currently participating as or part of any **Aggregated**

Generating Unit, other **Demand Side Unit** or any demand side management scheme;

(xxi) proposed effective date in **Single Electricity Market** for first-time applicants;

(b) Technical Details

(i) total **Demand Side Unit MW Capacity (MW)** of the **Demand Side Unit;**

(ii) **Demand Side Unit MW Capacity (MW)** of each **Individual Demand Site** comprising the **Demand Side Unit;**

(iii) total **Demand Side Unit MW Capacity** of the **Demand Side Unit** available from on-site generation **(MW)** operating as a continuous **Synchronous Generating Unit;**

(iv) **Demand Side Unit MW Capacity** of each **Individual Demand Site** comprising the **Demand Side Unit** available from on-site generation **(MW)**operating as a continuous **Synchronous Generating Unit;**

(v) total **Demand Side Unit MW Capacity** of the **Demand Side Unit** available from avoided **Demand** consumption **(MW)** and on-site generation **(MW)** operating in **DSU Short-term Synchronous Operating Mode;**

(vi) **Demand Side Unit MW Capacity** of each **Individual Demand Site** comprising the **Demand Side Unit** available from avoided **Demand** consumption **(MW)** and on-site generation **(MW)** operated as a **Non-Synchronous Generating Unit** or as a short term **Synchronous Generating Unit**

(vii) **Demand Side Unit MW Response Time** of the **Demand Side Unit;**

(viii) **Demand Side Unit Notice Time** of the **Demand Side Unit;**

(ix) **Minimum Down Time** of the **Demand Side Unit;**

(x) **Maximum Down Time** of the **Demand Side Unit;**

(xi) **Minimum Off Time** of the **Demand Side Unit;**

(xii) **Maximum Ramp Up Rate** of the **Demand Side Unit;**

(xiii) **Maximum Ramp Down Rate** of the **Demand Side Unit;**

APPENDIX C

PLANNING DATA REQUIREMENTS FOR THE DNO

PC.C1. INTRODUCTION

PC.C1.1 This Appendix specifies the planning data to be submitted to the **TSO** by the **DNO** pursuant to PC6.

PC.C2 GENERAL INFORMATION

PC.C2.1 Where the **DNO** intends to:

(a) construct a new 33kV circuit; or

(b) permanently reconfigure the 33kV network,

and the implementation of either (a) or (b) may materially affect the import or the export at a **Bulk Supply Point**, the **DNO** shall inform the **TSO** as soon as reasonably practicable and shall provide, on request, all the information which the **TSO** may reasonably require.

PC.C2.2 Where the compliance of the **Transmission System** with the Transmission and Distribution System Security and Planning Standards is planned to be achieved by temporarily reconfiguring the **Distribution System**, for example by transferring **Load** between **Bulk Supply Points**, whether manually or automatically, the **DNO** shall inform the **TSO** of such plans and provide all the information relating to such plans which the **TSO** may reasonably require.

PC.C3 BULK SUPPLY POINT DEMAND DATA

PC.C3.1 Introduction

The **DNO** shall provide the **TSO** with **Demand** data, both historic and forecast, as specified in this PC.C3.

PC.C3.2 Historic Bulk Supply Point Demand Data

PC.C3.2.1 The **DNO** shall inform the **TSO** by the end of April each year of the typical levels of reduction in **Demand** at each **Bulk Supply Point** between 16.00 hours and 19.00 hours each day during the most recent period of 1 November to 28 February due to customers connected to the **Distribution System** running their **Generating Units** to reduce their individual **Demands**. The value of the reduction in **Demand** shall be expressed in **MW**.

PC.C3.2.2 The **DNO** shall inform the **TSO** by the end of April 2010 of the maximum and minimum imports from the **Transmission System** at each **Bulk Supply Point** during the 12 month period up to the end of February 2010. The maximum and minimum

values shall be expressed in MVA and shall be the average imports within the half-hours in which the maximum and minimum occur at each **Connection Point**.

PC.C3.2.3 Commencing in 2011 the **DNO** shall inform the **TSO** by the end of April in each year of the magnitude of the maximum and minimum levels of **Active Power** and **Reactive Power** imported from the **Transmission System** and the magnitude of the maximum and minimum levels of **Active Power** and **Reactive Power** exported to the **Transmission System** at each **Bulk Supply Point** during the 12 month period up to the end of the previous February. The import and export values shall be expressed in **MW** and MVAr and shall be the average within the half-hours in which the maximum and minimum occur at each **Connection Point**.

PC.C3.2.4 Where any of the import or export values provided pursuant to PC.C3.2.2 or PC.C3.2.3 vary by more than 10% when compared to the corresponding value provided by the **DNO** in its previous 12 month submission, the **DNO** shall provide, on request, all the information relating to the variation which the **TSO** may reasonably require.

PC.C3.2.5 From January 2011 the **DNO** shall make available to the **TSO** half-hourly **Active** and **Reactive Power** flows at each **Bulk Supply Point** in a form and within a timescale agreed between the **DNO** and the **TSO**.

PC.C3.3 Forecasted Bulk Supply Point Demand Data

PC.C3.3.1 The **DNO** shall provide to the **TSO** by the end of June forecasts of maximum and minimum **Demand** at each **Bulk Supply Point** for the current and the seven succeeding financial years expressed in MVA.

PC.C3.3.2 Commencing in 2011 the **DNO** shall provide to the **TSO** by the end of June in each year forecasts of seasonal maximum and minimum **Demand** (**Active Power** and **Reactive Power**) at each **Bulk Supply Point** for the current and the seven succeeding financial years, expressed in **MW** and MVAr. The seasons to be considered are:

(a) Winter (December to February inclusive);

(b) Autumn (September to November inclusive); and

(c) Summer (May to August inclusive).

PC.C3.3.3 The forecasts provided pursuant to PC.C3.3.1 and PC.C3.3.2 shall be provided for both the maximum **Demand** on the **NI System** and the maximum **Demand** at the relevant **Bulk Supply Point**.

PC.C3.3.4 In preparing the forecasts provided pursuant to PC.C3.3.1 and PC.C3.3.2 the **DNO** shall assume that:

(a) the **Demand** at the **Bulk Supply Point** is not reduced by the output from **PPMs** connected to the **Distribution System** at 33kV; and

(b) customers connected to the **Distribution System** do not run their **Generating Units** between 16.00 hours and 19.00 hours in the period 1 November to 28 February to reduce their individual **Demands**.

PC.C3.3.5 The **DNO** shall provide to the **TSO** along with the **Bulk Supply Point Demand** forecasts provided pursuant to this PC.C3 a description of the **Bulk Supply Point Demand** forecasting techniques used.

PC.C3.3.6 The **DNO** shall provide to the **TSO** all the information in the possession of the **DNO** which the **TSO** may reasonably require relating to any step-change in **Load** growth, whether permanent or temporary, at a **Bulk Supply Point** which the **DNO** anticipates may occur in the forthcoming financial year and which, if it occurs, may materially affect the **Demand** at the relevant **Bulk Supply Point**.

PC.C4 DEMAND CONNECTED TO THE DISTRIBUTION SYSTEM

The **DNO** will inform the **TSO** of the type and electrical loading of any equipment connected, or to be connected, to the **Distribution System** where the **DNO** believes there may be a material effect on the **Transmission System** with respect to the Transmission and Distribution System Security and Planning Standards. The **DNO** shall also inform the **TSO** of any measures taken, or to be taken, to address the material effect.

PC.C5 FLUCTUATING LOADS > 5 MVA

Where the **DNO** believes that fluctuating **Loads** over 5 MVA on the **Distribution System** may have a material effect on the **Transmission System** with respect to the Transmission and Distribution System Security and Planning Standards, it shall provide the **TSO** with the following information for each individual **Demand** site:

(a) Details of the cyclic variation of **Demand** (**Active Power** and **Reactive Power**).

(b) The rates of change of **Demand** (**Active Power** and **Reactive Power**) both increasing and decreasing.

(c) The shortest repetitive time interval between fluctuations in **Demand** (**Active Power** and **Reactive Power**).

(d) The magnitude of the largest step changes in **Demand** (**Active Power** and **Reactive Power**), both increasing and decreasing.

(e) Maximum energy demanded per half hour by the fluctuating load cycle.

(f) Steady state residual **Demand** (**Active Power**) occurring between **Demand** fluctuations.

PC.C.6 ABNORMAL LOADS

Where the **DNO** believes that there may be a material effect on the **Transmission System** with respect to the Transmission and Distribution System Security and Planning Standards, it shall provide the **TSO** with details in respect of individual **Demand** sites which have characteristics differing from the normal typical range of **Loads** in the domestic, commercial or industrial fields. In particular, details on arc

furnaces, rolling mills, traction installations etc. which are liable to cause flicker problems.

PC.C7 ADDITIONAL / ALTERNATIVE DATA

Notwithstanding the planning data set out in this Appendix, the **TSO** may reasonably require additional data from the **DNO** to represent correctly the performance of **Plant** and **Apparatus** on the **Distribution System** where the present data submissions would, in the **TSO's** reasonable opinion, prove insufficient for the purpose of producing meaningful system studies.

APPENDIX D

Modelling Requirements for **Users**

PC.D1 INTRODUCTION

PC.D1.1 This Appendix specifies the modelling data to be submitted to the **TSO** by **Users** connected to or applying for a new or modified connection to the **Transmission System** or **Distribution System** pursuant to PC6.3.2.

PC.D2 MODELLING REQUIREMENTS FOR **USERS**

PC.D2.1 Scope

This Appendix applies to **Users** which, in this Appendix means:-

(a) **Generators** with respect to **Generating Units** connected to or seeking a new or modified connection to the **Transmission System**;

(b) **Generator** with respect to **CDGU's** and **Controllable PPMs** connected to or seeking a new or modified connection to the **Distribution System**,

(c) **Large Demand Customers**; and

(d) **HVDC Converter Station** owners;

(e) **HVDC System** owners; and

(f) **Interconnector Owners**.

PC.D2.2 General

All **Users** shall provide the **TSO** with suitable and accurate **Models** in order for the **TSO** to assess the impact of the connection on the transient performance, security and stability of the **System**.

The **Models** submitted by the **User** shall be representative of the **Users Plant** and **Apparatus** at the **Connection Point**. All **Models** must take into account all communication, controller and processing delays of the **Users Plant** and **Apparatus**. If all **Generating Units** contained within the **Users Plant** and **Apparatus** are not identical, the **Model** shall account for this by accurately representing the overall performance of the **Users Plant** and **Apparatus** at the **Connection Point**.

PC.D3 MODEL CAPABILITIES

All **Users** shall provide **Models** which are representative of the **Users Plant** and **Apparatus** at the **Connection Point**. The **Models** shall represent the **Users Plant** and **Apparatus** in balanced, root mean-square, positive phase-sequence, time domain studies and three phase electromagnetic transient and harmonic studies.

The balanced, root mean-square positive sequence time-domain **Model** shall be able to calculate how quantities, including but not limited to; **Active Power** and **Reactive Power** of the **Users Plant** and **Apparatus** vary due to changes in **Frequency** and voltage at the **Connection Point**. The **Model** shall include all electrical and mechanical phenomena that impact on the **Active Power** and/or **Reactive Power** of the **Users Plant** and **Apparatus** for sub-transient, transient and synchronous dynamics up to and including **Primary Operating Reserve** and **Secondary Operating Reserve** timeframes or when post-event steady state conditions have been achieved.

The three-phase electromagnetic transient **Model** shall include all material aspects of the **Users Plant** and **Apparatus** that affect the symmetrical and asymmetrical voltage and current outputs from the **Users Plant** and **Apparatus**. The **Model** shall represent phenomena that materially affect the voltage and **Frequency** on the **System** over timeframes of sub-cycle up to 50 cycles including, but not limited to, switching electronic devices, transformer saturation and equipment energisation.

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PC.D3.1 Models provided by the **Generator** shall contain but not be limited to the following sub-models,:

- alternator and prime mover,
- speed and power control,
- voltage control, including if applicable, power system stabiliser (PSS) function and excitation control system,
- **Generating Unit** protection models, as agreed between the **TSO** and the **Generator**, and
- converter models for **PPMs**,
- an estimate of the minimum and maximum short circuit contribution at the **Connection Point**, expressed in **MVA**, as an equivalent network.

ll PC.D3.2 Models provided by **HVDC System** owners shall contain but not be limited to the following sub-models where applicable:

(i) Transfer function block diagram including parameters of the control systems of each DC Converter and of the DC Converter Station and the **HVDC System**, for both the rectifier and inverter modes;

(ii) Transfer function block diagram representation including parameters of the electronic converters transformer tap changer control systems, including time delays; PC109 09 June 2023

(iii) Transfer function block diagram representation including parameters of AC filter and reactive compensation equipment control systems, including any time delays;

(iv) Transfer function block diagram representation including parameters of any **Frequency Control, Power System Stabiliser** and/or **Unit Load Control** systems;

(v) Transfer function block diagram representation including parameters of any small signal modulation controls such as power oscillation damping controls or sub-synchronous oscillation damping controls that have not been submitted as part of the **Frequency Control, Power System Stabiliser** and/or **Unit Load Control** systems data;

(vi) Transfer block diagram representation of the **Reactive Power** control at converter ends for a voltage source converter;

(vii) **HVDC System** protection models as agreed between the **TSO** and the **HVDC System** owner;

(viii) **HVDC System** owners are also required to supply an equivalent model of the control system when adverse control interactions may result with **HVDC Converter Stations** and other connections in close proximity if requested by **TSO**. The equivalent model shall contain all necessary data for the realistic simulation of the adverse control interactions;

(ix) Total Harmonic Distortion contribution by second-order and higher harmonics; and

(x) Total Harmonic Distortion chart showing by second-order and higher harmonics contributions of the DC Converter and/or **HVDC System**, as a function of MW transfer, with all filters and reactive compensation plant, belonging to the DC Converter Station or **HVDC System** working correctly.

PC.D4 MODEL DOCUMENTATION AND SOURCE CODE

Users shall provide the **TSO** with an appropriate balanced, root mean-squared positive-phase sequence time domain **Model** and a three-phase electromagnetic transient **Model** in accordance with this **Grid Code**. The **TSO** requires that sufficient information be provided by the **User** to allow for **Models** to be redeveloped in the event of future software environment changes or version updates. All **Models** shall be accompanied with appropriate documentation with sufficient detail as specified and deemed complete by the **TSO** (such agreement not to be unreasonably withheld or delayed). The **User** shall provide information including, but not limited to, a full description of the **Model** structure, inputs/outputs and functionality, Laplace diagrams or other suitably

understandable information. The **User** shall provide a description of the controller's functionality of all levels of control on the **Users Plant** and **Apparatus**, along with manufacturer details, version and operation manual. The **User** may also choose to provide the **TSO** with **Model** source code. The **Models** shall be provided in a software format as specified by the **TSO**. Alternatively, the **User** may provide an unambiguous reference to a standard open-source **Model**, such as a standard IEEE **Model**, or to a **Model** previously submitted to the **TSO** provided this **Model** accurately reflects the **Users Plant** and **Apparatus** at the **Connection Point**.

The **TSO** may, when necessary to ensure the proper operation of its complete system representation or to facilitate its understanding of the results of a dynamic simulation, request additional information concerning the **Model**, which may include **Model** documentation or source code of one or more routines in the **Model**. The **User** shall comply with such request without undue delay.

PC.D5 CONFIDENTIALITY

The **Models**, supporting documentation and associated data are provided to the **TSO** in order to carry out its duties to meet its **Licence** and **Grid Code** obligations. In that regard, the **TSO** is entitled to share the **Models**, supporting documentation and associated data with third parties, including but not limited to the **Other TSO** and **DNO** to perform co-ordinated operational and/or planning studies. Where such data is shared with third parties working for/with the **TSO**, this data will be shared and protected under the confidentiality conditions of the **Licence**.

It is the responsibility of the **User** to provide the **Models**, supporting documentation and associated data to the **TSO**. Where it is not possible for the **User** to provide the **Models**, supporting documentation and associated data to the **TSO**, the **TSO** will accept the **Models**, supporting documentation and associated data from a third party manufacturer. The **TSO** will only accept this information from a third party manufacturer provided the third party manufacturer agrees to enter into the **TSOs** standard confidentiality agreement for **Users**. In the event the third party manufacturer is unable to enter into the **TSOs** standard confidentiality agreement, the **User** shall be responsible for the provision of the **Models**, supporting documentation and associated data to the **TSO**.

PC.D6 PROVISION OF INFORMATION

At all times the **TSO** shall be in possession of an up to date full and accurate parameter listing of the **Users Plant** and **Apparatus**. This parameter listing must include all operational control functionality, including **Frequency**, voltage and all the **Users Plant** and **Apparatus** parameters relating to the control and operation of the **Users Plant** and **Apparatus**.

The **User** shall provide the **Models**, supporting documentation and associated data as **Standard Planning Data** in accordance with PC.A2.1.4 and PC.B2.1.3 and in any case must be submitted at least six months prior to energisation of the **Users Plant** and **Apparatus**.

At the request of the **User** and if deemed necessary by the **TSO,** the **TSO** shall provide technical data and a simulation **Model** of the network, to the extent necessary to carry out simulations to demonstrate compliance with the **Connection Conditions.**

PC.D7 VALIDATION

The **Models** provided to the **TSO** must be validated. The **TSO** must be satisfied that behaviour shown by the **Model** under simulation conditions is representative of the **Users Plant** and **Apparatus** under equivalent conditions.

Prior to energisation of the **Users Plant** and **Apparatus,** and where appropriate**,** the **User** shall provide type test results to show that the responses shown by the **Models** are representative of the **Users Plant** and **Apparatus** under laboratory test conditions.

Post **Commissioning/Acceptance Testing** the **User** shall complete dynamic simulations using the **Models** such that responses shown by the **Models** can be compared against measurements from **Commissioning/Acceptance Testing** to ensure the **Model** responses are representative of the **Users Plant** and **Apparatus**. Tests may include but are not limited to steady state reactive capability, **Voltage** control & **Reactive Power** stability, low **Voltage** ride through, high **Voltage** ride through, low **Frequency** response and high **Frequency** response. If these tests show the **Models** are not representative of the **Users Plant** and **Apparatus,** the **User** shall provide updated **Models**, supporting documentation and associated data to ensure the responses shown by the **Models** is representative of the responses shown by **Users Plant** and **Apparatus** during **Commissioning/Acceptance Testing**.

Through **Monitoring,** the **TSO** shall ensure that **Models** submitted by the **User** remain representative of the **Users Plant** and **Apparatus** throughout the operational lifetime of the **Users Plant** and **Apparatus**.

In the event the **TSO** identifies that the response of the **Models** are not representative of the **Users Plant** and **Apparatus**, the **TSO** shall notify the **User**. The **User** shall provide the revised **Models**, supporting documentation and associated data whose response is representative of the **Users Plant** and **Apparatus** as soon as reasonably practicable, but in any case no longer than 30 **Business Days** after notification of the noncompliance by the **TSO**, or as otherwise agreed with the **TSO**.

In the event of the **User** modifying hardware/software which affects the control and/or operation of the **Users Plant** and **Apparatus**, the **User** shall provide the **TSO** with updated **Models**, supporting documentation and associated data to enable the **TSO** to assess the impact of the modification of the **Users Plant** and **Apparatus** on the **System**. The **User** shall not implement any hardware/software modifications to the **Users Plant** and **Apparatus** without prior agreement with the **TSO**.

PC.D8 SOFTWARE ENVIRONMENT

The **User** must provide **Models** in software packages as specified by the **TSO**. The **TSO** shall inform the **User** of the required software version, computer platform, compiler version and model usability guidelines etc. upon request and shall be published on the **TSO** website. The **TSO** may, from time to time, request the **User** to provide updated **Models** which are compatible with changes in the **TSO's** computing environment, namely software version and/or compiler version. The **User** shall ensure such updated **Models** are provided without undue delay and in any case in a timeframe agreed between the **User** and the **TSO**. The **User** shall provide **Models** in the software formats as

defined by the **TSO**. Changes in the software format requirements for **Models** shall be subject to the **Grid Code** amendments process defined in GC.6.5 and the **TSO Licence**.

All **Models**, irrespective of software format, shall be accompanied by a sample case such that the **Model** can be tested before being integrated into the **System** model in the respective software environment. The sample case should include the **Users Plant** and **Apparatus** up to the **Connection Point** connected via a suitable impedance to an infinite bus.

APPENDIX E

CCGT INSTALLATION MATRIX EXAMPLE FORM

CCGT INSTALLATION	CCGT MODULES AVAILABLE		
	1st GT	2nd GT	1st ST
	UNIT MW CAPACITY		
MW OUTPUT	165	165	170
68 MW to 165 MW	✓		
166 MW to 250 MW	✓		✓
251 MW to 500 MW	✓	✓	✓

Please insert **MW** ranges and tick the boxes to indicate which units are synchronised to deliver each **MW** range, as shown in the example above.

CONNECTION CONDITIONS

CC1 INTRODUCTION

CC1.1 (a) The **Connection Conditions** specify the technical, design and certain operational criteria which must be complied with by **Users** whose **Plant** and **Apparatus** is connected to, or who are seeking a connection to**,** the **Transmission System** and by **Generators** with respect to **CDGUs** and **Controllable PPMs** connected to or seeking a connection to the **Distribution System.**

(b) They also set out the procedures by which the **Transmission System Operator (TSO)** shall seek to ensure compliance with these criteria as a pre requisite to granting approval for the connection of a **User**'**s Plant and Apparatus** to the **Transmission System**, or to decide whether or not to prevent a **User**'s connection to the **Distribution System.**

(c) **Users** are defined for the purpose of these **Connection Conditions** in CC3.

CC1.2 (a) Procedures by which the **TSO** and **Users** connected or seeking a connection to the **Transmission System** may conclude a **Connection Agreement** are reflected in the **Planning Code**. Each **Connection Agreement** shall require **Users** to comply with the terms of the **Grid Code** and the **TSO** will not grant approval to connect the **User's** installation to the **Transmission System** unless and until it is satisfied that the criteria laid down by the **Connection Conditions** have, subject to any derogations issued by the **Authority**, been met. The **TSO**'s grant of approval to connect a **User**'s installation to the **Transmission System** shall also be subject to the provisions of paragraph 6 of Condition 25 of the **TSO Licence** as amended from time to time.

(b) With respect to **Generators** connected to, or seeking a connection to, the **Distribution System**, the **Transmission Use of System Agreement** or **Grid Code Compliance Agreement** as the case may be shall require **Users** to comply with the terms of the **Connection Conditions** and the **TSO** may prevent the connection of a **User**'s installation to the **Distribution System** unless and until it is satisfied that the relevant criteria laid down by the **Connection Conditions** have, subject to any derogations issued by the **Authority**, been met.

CC1.3 The provisions of the **Connection Conditions** shall apply to all connections to the **Transmission System**:

(a) existing at 31 March 1992; and

(b) established or modified thereafter.

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CC1.4 The TSO shall be notified by **Users** whose **Plant** and **Apparatus** is connected to the **Transmission System** and by **Generators** with respect to **CDGUs** and **Controllable PPMs** connected to the **Distribution System** of any planned modification of the technical capabilities the **Generating Unit** which may affect its compliance with these **Connection Conditions**, before initiating that modification.

CC1.5 The **Connection Conditions** are structured such that certain provisions are dealt with in the Schedules to these **Connection Conditions**, with separate schedules for different types of **Plant**.

CC1.6 As explained in the Glossary and Definitions section, references to the term "**User System**" shall be read as referring to the **Distribution System** with respect to provisions applicable to the **DNO**.

CC2 OBJECTIVES

CC2.1 The **Connection Conditions** are designed to ensure that:

(a) no new or modified connection will impose unacceptable effects on the **Transmission System,** on any **User System** or on the **Other Transmission System** nor will it be subject itself to unacceptable effects by its connection to the **Transmission System**;

(b) the basic rules for connection treat all **Users** of an equivalent category in a non-discriminatory fashion, in accordance with the **TSO's** statutory and **Licence** obligations; and

(c) to enable the **TSO** to comply with its **Licence** and statutory obligations.

CC3 SCOPE

CC3.1 The **Connection Conditions** apply to the **TSO** and to **Users** which, in the **Connection Conditions**, means:

(a) **Generators** with respect to **Generating Units** connected to or seeking a connection to the **Transmission System** and with respect to **CDGUs** and **Controllable PPMs** connected to or seeking a connection to the **Distribution System**;
(b) **Large Demand Customers**;
(c) **Interconnector Owners**;
(d) **Aggregators**;
(e) the **DNO**; and
(f) the **TO** in relation to CC10.1.3, CC10.2.2 and CC10.3.

CC3.2 The only provisions relevant to **Generators** connected to the **Distribution System** in the **CCs** are CC11, Part II of Schedules 1 and 2 and Appendix 3.

CC3.3 Persons other than the **DNO** whose prospective activities would place them in any of the above categories of **User** will, either pursuant to a **Licence** or as a result of the

application procedures for a **Connection Agreement** or **Transmission Use of System Agreement** or pursuant to a **Grid Code Compliance Agreement**, become bound by the CC prior to their generating or consuming, as the case may be, and references to the various categories (or to the general category) of **User** should, therefore, be taken as referring to them in that prospective role as well as to **Users** actually connected.

CC4 CONNECTION PRINCIPLES

CC4.1 The design of connections between the **Transmission System** and **Users' Systems** shall be in accordance with the **Licence Standards**.

CC4.2 The **TSO** will determine the point, including the voltage, at which each **User** other than the **DNO** may be connected to the **Transmission System**.

CC4.3 The **User's Plant** and **Apparatus** shall comply with the principles outlined in Regulation 28 of the Electricity Supply Regulations (N.I.) 1991 and Regulations 4-12 and 15 of the Electricity at Work Regulations (N.I.) 1991 or any amendments to or re-statements of those provisions.

CC5 SUPPLY STANDARDS

CC5.1 The **Frequency** of the **NI System**, and the voltage and harmonic design criteria of the Transmission System are set out in CC5.3 to CC5.5.

CC5.2 Each **User** shall ensure that its **Plant** and **Apparatus** at **Connection Points** is capable of operating under any variation in the **System Frequency** and voltage as set out in CC5.3 to CC5.5.

CC5.3 **Frequency** Variations

CC5.3.1 The **Frequency** of the **NI System** shall be nominally 50 Hz and shall normally be controlled within the limits of 49.5 Hz to 50.5 Hz and in accordance with the Electricity Supply Regulations (N.I.) 1991.

CC5.3.2 In exceptional circumstances, **System Frequency** could rise to 52 Hz or fall to 47 Hz but sustained operation outside the range specified in the Electricity Supply Regulations (N.I.) 1991 (as amended, updated or superseded) is not envisaged. **Users** should take these factors into account in the design of **Plant** and **Apparatus**.

CC5.3.3(i) In exceptional circumstances, **System Frequency** could vary causing a considerable **Rate of Change of Frequency**. Under such conditions, **Users** must ensure that their **Plant** and **Apparatus** remains synchronised to the **NI System** for a **Rate of Change of Frequency** up to and including 1 Hz per second as measured over a rolling 500 milliseconds period within the frequency range mentioned in CC5.3.2. For the avoidance of doubt, this requirement relates to the capabilities of **Generating Units** only and does not impose the need for **Rate of Change of Frequency** protection nor does it impose a specific setting for anti-islanding or loss-of-mains protection relays. **Voltage** dips may cause localised **Rate of Change of Frequency** values in excess of 1 Hz per second for short periods, and in these cases, the relevant condition for each type of generation contained in the schedule of these **Connection Conditions** supersedes

	this CC5.3.3(i) (the relevant conditions being: CC.S1.1.5.6 for any **User** other than a **PPM** connected to the **Transmission System**; CC.S2.1.3.9 or a **PPM** connected to the **Transmission System**; CC.S2.2.3.3 for a **PPM** connected to the **Distribution System** and CC.S1.2.4.4 for any **User** other than a **PPM** connected to the **Distribution System**.)
○	
CC5.3.3(ii)	In exceptional circumstances, **System Frequency** could vary causing a considerable **Rate of Change of Frequency**. Under such conditions, **Users** must ensure that their **Plant** and **Apparatus** remains synchronised to the **NI System** for a **Rate of Change of Frequency** up to and including 1 Hz per second as measured over a rolling 500 milliseconds period within the frequency range mentioned in CC5.3.2. For the avoidance of doubt, this requirement relates to the capabilities of **Generating Units** only and does not impose the need for **Rate of Change of Frequency** protection nor does it impose a specific setting for anti-islanding or loss-of-mains protection relays. **Voltage** dips may cause localised **Rate of Change of Frequency** values in excess of 1 Hz per second for short periods, and in these cases, the relevant condition for each type of generation contained in the schedule of these **Connection Conditions** supersedes this CC5.3.3(ii) (the relevant conditions being: CC.S1.1.5.6 for any **User** other than a **PPM** connected to the **Transmission System**; CC.S2.1.4 or a **PPM** connected to the **Transmission System**; CC.S2.2.3.4 for a **PPM** connected to the **Distribution System** and CC.S1.2.4.4 for any **User** other than a **PPM** connected to the **Distribution System**.)

CC5.4 Voltage Variations

CC5.4.1 The voltage variation on the **Transmission System** shall comply with the Electricity Supply Regulations (N.I.) 1991 (as amended, updated or superseded), that is, will normally remain within the limits ± 10% of the nominal value or as otherwise agreed.

CC5.4.2 The design criteria in respect of voltage fluctuations and unbalance shall be in accordance with the **Licence Standards**.

CC5.4.3 Under fault and circuit switching conditions the rated **Frequency** component of voltage may fall or rise transiently. The fall and rise in voltage will be affected by the method of **Earthing** of the respective system voltage neutral point.

CC5.4.4 Each connection to the **Transmission System** must not adversely affect the method of voltage control employed by the **TSO.** Information on the voltage regulation and control arrangements will be made available by the **TSO** on request by the **User**.

CC5.5 Harmonic Content

The design criteria in respect of harmonic distortion shall be in accordance with the **Licence Standards**.

CC5.6 Phase Unbalance

The design criteria in respect of phase unbalance shall be in accordance with the **Licence Standards**.

CC6 TECHNICAL CRITERIA:

CC6.1 **Plant** and **Apparatus** at the **Connection Point**

At the **Connection Point**, all **Users' Plant** and **Apparatus** shall meet the following technical design and operational criteria. Detailed information relating to a particular connection will, where indicated below, be made available by the **TSO** on request by the **User**.

CC6.2 **Plant** and **Apparatus**

CC6.2.1 (a) The **TSO** shall ensure in respect of the **TO's** equipment, and **Users** shall ensure in respect of their own equipment, that subject as provided in (b) below, the principles of design, manufacture, installation and testing of overhead lines, underground cables and other **Plant** and **Apparatus** designed after 31 March 1992 shall conform to (and such equipment shall comply with) all applicable statutory obligations and the applicable requirements of the following standards, each as current at the date of design of such **Plant** and **Apparatus**, which shall apply (to the extent of any inconsistency) in the following order of precedence:

(i) relevant European Technical and Quality Assurance Standards or European Specification;

(ii) relevant IEC Publications or other international standards; and

(iii) relevant British Standards or other equivalent national standard.

(b) In the case of **Plant** or **Apparatus**:

(i) designed prior to 31 March 1992 and in use or awaiting re-use at such date (or about to be used at such date); and

(ii) designed after 31 March 1992 and subsequently re-used;

the applicable standards under (a) above shall be those which were current at the date when the **Plant** or **Apparatus** was originally designed, provided that the **TSO** reasonably considers the **Plant** and/or **Apparatus** to be fit for its purpose having full regard to the respective obligations of the **TSO** and the relevant **User**, and otherwise shall be those current at the date of re-use.

CC6.2.2 The short circuit rating and insulation level of a **User**'s **Plant** and **Apparatus** at the relevant **Connection Point** shall not be less than that specified in the relevant **Connection Agreement**.

CC6.2.3 The **TSO** shall ensure in respect of the **TO**'s **Plant** and **Apparatus** at the **Connection Point** and a **User** shall ensure in respect of its **Plant** and **Apparatus** at the **Connection**

Point that the specifications shall be such as to permit operation within the applicable **Local Safety Instructions**.

CC6.3 **Metering**

CC6.3.1 The requirements to be met by each **User** in respect of metering equipment are set out in the **Metering Code** and, with respect to **Generators** whose **CDGUs** or **Controllable PPMs** are connected to the **Distribution System**, the **Distribution Code Metering Code**.

CC6.4 **Protection**

CC6.4.1 All **User Systems** and the **Transmission System** must incorporate **Protection** in accordance with the requirements of the Electricity Supply Regulations (N.I.) 1991 as amended or re-stated.

CC6.4.2 The basic requirement in all cases is that **Users'** arrangements for **Protection** at the **Connection Point**, including types of equipment and **Protection** settings must be compatible with standard practices on the **Transmission System** from time to time, whilst maintaining necessary discrimination and coordination. Relevant details of the application of these requirements to a particular connection will be made available to the **User** upon request pursuant to CC6.1.

In particular:

(a) maximum fault clearance times (from fault inception to arc extinction) must be within the limits established by the **TSO** in accordance with the **Protection** and equipment short circuit rating policy adopted by the **TSO** from time to time for the **Transmission System**;

(b) auto reclosing or sequential switching features may need to be used on the **Transmission System**. If needed to be used on the **Transmission System**, the **TSO** will on request provide details of the auto-reclose or sequential switching features.

CC6.4.3 With respect to **Users** other than the **DNO**, during the course of an application for a **Connection Agreement** the **TSO** shall specify the **Protection** standards applicable to the **Transmission System** and agree with the **User** (or, in the event that agreement cannot be reached, the **TSO** will determine acting reasonably) any conditions for compatibility with the **TO Protection** arrangements which shall be complied with by the **User**.

In particular:

(a) in order to ensure satisfactory operation of the **TO System, Protection** systems, operating times, discrimination and sensitivity at the **Connection Point** shall be agreed between the **TSO** and the **User** (or, in the event that agreement cannot be reached, shall be determined by the **TSO**) and may be reviewed from time to time by the **TSO**. If, as a consequence of such review, the **TSO** identifies a requirement for some variation to such **Protection** arrangements, the relevant provisions of the **Connection Agreement** shall apply;

(b) in order to cover a circuit breaker or equipment having a similar function failing to operate correctly to interrupt fault current on a **High Voltage System**, back-up **Protection** by operation of other circuit breakers or equipment having a similar function must normally be provided by the **User**. The **TSO** will inform the **User** if it is not required. If the back-up circuit breaker is owned by the **TO**, it may be equipped with **Protection** that is limited to that required to provide excess **Energy Protection** to the **Transmission System**; and

(c) unless the **TSO** specifies otherwise, it is not acceptable for **Users** to limit the fault current infeed to the **Transmission System** by the use of **Protection** and associated equipment if the failure of the **Protection** and associated equipment to operate as intended in the occurrence of a fault could cause equipment owned by the **TO** to operate outside its short-circuit rating.

Certain provisions on working on certain **Protection** equipment are included in CC9.

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CC6.4.4 **Generating Units** shall fulfil the following protection system management requirements:

(a) with regard to control schemes and settings:

(i) the schemes and settings of the different control devices of the **Generating Unit** that are necessary for transmission system stability and for taking emergency action shall be coordinated and agreed between the **TSO**, **DNO** and **Generator**;

(ii) any changes to the schemes and settings, mentioned in (i), of the different control devices of the Generating Unit shall be coordinated and agreed between the TSO, DNO and Generator, in particular if they apply in the circumstances referred to in point (i);

(b) with regard to electrical protection schemes and settings:

(i) the **TSO** shall specify the schemes and settings necessary to protect the network, taking into account the characteristics of the **Generating Unit**. The protection schemes for the **Generating Unit** and the network as well as the settings relevant to the **Generating Unit** shall coordinated and agreed between the **TSO** and the **Generator**. The protection schemes and settings for internal electrical faults must not jeopardise the performance of a **Generating Unit**, in line with the requirements set out in this CC6.4.4;

(ii) electrical protection of the Generating Unit shall take precedence over operational controls, taking into account the security of the system and health and safety of staff and of the public, as well as mitigating any damage to the Generating Unit;

(iii) protection schemes may cover the following aspects;

- external and internal short circuit,
- asymmetric load (negative phase sequence),
- stator and rotor overload,
- over/underexcitation,
- over/undervoltage at the connection point,
- over/undervoltage at the terminals,
- inter-area oscillations,
- inrush current,
- asynchronous operation (pole slip),
- protection against inadmissible shaft torsions (for example, subsynchronous resonance),
- **Generating Unit** line protection,
- unit transformer protection,
- back-up against protection and switchgear malfunction,
- circuit breaker fail,
- overfluxing,
- inverse power,
- rate of change of frequency, and
- neutral voltage displacement.

(iv) changes to the protection schemes needed for the **Generating Unit** and the network and to the setting relevant to the **Generating Unit** shall be agreed between the **TSO** and the **Generator**, and agreement shall be reached before any changes are made;

(c) the **Generator** shall organise its protection and control devices in accordance with the following priority ranking (from highest to lowest):

(i) network and **Generating Unit** protection;

(ii) synthetic inertia, if applicable;

(iii) frequency control (active power adjustment);

(iv) power restriction; and

(v) power gradient constraint;

(d) with regard to information exchange:

(i) **Generating Units** shall be capable of exchanging information with the **TSO** in real time or periodically with time stamping, as specified by the **TSO**;

(ii) the **TSO** shall specify the content of information exchanges including a precise list of data to be provided by the **Generator**.

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CC6.4.5 With regard to loss of angular stability or loss of control, a **Generating Unit** shall be capable of disconnecting automatically from the network in order to help preserve system security or to prevent damage to the **Generating Unit.** The **Generator** and the **DNO** in coordination with the **TSO** shall agree on the criteria for detecting loss of angular stability or loss of control

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CC6.4.6 With regard to the installation of devices for system operation and devices for system security, if the **TSO** considers that it is necessary to install additional devices at the **Generators Generating Plant** in order to preserve or restore system operation or security, the **TSO** and the **Generator** shall investigate the matter and agree on an appropriate solution.

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CC6.4.7 Earthing arrangement of the neutral-point at the network side step-up transformers shall comply with the specifications of the **TSO**.

ll CC6.4.8	The **TSO** in accordance with the relevant **Connection Agreement** shall specify the schemes and settings necessary to protect the **Transmission System**, taking into account the characteristics of the **HVDC Converter Stations** and any conditions for compatibility with the **TO Protection** arrangements. The protection schemes needed for the **HVDC Converter Stations** and the **Transmission System** as well as the settings relevant to the **HVDC Converter Stations** shall be coordinated and agreed between the **TSO** and the **HVDC System** owner. The protection schemes and settings for internal electrical faults must not jeopardise the performance of an **HVDC Converter Station**.
CC6.4.9	Electrical protection of the **HVDC Converter Stations** shall take precedence over operational controls, taking into account the security of the system and the health and safety of staff and of the public, as well as mitigating any damage to the **HVDC Converter Stations**.
CC6.4.10	Changes to the protection schemes needed for the **HVDC Converter Station** and the **Transmission System** and to the settings relevant to the **HVDC Converter Station** shall be agreed between the **TSO** and the **HVDC System** owner prior to implementation.
CC6.4.11	For the electrical protection schemes and settings, undervoltage protection shall be set by the **HVDC System** to the widest possible technical capability of the **HVDC System**. The TSO may specify narrower settings pursuant to clauses CC6.4.8, CC6.4.9 and CC6.4.10. These narrower settings shall be in accordance with the requirements of the relevant **Connection Agreement**

CC6.5 **Intertripping**

In all circumstances where the **Isolation** of faults or **System** abnormalities is dependent upon the operation of both the **TO's** and the **User's** circuit breakers, **Intertripping** facilities shall be provided. These **Intertripping** facilities shall be in accordance with the requirements of the relevant **Connection Agreement**.

CC6.6 Automatic Reclosure

With respect to **Users** other than the **DNO**, where automatic reclosure of the **TO** circuit breakers is required following faults on the **User's System**, automatic switching equipment shall be provided in accordance with the requirements of the relevant **Connection Agreement**.

CC6.7 Voltage Fluctuations and Unbalance and Harmonic Distortion

With respect to **Users** other than the **DNO**, the design criteria to be applied to **Users' Loads** connected to the **Transmission System** to limit voltage fluctuations and unbalance and harmonic distortion will be notified to the **User** in the course of an application for connection to the **Transmission System** and will be in accordance with the **Licence Standards**. In the event that a **User** causes any such limits to be breached, the **TSO** shall be entitled to require the **User** to take such steps as the **TSO** reasonably considers to be necessary in order to prevent such breach from continuing and the **User** shall comply with the **TSO's** instructions without delay.

CC6.8 Neutral **Earthing**

CC6.8.1 The specification of a **User's Apparatus** shall meet the voltages which will be imposed on the **Apparatus** as a result of the method of **Earthing** of the **Transmission System** as specified in the relevant **Connection Agreement**.

CC6.8.2 The higher voltage windings of each transformer of a **User** connected to the **Transmission System** shall be star connected with the star point earthed. If the earth electrode system to which the **User's** star point is earthed is not independent from the earth electrode system of any **Substation** owned by the **TO**, it shall be connected to the earth electrode system of that **Substation**.

CC6.8.3 The **Earthing** of a **User's Apparatus** at the **Connection Point** must be in accordance with current **TO** practice which will be notified to the **User**, initially, during the course of an application for connection to the **Transmission System**. In the event that the **TO** wishes to change its current practice, the **TSO** will notify the **User** as soon as reasonably practicable in advance of the change and any modifications which such change will require to be undertaken on the **User's System** will be implemented in accordance with the modifications procedure set down in the **User's Connection Agreement** (for **Users** other than the **DNO**), if it is applicable.

CC6.8.4 **Users** shall take all reasonable precautions in relation to a particular **Connection Point** to limit the occurrence and effects of circulatory currents in respect of neutral points of any interconnected system (e.g. where there is more than one source of **Energy**).

CC6.9 **Automatic Load Shedding Devices**

CC6.9.1 A **User** (other than the **DNO**) connected to the **Transmission System** may be required by the **Connection Agreement** to be subject to arrangements for **Automatic Load Shedding** at selected **Connection Points**. One of the purposes of these facilities is to improve the overall security of supply by providing some measure of **Demand** relief to assist in preventing **NI System** collapse under emergency conditions involving low **System Frequency**. OC4 contains a section dealing with **Automatic Load Shedding**. The setting levels and demand block sizes for the relevant supply points shall be determined by the **TSO** and specified in the relevant **Connection Agreement**. Technical requirements relating to **Low Frequency Relays** are given in Appendix 3.

CC6.9.2 The **DNO** may be required to be subject to arrangements for **Automatic Load Shedding** at selected **Bulk Supply Points**. One of the purposes of these facilities is to improve the overall security of supply by providing some measure of **Demand** relief to assist in preventing **NI System** collapse under emergency conditions involving low **System Frequency**. OC4 contains a section dealing with **Automatic Load Shedding**. The setting levels and demand block sizes for the relevant supply points shall be determined by the **TSO** and specified in the relevant **Connection Agreement**. Technical requirements relating to **Low Frequency Relays** are given in Appendix 3.

CC6.10 Superimposed Signals

Where a **User** proposes to use mains borne signalling equipment to superimpose signals on the **Transmission System**, the prior written agreement of the **TSO** is required (which agreement will not be unreasonably withheld).

CC7 TECHNICAL CRITERIA:

Technical Criteria for **PPMs** and **Generating Units** other than those comprised within **PPMs**

CC7.1 The Schedules to these **Connection Conditions** contain certain technical requirements for **Users**, divided into type of **Plant** or **User** connection. Schedule 1 sets out technical criteria that **Generators** must comply with in respect of their **CCGT Modules**, **Steam Turbine Units** and **Gas Turbine Units**. Schedule 2 sets out technical criteria that **Generators** must comply with in respect of their **PPMs**.

CC7.2 The detail of such technical criteria for **WFPSs** and **PPMs** is in some cases as specified by the **TSO** from time to time in the **WFPS Settings Schedule** and **PPM Settings Schedule** published on the SONI website (or such other place or by such other means as may be notified to the **Generator** from time to time), for the reasons set out in the introduction to the **WFPS Settings Schedule** and **PPM Settings Schedule**. The version of the **WFPS Settings Schedule** and **PPM Settings Schedule** at any time current is therefore deemed to form part of the **Grid Code**. Changes to the **WFPS Settings Schedule and PPM Settings Schedule** shall be the subject of consultation undertaken by the **TSO** except to the extent that those changes do not alter the setting for a technical criterion specified in the **WFPS Settings Schedule** and **PPM Settings Schedule** so that it ceases to be within the range prescribed for that criterion in the **Grid Code Connection Conditions**.

CC7.3 The **Grid Code** and the **WFPS Settings Schedule** and **PPM Settings Schedule** set out technical criteria in relation to communications, control and telemetry that **Generators** must comply with in respect of their **WFPSs**.

CC8 TECHNICAL CRITERIA:

This CC8 shall not apply to the **DNO** with the exception CC8.8. As explained in CC11.1.1, references to the **Connection Agreement** in CC8 shall be read as references to a **Transmission Use of System Agreement** or a **Grid Code Compliance Agreement** where relevant.

CC8.1 Communications Equipment

Where required by the **TSO** in order to ensure control of the **NI System**, communications between **Users** and the **TSO** shall be established in accordance with the relevant **Connection Agreement**.

CC8.2 Primary Speech Facility

CC8.2.1 Equipment shall be provided for connection to the Corporate Control Telephone Network notified by the **TSO** by means of which routine and emergency control telephone calls may be established between each **User** and the **TSO**. Provision of this equipment shall be in accordance with the relevant **Connection Agreement**.

CC8.2.2 Connection to the Corporate Telephone Network notified by the **TSO** and any circuit or circuits required to connect the **User** with the point of connection shall be provided in accordance with the relevant **Connection Agreement**.

CC8.2.3 The **User** shall furnish the **TSO** with all relevant information associated with its connection to the Corporate Telephone Network notified by the **TSO** to enable the **TSO** to meet its obligations under the "Temporary Licence For The Electricity Association Member Companies To Run Certain Telecommunications Systems", issued by the Department of Trade and Industry and/or any other applicable requirements.

CC8.2.4 All equipment the **TSO** requires to be connected to the Corporate Control Telephone Network notified by the **TSO** shall be provided and maintained by the **TSO** at its own cost.

CC8.2.5 All equipment connected to the Corporate Telephone Network notified by the **TSO** shall be maintained by a Registered Maintainer as defined by Statutory Regulations administered by the British Standards Institute on behalf of the DTI.

CC8.3 **Facsimile Machine**

Each **Generator** with a **CDGU** or a **CCGT Installation** shall provide and maintain in full working order a facsimile machine at each **Power Station** Control Centre and each will notify the **TSO** of the telephone number. The **TSO** shall provide and maintain in full working order a facsimile machine at Castlereagh House Grid Control Centre and will notify each **Generator** of the number.

CC8.4 **Telemetry**

(a) In addition to the requirements of the **MC**, each **User** shall provide such voltage, current, **Frequency**, **Active** and **Reactive Power** measurements and status points and alarms and controls at the **TSO** telemetry outstation interface (if any) as required and specified by the **TSO** in the relevant **Connection Agreement**. The **TSO** shall provide, install and maintain the telemetry outstation. Each **User** shall be responsible for providing a secure AC power supply to the telemetry outstation.

(b) If it is agreed between the **TSO** and a **User** that the **TSO** will telecontrol the **User's** switchgear on the **User Site**, the **TSO** shall install the necessary telecontrol facilities. It shall be the responsibility of the **User** to provide the necessary control interface for the switchgear of the **User** which is to be controlled.

CC8.5 **Control Facility**

CC8.5.1 The **User's** contact locations and personnel shall be notified by the **User** to the **TSO** prior to connection and thereafter updated as appropriate.

CC.8.5.2 A **User** in relation to a **CDGU,** a **Demand Side Unit, Aggregated Generating Units** and/or an **Interconnector** is required to provide a continually manned **Control Facility**. For the avoidance of doubt, the **Control Facility** for **Aggregated Generating Units** and **Aggregated Demand Sites** is to be provided by the relevant **Aggregator**.

CC.8.5.3 The **Control Facility** shall be staffed by a **Responsible Operator**(s) who shall respond to communications from the **TSO** without undue delay (except where otherwise provided for by agreement between the **User** and the **TSO**, such agreement

not to be unreasonably withheld) and are of suitable experience and training and are authorised to perform the following functions:

(a) to accept and execute **Dispatch Instructions**;

(b) to receive and acknowledge receipt of requests, for amongst other matters, operation outside the Declared values of **Availability**, **System Support Service** capability, or operation of the **CDGU**, **Demand Side Unit**, **Aggregated Generating Units** and/or **Interconnector** during **System Emergency Conditions**.

CC.8.5.4 At any point in time, a single person shall be designated by the **User** and notified to the **TSO** as the **Responsible Manager**. The **Responsible Manager** shall be responsible for dealing with the **TSO** on matters relating to the **Grid Code**. In the event that the **Responsible Manager** is not a person on duty at the **Control Facility**, then the **Responsible Manager** must be capable of being contacted from the **Control Facility** at all times, and in the event that the **TSO** issues a request to the **Control Facility** requiring the **Responsible Manager** to contact the **TSO Control Centre**, the **Responsible Manager** shall comply with the request without undue delay and in any case within 15 minutes of the request. For the avoidance of doubt, in the case of an **Interconnector**, the **Interconnector Owner** is the **Responsible Manager**.

CC8.5.5 The **Responsible Manager** shall be authorised by the **User** to perform the following functions on behalf of the **CDGU**, **Demand Side Unit**, **Aggregated Generating Units** and/or **Interconnector**:

(a) to make **Declarations** for the **CDGU**, **Demand Side Unit**, **Aggregated Generating Units** and/or **Interconnector**;

(b) to communicate with respect to issues regarding **Outages** of the **CDGU**, **Demand Side Unit**, **Aggregated Generating Units** and/or **Interconnector.**

CC8.5.6 The **User** may, from time to time, notify a replacement contact location and personnel which meets the foregoing requirements.

CC8.5.7 Unless otherwise agreed with the **TSO,** each **Individual Demand Site** comprising a **Demand Side Unit** shall have a **Responsible Operator** that must be capable of being contacted from the **Control Facility** of the **Demand Side Unit Operator** at all times and is capable of being at the **Individual Demand Site** within 1 hour of request to respond to any query or issue from the **Responsible Operator** at the **Control Facility** of the **Demand Side Unit Operator.**

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CC8.5.8 A **User** who is **a Generator** with a capacity between 5 and 10 **MW** and is not a **CDGU** which has lost automatic control will be given notice by the **TSO** and must take manual intervention to return the **Generator** to the required set point in a time period no greater than 1 hour. Best endeavours shall be made to resolve the loss of automatic remote control in as quick a timeframe as possible.

CC8.6 **Electronic Interface Facilities**

Users shall ensure that accommodation is provided for **Electronic Interface** facilities.

CC8.7 **Telecontrol Connection** Standards

All communication connections between each **User** and the **TSO** shall conform to:

(a) appropriate CCITT standards and other standards required by licensed public telephone operators; and/or

(b) appropriate standards for radio systems as required by the Radio communications Agency from time to time.

In respect of (b) above, each **User** shall, except to the extent that an alternative means of communication has been agreed with the **TSO** in a **Connection Agreement**, provide where required by the **TSO** facilities on which a small radio aerial can be mounted and shall obtain where necessary any planning permissions required therefor.

CC8.8 Obligations on the **DNO**

CC8.8.1 When entering into a connection agreement with a **User** in respect of a **Controllable PPM** which is or is to be connected to the **Distribution System** or in respect of a **Generating Unit** which is to be subject to **Central Dispatch** and which is or is to be connected to the **Distribution System**, the **DNO** shall install, at the time the physical connection is established, and following a request by the **TSO** the relevant equipment contained in an **Event Recorder** (whose data can be retrieved remotely via a communications network for analysis), to enable the **TSO** to carry out its **Monitoring**, **Testing** and **Investigation** rights and obligations under OC11. This paragraph shall not apply with respect to **Generating Units** that form part of an **Aggregated Generating Unit**.

CC8.8.2 Where the **DNO** is required to install the relevant equipment contained in an **Event Recorder** under CC8.8.1, the **DNO** shall also provide the **TSO** with the means to retrieve remotely the data collected by such equipment.

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CC8.8.3 With regard to instrumentation:

(a) **Generating Units** shall be equipped with an **Event Recorder** to provide fault recording and monitoring of dynamic system behaviour. The **TSO** shall have the right to specify quality of supply parameters including harmonic recording accuracy class to be complied within a reasonable prior notice period. The **Event Recorder** shall record the following parameters:

- voltage,
- active power,

– reactive power,

frequency, and

– harmonics

(b) the settings of the **Event Recorder**, including triggering criteria and the sampling rates shall be agreed between the **Generator** and the **TSO** in coordination with the **DNO**,

(c) the **Event Recorder** shall include an oscillation trigger specified by the **TSO** in coordination with the **DNO**, with the purpose of detecting poorly damped oscillations,

(d) the **Event Recorder** shall include arrangements for the **Generator**, the **TSO** and **DNO** to access information. The communications protocols for recorded data shall be agreed between the **Generator**, the **TSO** and **DNO**,

(e) the facilities for the **Event Recorder** shall include arrangements for the **Generator**, the **TSO** and **DNO** to access information. The communications protocols for recorded data shall be agreed between the **Generator**, the **TSO** and **DNO**.

CC8.8.4 Variations in **System Frequency**

CC8.8.4.1 The **DNO** shall provide in the **Distribution Code** that, apart from those circumstances set out in CC8.8.4, all **Independent Generating Plant** connected to the **Distribution System** with an **Output** of 100 kW or more shall stay connected and operate:

(a) continuously where the **System Frequency** varies within the range 49.5 to 52.0 Hz;
(b) for a period of up to one hour where the **System Frequency** varies within the range 48.0 to 49.5 Hz; and
(c) for a period of up to 5 minutes where the **System Frequency** varies within the range 47.0 to 48.0 Hz.

The **DNO** shall notify the **TSO** if an **Independent Generating Plant** above 100KW does not operate within the parameters set out above and, if required by the **TSO,** shall use reasonable endeavours to enforce the **Distribution Code** obligations on the **Independent Generating Plant**.

CC8.8.4.2 On or after 27th April 2019 the **DNO** shall provide in the **Distribution Code** that, all **Independent Generating Plant** connected to the **Distribution System** shall stay connected and operate in accordance with the requirements of NIE Networks Engineering Recommendation G98/NI, Engineering Recommendation G99/NI and the **PPM Setting Schedule**, each as applicable and as amended, supplemented, varied or replaced from time to time and with all other relevant Engineering Recommendations and relevant regulations and the particular requirements of the **DNO** which will take account of the conditions prevailing on the **Distribution System** at the **Connection Point** at the relevant time.

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CC8.8.5 The requirements of CC8.8.4.1 do not apply where:

(a) the islanding protection has operated correctly, consistent with the settings agreed with the **DNO**;
(b) there is manual intervention by the **Generator**.

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CC8.8.6 **System Frequency Variations**

CC8.8.6.1 All **CDGUs** and **Controllable PPMs** shall be capable of staying connected to the **System** and remaining operable within the frequency ranges and time periods specified in the table below

Frequency Range (Hz)	Time Period for Operation (s)
47.0 – 47.5 Hz	20 seconds
47.5 – 48.5 Hz	90 minutes
48.5 – 49.0 Hz	90 minutes
49.0 – 51.0 Hz	Unlimited
51.0 – 51.5 Hz	90 minutes
51.5 – 52 Hz	60 minutes

CC8.8.6.2 A **Generator** shall not unreasonably withhold consent to apply wider frequency ranges or longer minimum times for operation taking account of their economic and technical feasibility.

CC8.8.6.3 The **Generator** in coordination with the **TSO** may agree on wider frequency ranges, longer minimum operating times for operation or specific requirements for combined

frequency and voltage deviations to ensure the best use of the technical capabilities of the **Generating Unit (s)** if required to preserve or restore system security.

CC8.8.6.4 The **Generator** shall be capable of maintaining constant output at its target active power value regardless of changes in frequency, except where output follows the changes specified in the context of CC8.8.7.1 and CC8.8.7.4.

CC8.8.7 **Frequency** Response

All **CDGUs** and **Controllable PPMs** must be capable of providing **Frequency** response under the following **Frequency** response operating modes in accordance with CC8.8.7.1 to CC8.8.7.4.

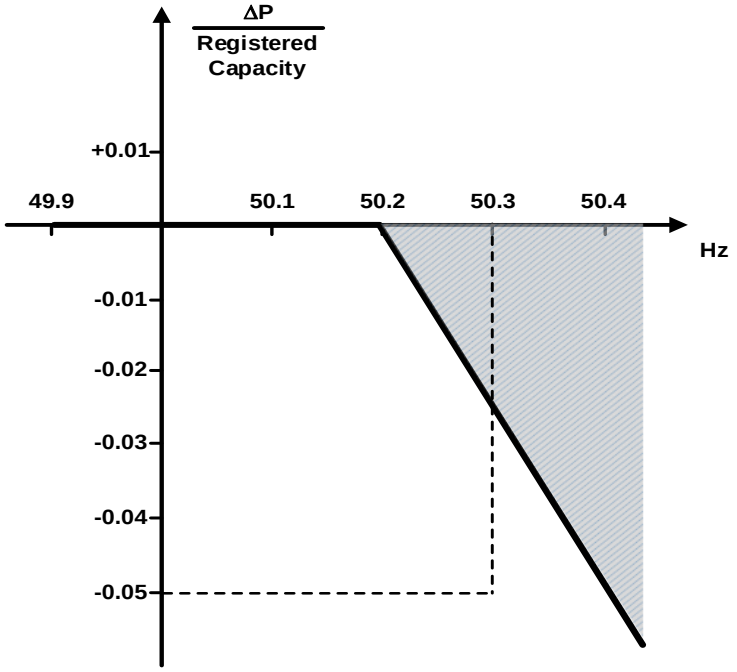
CC8.8.7.1 **Limited Frequency Sensitive Mode – Overfrequency (LFSM-O)**

If **NI System Frequency** rises to or above 50.2 Hz, each **Generator** at its **Generating Plant** will be required to ensure that each of its **CDGUs** and **Controllable PPMs** has the capability to contribute to containing and correcting the high **System Frequency.** This capability shall be in accordance with;

(a) The default rate of change of **Active Power** output must be at a rate of 5 percent of output per 0.1 Hz deviation of **System Frequency** above 50.2 Hz (i.e. a **Droop** of 4%) as shown in the **Frequency** response characteristic below. Each **Generator** at its **Generating Plant** will be required to ensure that each of its **CDGUs** and **Controllable PPMs** proportional governor should be equipped with controls which allow the droop to be set independently in the range 2% to 12% above 50.2 Hz,

(b) The reduction in **Active Power** output must be continuously and linearly proportional, as far as is practicable, to the excess of **Frequency** above 50.2 Hz and must be provided increasingly with time,

(c) Each **CDGUs** and **Controllable PPM** shall be capable of initiating a power **Frequency** response with an initial delay that is as short as possible. If the delay exceeds 2 seconds the **Generator** shall justify the variation, providing technical evidence to the **TSO**.



(d) Each **Generator** at its **Generating Plant** will be required to ensure that each of its **CDGUs** and **Controllable PPMs** which is providing **LFSM-O** must continue to provide it until the **Frequency** has returned to or below 50.2 Hz or until otherwise instructed by the **TSO**.

(e) Each **Generator** at its **Generating Plant** will be required to ensure that each of its **CDGUs** and **Controllable PPMs** which is providing **LFSM-O** shall be capable of operating stably during **LFSM-O** operation. When **LFSM-O** is active, the **LFSM-O** setpoint will prevail over any other **Active Power** setpoints.

(f) If **CDGUs** or **Controllable PPMs** are operating at **Minimum Generation** they should continue to operate at **Minimum Generation** with no further decrease in **Active Power** output.

(g) All reasonable efforts should in the event be made by the **Generator** to avoid such tripping provided that the **System Frequency** is below 52 Hz in accordance with the requirements of CC8.8.6.1. If the **System Frequency** is at or above 52 Hz, the requirement to make all reasonable efforts to avoid tripping does not apply and the **Generator** is required to take action to protect its **Plant** and **Apparatus.**

CC8.8.7.2 **Limited Frequency Sensitive Mode – Underfrequency (LFSM-U)**

Each **Generator** at its **Generating Plant** will be required to ensure that each of its **CDGUs** and **Controllable PPMs** operating in **Limited Frequency Sensitive Mode** shall be capable of increasing **Active Power** output in response to **System Frequency** when this falls below 49.5 Hz. This capability shall be in accordance with;

(a) The default rate of change of **Active Power** output must be at a rate of 5 percent of output per 0.1 Hz deviation of **System Frequency** below 49.5 Hz (i.e. a **Droop** of 4%) as shown in the **Frequency** response characteristic below. Each **Generator** at its **Generating Plant** will be required to ensure that each of its **CDGUs** and **Controllable PPMs** proportional governor should be equipped with controls which allow the droop to be set independently in the range 2% to 12% with a default setting of 4%,

(b) The actual delivery of **Active Power Frequency** Response in **LFSM-U** mode shall take into account;

(i) the ambient conditions when the response is to be triggered,

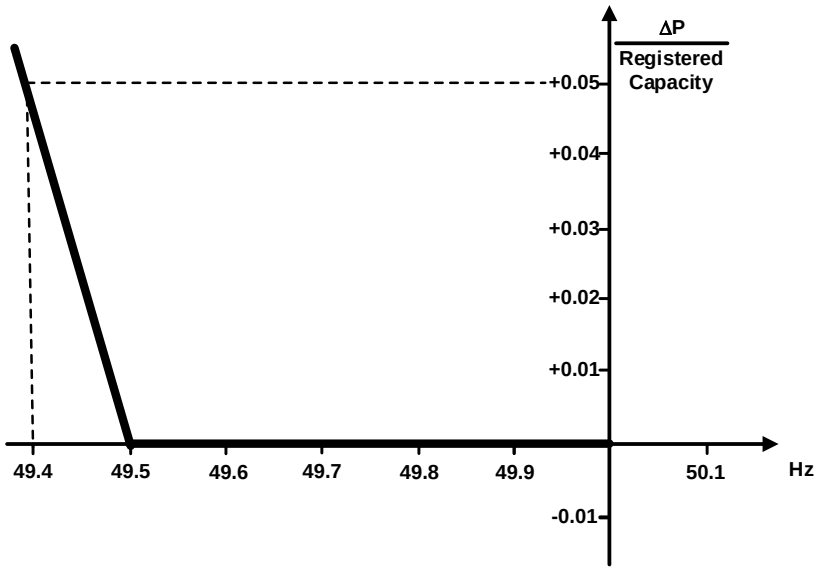
(ii) the operating conditions of the **CDGUs** and/or **Controllable PPM** in particular limitations on operation near **Registered Capacity** at low frequencies and the respective impact of ambient conditions as detailed in CC8.8.7.4,

(iii) the availability of primary energy sources.

(c) The activation of Active Power frequency response by each **CDGU** and **Controllable PPM** shall not be unduly delayed. In the event of any delay greater than 2 seconds the **Generator** shall justify it to the **TSO**.

(d) In **LFSM_U Mode**, **CDGUs** and **Controllable PPMs** shall be capable of providing a power increase up to its **Registered Capacity**,

(e) stable operation of each **CDGU** and **Controllable PPM** during **LFSM-U** shall be ensured.



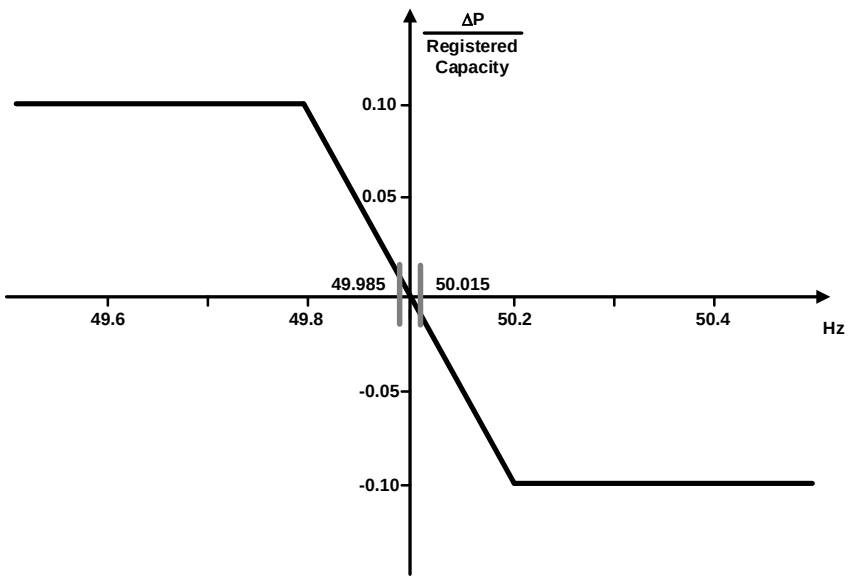
CC8.8.7.3 **Frequency Sensitive Mode – (FSM)**

In addition to the requirements of CC8.8.6.1 and CC8.8.6.2 each **Generator** at its **Generating Plant** will be required to ensure that each of its **CDGUs** and **Controllable PPMs** must be fitted with a fast acting proportional **Frequency** control device (or turbine speed governor) and unit load controller or equivalent control device to provide **Frequency** response under normal operational conditions in accordance with CC5.3.

CC8.8.7.3.1 The **Frequency** control device (or speed governor) in co-ordination with other control devices must control each **CDGUs** and/or **Controllable PPMs Active Power** output with stability over the entire operating range of the **CDGUs** and/or **Controllable PPMs**; and

CC8.8.7.3.2 **CDGUs** and **Controllable PPMs** shall also meet the following minimum requirements:

(i) **Frequency** control devices (or speed governors) must be capable of providing **Active Power Frequency** response with a nominal droop characteristic of 4%. in accordance with the performance characteristic shown below



Frequency control devices (or speed governors) must be capable of operating to the parameters for **Active Power Frequency** response in **Frequency Sensitive Mode** as shown in the table below.

Parameter	Setting
Nominal **System Frequency**	50 Hz
Frequency Response Insensitivity in mHz ($\|\Delta f_i\|$)	±15m Hz

Frequency Response Insensitivity as a percentage of nominal frequency ($\frac{\lvert\Delta f_1\rvert}{f_n}$)	±0.03 %
Frequency Response Deadband in mHz	±15m Hz
Droop (%)	4 %

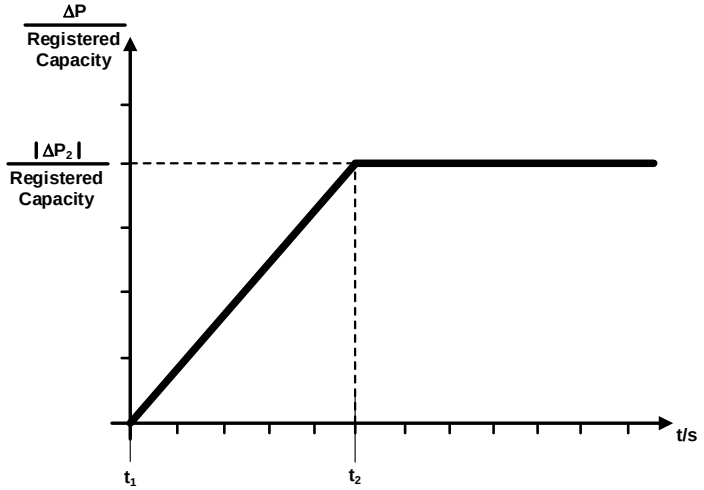
(ii) In satisfying the performance requirements specified in CC8.8.7.3.2 (i), **Generators** and their **Generating Plant** should be aware:-

- in the case of overfrequency, the **Active Power Frequency** response is limited by the **Minimum Generation** ,
- in the case of underfrequency, the **Active Power Frequency** response is limited by the **Registered Capacity**,
- the actual delivery of **Active Power** frequency response depends on the operating and ambient conditions of the **CDGUs** and/or **Controllable PPMs** when this response is triggered, in particular limitations on operation near **Registered Capacity** at low **Frequencies** as specified in CC8.8.7.4 and available primary energy sources.

Each **Generator** at its **Generating Plant** will be required to ensure that each of its **CDGUs** and **Controllable PPMs** proportional governor should be equipped with controls which allow the droop to be set independently in the range 2% to 12%. The frequency control device (or speed governor) must also be capable of being set so that it operates with an overall default speed **Droop** of 4%. The **Frequency Response Deadband** and **Droop** must be able to be reselected repeatedly.

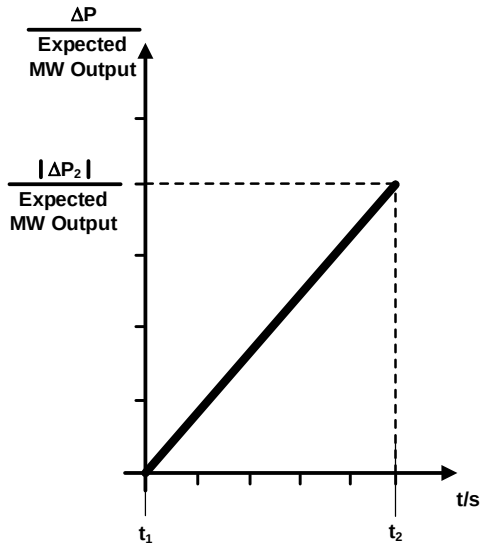
CC8.8.7.3.3 **Frequency** Step Change

(i) In the event of a **Frequency** step change, each **CDGU** shall be capable of activating full and stable **Active Power Frequency** response (without undue power oscillations), in accordance with the performance characteristic and parameters shown below.



Parameter	Setting
Active Power as a percentage of **Registered Capacity** ($\frac{\lvert\Delta P_2\rvert}{\text{Registered Capacity}}$)	10%
Maximum admissible initial delay t_1	0 seconds
Activation time t_2	5 seconds

(ii) In the event of a **Frequency** step change, each **Controllable PPM** shall be capable of activating full and stable **Active Power Frequency** response (without undue power oscillations), in accordance with the performance characteristic and parameters shown below and detailed in the **PPM Setting Schedule.**



Parameter	Setting
Active Power as a percentage of expected **MW** output based on droop characteristic ($\frac{\lvert\Delta P_2\rvert}{\text{Expected MW Output}}$)	60%
Maximum admissible initial delay t_1	0 seconds
Activation time t_2	5 seconds

(iii) For each **CDGU** and **Controllable PPM,** the initial activation of **Active Power Primary Frequency** response is 0 seconds and shall not be unduly delayed. If the **Generator** cannot meet this requirement they shall provide

technical evidence to **TSO** demonstrating why a longer time is needed for the initial activation of **Active Power Frequency** response.

(iv) Each **CDGU** and **Controllable PPM** shall be capable of providing full **Active Power** frequency response for a period of 20 minutes.

(v) With regard to CC8.8.7.3.3 (iv), Active Power control must not have any adverse impact on the **Active Power** frequency response of **Generating Units**.

(vi) With regard to frequency restoration control, **CDGUs** and **Controllable PPMs** shall provide functionalities complying with specifications specified by the **TSO**, aimed at restoring **Frequency** to its nominal value or maintaining power flows between control areas at their scheduled values.

(vii) With regard to disconnection due to underfrequency, **Generating Units** capable of acting as load, including hydro pump-storage power-generating facilities, shall be capable of disconnecting their load in case of underfrequency. The requirement referred to in this point does not extend to auxiliary supply.

CC8.8.7.3.4 With regard to real time monitoring of **FSM:**

(a) to monitor the operation of active power frequency response, the communication interface shall be equipped to transfer in real time and in a secured manner from the **Generating Unit** to the **TSO Control Centre**, at least the following signals:

- Status signal of FSM (on/off),
- scheduled active power output,
- actual value of the active power output,
- actual parameter settings for active power frequency response,
- droop and deadband;

(b) the **TSO** shall specify additional signals to be provided by the **Generator** by monitoring and recording devices in order to verify the performance of the active power frequency response provision of participating **Generating Units**.

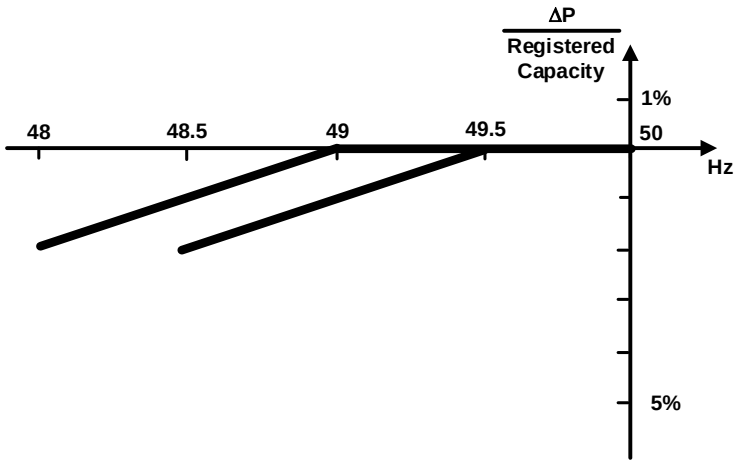
CC8.8.7.4 Admissible **Active Power** reduction of **Generating Units** from **Registered Capacity** output with falling **Frequency**

Each **CDGU** and **Controllable PPM** must be capable of:

(a) continuously maintaining constant **Active Power** output for **System Frequency** changes within the range specified in CC8.8.6.1, and

(b) (subject to the provisions of CC8.8.6.1) maintaining its **Active Power** output at a level not lower than the figure determined by the linear relationship shown in below for **System Frequency** changes below 49.5 Hz for Steady State domain and 49 Hz for Transient domain for ambient conditions of 10^0C, 70% relative humidity and 1013 hPa for gas fired turbine generators, such that if the **System**

Frequency drops to below 49.5 Hz for Steady State domain and 49 Hz for Transient domain the **Active Power** output does not decrease by more than 2%.



(c) For the avoidance of doubt, in the case of a **PPM** where the mechanical power input will not be constant over time, the requirement is that the **Active Power** output shall be independent of **System Frequency** under (a) above and should not drop with **System Frequency** by greater than the amount specified in (b) above.

CC8.8.7.5 With regard to the capability to take part in island operation:

(a) **CDGUs** and **Controllable PPMs** shall be capable of taking part in island operation if required by the **TSO** and;

(i) the **Frequency** limits for island operation shall be established in accordance with CC5.3 and CC8.8.6,

(ii) the voltage limits for island operation shall be those established in accordance with CC.S1.1.3.3 (e) and CC.S2.1.3.5;

(b) **CDGUs** and **Controllable PPMs** shall be able to operate in **FSM** during island operation as specified in CC8.8.7.3.2. In the event of a power surplus, **CDGUs** and **Controllable PPMs** shall be capable of reducing **Active Power** output from a previous operating point to any new operating point within their **Reactive Power** capability. In that regard **CDGUs** and **Controllable PPMs** shall be capable of reducing **Active Power** output to **Minimum Generation**;

(c) The method for detecting a change from interconnected system operation to island operation shall be agreed between the **Generator** and **TSO** in coordination with the **DNO**. The agreed method of detection must not rely solely on the **TSO's** switchgear position signals;

(d) **CDGUs** and **Controllable PPMs** shall be able to operate in **LFSM-O** and **LFSM-U** during island operation as specified in CC8.8.7.1 and CC8.8.7.2.

CC9 SITE RELATED CONDITIONS

CC9.1 Ownership, Control, Operation & Maintenance at the **Connection Point**

CC9.1.1 The ownership boundary between the **Transmission System** and a **User's System** shall be agreed between the **User** and the **TSO**.

CC9.1.2 In the absence of a separate written agreement between the parties to the contrary, construction, commissioning, control, operation and maintenance responsibilities follow ownership.

CC9.1.3 In respect of **Users** other than the **DNO**, for connections to the **Transmission System** for which a **Connection Agreement** is required and those covered by regulation 26 and parts 1 and 2 of schedule 3 of the Electricity Supply Regulations (N.I.) 1991, as amended or re-stated from time to time, a **Site Responsibility Schedule** shall be prepared by the **TSO** (reflecting the details agreed between the **TSO** and the **User**) in respect of each **Connection Site** pursuant to the relevant **Connection Agreement** and signed by both parties (by way of confirmation of its accuracy), detailing the division of responsibilities at interface sites in respect of ownership, control, operation, maintenance and safety. The format, principles and basic procedure to be used in the preparation of **Site Responsibility Schedules** are set down in Appendix 1.

CC9.1.4 An **Ownership Diagram** shall be included in the above **Site Responsibility Schedule**. The diagram shall show all **HV Apparatus** and the connections to all external circuits and shall incorporate numbering, nomenclature and labelling as set out in OC9. A guide to the types of **HV Apparatus** to be shown in the **Ownership Diagram** is shown in Appendix 2 together with the principles to be followed in the preparation of the diagram and the preferred graphical symbols to be used.

CC9.1.5 A copy of the **Site Responsibility Schedule** and any **Ownership Diagrams** shall be retained by the **TSO** and by the **User (**other than the **DNO)**.

CC9.1.6 The **User (**other than the **DNO)** shall notify the **TSO** of any changes at or relating to the **Connection Site** which may affect the **Site Responsibility Schedule** or **Ownership Diagrams** and the **TSO** shall carry out any necessary updating and the principles set out in CC9.1.3 shall apply to such updating.

CC9.2 Access to Sites

The provisions relating to access to **TO Sites** by **Users** and to **User's Sites** by members or representatives of the **TSO** or the **TO** shall be set out in the relevant **Connection Agreement, Transmission Use of System Agreement**, and/or **Lease**.

CC9.3 Work on **Protection** at **Connection Points**

With respect to **Users** connected to the **Transmission System**, no busbar **Protection**, mesh corner **Protection**, circuit breaker fail **Protection**, AC or DC wiring (other than power supplies or DC tripping associated with a **Generating Unit**) shall be worked upon or altered by or on behalf of a **User** unless the **TSO** has been given a reasonable

opportunity to arrange for a **TSO** or **TO** representative to attend. The **TSO** or **TO** shall not work upon or alter any **Generating Unit Protection** unless it has given the **Generator** a reasonable opportunity for a representative of the **Generator** to attend.

CC9.4 Standard of Maintenance

CC9.4.1 (a) It is a requirement that all **User's Plant** and **Apparatus** on **TO Sites** is maintained adequately for the purpose for which it is intended and to ensure that it does not pose a threat to the safety of any of **TO's Plant**, **Apparatus** or personnel on the **TO Site**.

(b) The **TSO** shall ensure that all of the **Transmission System Plant** and **Apparatus** on **Users' Sites** is maintained adequately for the purpose for which it is intended and to ensure that it does not pose a threat to the safety of any **User's Plant, Apparatus** or personnel on the **User's Site**.

(c) The **TSO** or the **User** (as the case may be) will have the right to inspect the test results and maintenance records relating to such **Plant** and **Apparatus** at any time.

CC9.5 Responsibility for Safety

CC9.5.1 The **Site Responsibility Schedule** referred to in CC9.1.3 shall detail the demarcation of responsibility for safety of persons carrying out work or testing at **Connection Sites** and on circuits which cross a **Connection Site** at any point.

CC9.5.2 More detailed information on procedures and responsibilities involved in the provision of **Safety Precautions** is set out in OC6.

CC10 APPROVAL TO CONNECT

For the avoidance of doubt, this CC10 applies only to Users connected or seeking a connection to the Transmission System.

CC10.1 Readiness to Connect

CC10.1.1 A **User** (other than the **DNO**) whose development is under construction in accordance with the relevant **Connection Agreement** and who wishes to establish connection with the **Transmission System** shall apply to the **TSO** by submitting a standard connection card or otherwise in writing, stating readiness to connect and giving the following:

(a) confirmation that the **User's** installation complies with the principles outlined in Regulation 28 of the Electricity Supply Regulations (N.I.) 1991 and Regulations 4-12 and 15 of the Electricity at Work Regulations (N.I.) 1991 (or as amended or re-stated);

(b) where relevant, updated **Planning Code** data based on actual values; and

(c) a proposed connection date.

CC10.1.2 The **TSO** may require a **User** (other than the **DNO**) to provide in addition to its written application to the **TSO** for connection in accordance with CC10.1.1, a report, prepared

by such person as the **TSO** may reasonably consider to be competent to issue the same, certifying to the **TSO** that all matters required by CC5 have been considered and that CC6 to CC8 inclusive have been complied with by the **User** and incorporating:

(a) type test reports and test certificates produced by Nationally Accredited Laboratories (or other equivalent testing organisations) showing that the **Plant** and **Apparatus** specified in the **Connection Conditions** meets the criteria specified;

(b) copies of the manufacturer's test certificates relating to **Plant** and **Apparatus** referred to in the **Connection Conditions**, including measurements of positive and zero sequence impedance of **Apparatus** which will contribute to the fault current at the **Connection Point**;

(c) details of **Protection** arrangements and settings under CC6.4;

(d) a certificate declaring the maximum short circuit current in amperes which the **User's System** would contribute to a three-phase short circuit at the **Connection Point**, and the minimum zero sequence impedance of the **User's System** at the **Connection Point** and taking into account the contributions of any **Generating Unit** or **Power Station** motors and transformers; and

(e) confirmation that design conforms with the standards referred to in CC6.

CC10.1.3 A **User** (other than the **DNO)** shall, in all cases, supply the following information together with its notification under CC10.1.1:

(a) to the **TO**, a list of persons proposed to be appointed by the **User** to undertake, and to be responsible for, the application and removal of **Safety Precautions** on those parts of the **User's System** which are directly connected to the **Transmission System**;

(b) to the **TSO**, a list of persons appointed by the **User** to undertake operational duties on the **User's System** and to issue and receive operational messages and instructions in relation to the **User's System**;

(c) to the **TSO**, a list of names and telephone numbers of responsible management representatives in accordance with OC7;

(d) to the **TSO**, site common drawings as specified in the **Connection Agreement**;

(e) to the **TSO**, in the case of **User Systems** directly connected to the **Transmission System**, a single line diagram of the **User's Apparatus** showing all items to which these **Connection Conditions** apply; and

(f) to the **TSO**, in the case of **User Systems** directly connected to the **Transmission System**, information to enable the **TSO** to prepare a **Site Responsibility Schedule**.

CC10.1.4 In order that the **TSO** may verify that the requirements of these **Connection Conditions** can be met, the **User** (other than the **DNO**) shall provide a proposed commissioning programme, giving at least six weeks (or such longer period as the **TSO**

may reasonably consider to be appropriate in the circumstances) notice of the proposed connection date, and detailing all proposed site testing of main and ancillary equipment, together with the names of the organisations which are to carry out such testing and the proposed timetable for such testing. The required period of notice will be notified to the **User** by the **TSO** during the course of an application for connection. The **TSO** will consider the proposed commissioning programme and, as soon as reasonably practicable, will notify the **User**:

(a) that it approves the programme, in which case the **TSO** and the **User** shall take all reasonable steps to ensure that the **Commissioning/Acceptance Testing** is undertaken in accordance with the commissioning programme (subject to **NI System** conditions); or

(b) that it considers that the **Commissioning/Acceptance Testing** proposed in the programme may involve the application of irregular, unusual or extreme conditions and which may have a material effect on the **NI System**, beyond the **User's System** and that such testing therefore falls within the scope of OC10, **"System Tests"**, in which event the proposed commissioning programme shall be treated as a **Proposal Notice** submitted under OC10.4.1 and the relevant provisions of OC10 shall apply to the proposed testing; or

(c) that it requires the proposed commissioning programme to be amended in which event the **User** and the **TSO** shall endeavour to agree an appropriate amendment to the commissioning programme, failing which the programme will be as determined by the **TSO** acting reasonably and, in either case, the **TSO** and the **User** shall take all reasonable steps to ensure that the **Commissioning/Acceptance Testing** is undertaken in accordance with the commissioning programme as amended; or

(d) that it rejects the proposed commissioning programme and the reasons for such rejection in which event, subject to the resolution of any dispute in accordance with the relevant **Connection Agreement**, the proposed **Commissioning/Acceptance Testing** shall not take place but the **User** shall be entitled to submit a revised commissioning programme for the **TSO 's** consideration.

CC10.1.5 The **TSO** shall be entitled to witness site testing of equipment whose performance can reasonably be regarded as affecting the integrity of the **Transmission System**. The **User** (other than the **DNO**) shall provide the **TSO** with certified results of all such tests and the **TSO** may withhold agreement to energise the **User's Equipment** where test results establish that the **Connection Conditions** have not been complied with.

○

CC10.1.6 The **TSO** may participate in testing either on site or remotely from the **TSO Control Centre**. For that purpose, the **Generator** shall provide the **Monitoring** equipment necessary to record all relevant test signals and measurements as well as ensure that the necessary representatives of the **Generator** are available on site for the entire testing period. Signals specified by the **TSO** shall be provided if, for selected tests, the system operator wishes to use its own equipment to record performance. The **TSO** has sole discretion to decide about its participation.

CC10.1.7 Where in advance of the proposed connection date, a **Generator** requires connection to the **NI System** for the purpose of testing, the **Generator** will be required to satisfy the **TSO** of the following:

(a) compliance with those requirements of the **Connection Conditions** and **Connection Agreement** necessary to give assurance that it is safe to connect; and

(b) where applicable, provision of a commissioning programme in accordance with CC10.1.4.

○

CC10.1.8 The **User** shall notify the **TSO** of the planned test schedules and procedures to be followed for verifying the compliance of a **Generating Unit** with the requirements of the **Connection Conditions**. The TSO shall approve in advance the planned test schedules and procedures. Such approval by the TSO shall be provided in a timely manner and shall not be unreasonably withheld

CC10.2 Confirmation of Approval to Connect

CC10.2.1 Within 30 days of notification by a **User** (other than the **DNO**) pursuant to CC10.1.1 the **TSO** shall (except where it has rejected the **User's** application in accordance with CC10.1.4(d)) inform the **User** whether or not the requirements of CC10.1 and the other requirements of the **Connection Conditions** are satisfied and the making of the connection is approved subject to satisfactory results of those tests (including **Commissioning/Acceptance Tests**) which cannot be performed prior to energisation of the **User's Plant** and **Apparatus**. Where approval is withheld, reasons shall be stated by the **TSO**.

CC10.2.2 Where the notification given by the **TSO** pursuant to CC10.2.1 is in the affirmative, the **TSO** (or in the case of (a), the **TO**) will in addition supply to the **User** the following information:

(a) a list of persons proposed to be appointed by the **TO** to undertake, and to be responsible for, the application and removal of **Safety Precautions** in relation to the **Connection Site**;

(b) a list of persons appointed by the **TSO**, following its appointment as **Safety Co-ordinator** by the **TO**, to undertake operational duties on the **Transmission System** and to issue and receive operational messages and instructions in relation to the **User's System**; and

(c) a list of names and telephone numbers of responsible management representatives in accordance with OC7.

CC10.2.3 When indicating agreement to the energising of a connection, the **TSO** shall, to the extent not previously determined in a commissioning programme, specify the contents and sequence of the energising programme and associated testing. In either case, the **TSO** shall be entitled to postpone or suspend the programme where, due to circumstances which could not reasonably have been foreseen by the **TSO**, continuation of the programme would impose an unacceptable level of risk to the integrity of the **NI System**.

CC10.3 Approval of Staff

CC10.3.1 At the same time that the **User** submits to the **TO** in relation to safety requirements the list of information pursuant to CC10.1.3, it shall submit to the **TO** a list of staff which will be used to implement **Safety Precautions**. The **TO** may ask the **User** questions to clarify the suitability of persons named on the list.

CC10.3.2 At the same time that the **TSO** and the **TO** submits to the **User** the list of information pursuant to CC10.2.2 the **TO** shall submit to the **User** a list of **TO** staff which will be used to implement **Safety Precautions**. The **User** may ask the **TO** questions to clarify the suitability of persons named on the list.

CC10.3.3 The **TO** and each **User** have the right to object to the inclusion of particular members of staff on the other's list, on technical grounds, and in the event of objection which is accepted by the other, that member of staff will not be used to implement **Safety Precautions**.

CC10.3.4 A party must accept an objection to the extent it is reasonable to do so. In the event of a disagreement, each party must escalate the dispute to its highest management level in order to seek to resolve the dispute. In the absence of the dispute so being resolved, each party must write to the **Authority** explaining why it believes its position is correct under this CC10.3.4. It will be for the **Authority** to determine whether each party is complying with this CC10.3.4.

CC10.3.5 As part of the approval process, each party may (upon reasonable notice and at reasonable times) interview members of staff on the other's list or the parties may agree to hold joint interviews.

CC10.3.6 If the list of the **TO** or a **User**, as the case may be, changes, the relevant party must notify the other without delay and the relevant provisions of this CC10.3 shall apply to any new names included as part of that change.

CC10.3.7 Neither the **TO** nor any **User** shall have any liability to the other by reason of or arising from their approval under this CC10.3 of the other's list of staff entitled to implement **Safety Precautions**.

CC11 OBLIGATIONS ON USERS CONNECTED TO THE DISTRIBUTION SYSTEM

For the avoidance of doubt, this CC11 shall apply only to **Users** connected to the **Distribution System**.

CC11.1.1 **Users** with respect to **CDGU**s and **Controllable PPMs** connected to the **Distribution System** shall comply with the obligations set out in CC7 and CC8 (with the exception of CC8.8 which applies only to the **DNO**). For the purposes of CC11.1.1, references to the **Connection Agreement** in CC8 shall be read as references to a **Transmission Use of System Agreement** or a **Grid Code Compliance Agreement** as the case may be.

CC11.1.2 **Users** whose development is under construction and that are to be connected to the **Distribution System** shall submit the following information to the **TSO** as soon as reasonably practicable***:***

(a) where relevant, updated **Planning Code** data based on actual values; and

(b) a proposed connection date to the **Distribution System**.

CC11.1.3 The **TSO** may require a **User** which is to be connected to the **Distribution System** to provide in addition to its submission of information in accordance with CC11.1.2, a report, prepared by such person as the **TSO** may reasonably consider to be competent to issue the same, certifying to the **TSO** that CC7 and CC8 have been complied with by the **User** and incorporating:

(a) type test reports and test certificates produced by Nationally Accredited Laboratories (or other equivalent testing organisations) showing that the **Plant** and **Apparatus** specified in the **Connection Conditions** meets the criteria specified;

(b) copies of the manufacturer's test certificates relating to **Plant** and **Apparatus** referred to in the **Connection Conditions**, including measurements of positive and zero sequence impedance of **Apparatus** which will contribute to the fault current at the point of connection to the **Distribution System**;

(c) a certificate declaring the maximum short circuit current in amperes which the **User's System** would contribute to a three-phase short circuit at the connection to the **Distribution System**.

CC11.1.4 A **User** which is to be connected to the **Distribution System** shall, in all cases, supply the following information to the **TSO** together with its submission of information under CC11.1.2:

(a) a list of persons appointed by the **User** to undertake operational duties on the **User System** and to issue and receive operational messages and instructions in relation to the **User System**;

(b) a list of names and telephone numbers of responsible management representatives in accordance with OC7;

(c) a single line diagram of the **User's Apparatus** showing all items to which these **Connection Conditions** apply.

CC11.1.5 In order that the **TSO** may verify that the requirements of these **Connection Conditions** can be met, the **User** shall provide a proposed commissioning programme, giving at least six weeks (or such longer period as the **TSO** may reasonably consider to be appropriate in the circumstances) notice of the proposed connection date to the **Distribution System**, and detailing all proposed site testing of main and ancillary equipment, together with the names of the organisations which are to carry out such testing and the proposed timetable for such testing. The required period of notice will be notified to the **User** by the **TSO** during the course of an application for connection to the **Distribution System**. The **TSO** will consider the proposed commissioning programme and, as soon as reasonably practicable, will notify the **User**:

(a) that it approves the programme, in which case the **TSO** and the **User** shall take all reasonable steps to ensure that the **Commissioning/Acceptance Testing** is

undertaken in accordance with the commissioning programme (subject to **Transmission System** conditions); or

(b) that it considers that the **Commissioning/Acceptance Testing** proposed in the programme may involve the application of irregular, unusual or extreme conditions and which may have a material effect on the **Transmission System** beyond the **User's System**; or

(c) that it requires the proposed commissioning programme to be amended in which event the **User** and the **TSO** shall endeavour to agree an appropriate amendment to the commissioning programme, failing which the programme will be as determined by the **TSO** acting reasonably and, in either case, the **TSO** and the **User** shall take all reasonable steps to ensure that the **Commissioning/Acceptance Testing** is undertaken in accordance with the commissioning programme as amended; or

(d) that it rejects the proposed commissioning programme and the reasons for such rejection in which event, subject to the resolution of any dispute in accordance with the relevant **Transmission Use of System Agreement** or **Grid Code Compliance Agreement** as the case may be, the proposed **Commissioning/Acceptance Testing** shall not take place but the **User** shall be entitled to submit a revised commissioning programme for the **TSO's** consideration.

CC11.1.6 To the extent the **TSO** can obtain the relevant information from the **DNO**, the **TSO** will not ask the **User** to carry out **Commissioning/ Acceptance Testing** required under CC11.1.5.

CC11.1.7 The **TSO** shall be entitled to witness site testing of equipment whose performance can reasonably be regarded as affecting the integrity of the **Transmission System**. The **User** shall provide the **TSO** with certified results of all such tests. To the extent the **TSO** can obtain the relevant information from the **DNO**, the **TSO** will not ask the **User** to carry out **Commissioning/ Acceptance Testing** required under CC11.1.5.

CC11.1.8 Where in advance of the proposed connection date, a **Generator** requires connection to the **Distribution System** for the purpose of testing, the **Generator** will be required to satisfy the **TSO** of the following:

(a) compliance with those requirements of the **Connection Conditions** and **Transmission Use of System Agreement** or **Grid Code Compliance Agreement** as the case may be necessary to give assurance that it is safe to connect; and

(b) where applicable, provision of a commissioning programme in accordance with CC11.1.5.

CC11.2.1 Within 30 days of submission of information by a **User** pursuant to CC11.1.2 the **TSO** shall inform the **User** whether or not the requirements of CC11.1 and the other requirements of the **Connection Conditions** are satisfied.

CC11.2.2 Where the notification given by the **TSO** pursuant to CC11.2.1 is in the affirmative, the **TSO** will in addition supply to the **User** the following information:

(a) a list of persons appointed by the **TSO** to undertake operational duties on the **Transmission System** and to issue and receive operational messages and instructions in relation to the user's system; and

(b) a list of names and telephone numbers of responsible management representatives in accordance with OC7.

CC11.2.3 Where the notification given by the **TSO** pursuant to CC11.2.1 is in the negative, the **TSO** can request further information from the **DNO**. If a **User** does not satisfy the requirements of the **Connection Conditions,** the **TSO** can request that the **DNO** prevents a connection to, or disconnects the **User** from, the **Distribution System**.

CC12 GENERATOR AGGREGATORS

CC12.1 Each **Aggregator** shall give to the **TSO** such information in relation to **Connection Conditions** related issues from time to time that the **TSO** may reasonably deem necessary.

CC13 DEMAND SIDE UNITS

CC13.1 Each **Demand Side Unit** shall, as a minimum, have the following capabilities:

(a) Able to provide **Demand Side Unit MW Response** between 0 MW and the **Demand Side Unit MW Capacity**;

(b) **Maximum Ramp Up Rate** not less than 1.67% per minute of **Demand Side Unit MW Response** as specified in the **Dispatch Instruction**;

(c) **Maximum Ramp Down Rate** not less than 1.67% per minute of **Demand Side Unit MW Response** as specified in the **Dispatch Instruction**.

(d) **Minimum Down -Time** not greater than 30 minutes;

(e) **Maximum Down- Time** not less than 2 hours;

(f) **Minimum off time** not greater than 2 hours;

(g) **Demand Side Unit MW Response Time** of not greater than 1 hour;

(h) maintain **Demand Side Unit MW Response** at **NI System Frequencies** in the range 49.5Hz to 52Hz;

(i) maintain **Demand Side Unit MW Response** at NI **System Frequencies** within the range 48Hz to 49.5Hzfor a duration of 1 hour;

(j) maintain **Demand Side Unit MW Response** at NI **System Frequencies** within the range 47.0Hz to 48Hz for a duration of 5 minutes; and

(k) maintain **Demand Side Unit MW Response** for a rate of change of **NI System Frequency** up to and including 1.0 Hz per second as measured over a rolling 500 milliseconds period.

On-site generation operated as a continuous **Synchronous Generating Unit** that forms part of a **Demand Side Unit**, shall, as a minimum, have the following capabilities:

(l) maintain **Demand Side Unit MW Response** at **NI System Frequencies** in the range 49.5Hz to 52Hz;

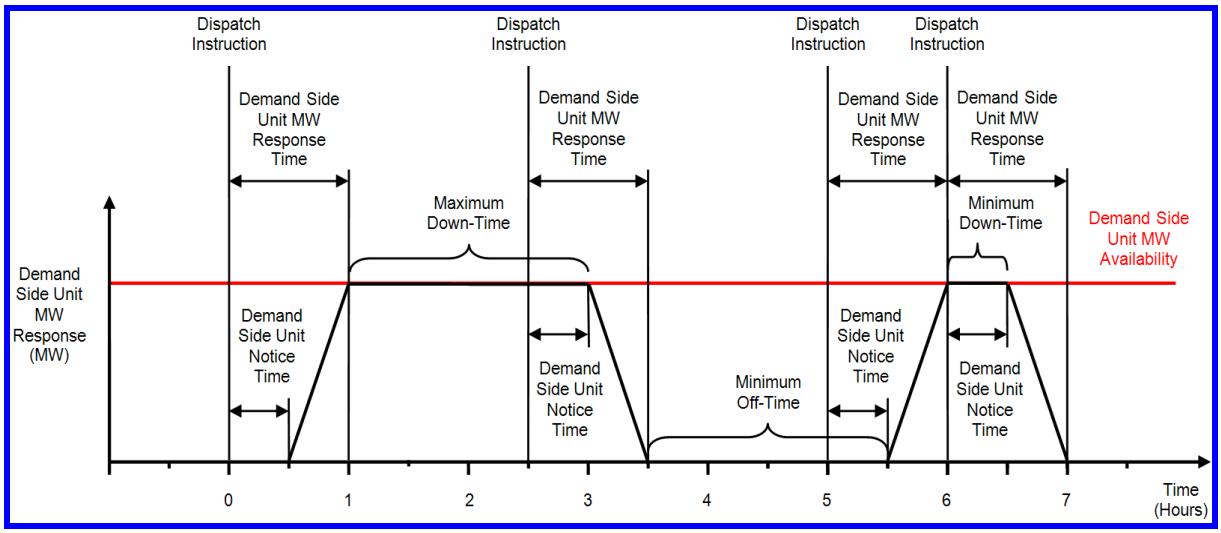
(m) maintain **Demand Side Unit MW Response** at NI **System Frequencies** within the range 48Hz to 49.5Hzfor a duration of 1 hour;

(n) maintain **Demand Side Unit MW Response** at NI **System Frequencies** within the range 47.0Hz to 48Hz for a duration of 5 minutes; and

(o) remain synchronised to the **NI System** during a rate of change of **NI System Frequency** of values up to and including 1.0 Hz per second as measured over a rolling 500 milliseconds period.

On-site **Generation** operating in **DSU Short-term Synchronous Operating Mode** that forms part of a **Demand Side Unit**, shall, as a minimum, have the following capabilities:

(p) operate continuously at normal rated output at **NI System Frequencies** in the range 49.5Hz to 52Hz;



CC13.2 The requirements of CC13.1(h) to CC13.1(p) do not apply where:

(a) The islanding protection has operated correctly, consistent with the settings agreed with the **TSO** or **DNO** as applicable;

(b) The System Frequency has changed at a rate greater that 1.0 Hz per second as measured over a rolling 500 millisecond period; or

(c) There is manual intervention by the Generator

CC13.3 Signals and indications required to be provided by **Demand Side Unit Operators** will include but shall not be limited to the following:

(a) total aggregated **Demand Side Unit MW Response** from **Generation** operating as a continuous **Synchronous Generating Unit**;

(b) aggregated **Demand Side Unit MW Response** from **Generation** operating as a continuous **Synchronous Generating Unit** per **Bulk Supply Point**;

(c) total aggregated **Demand Side Unit MW Response** from avoided **Demand** consumption **and Generation** operating in **DSU Short-term Synchronous Operating Mode**;

(d) aggregated **Demand Side Unit MW Response** from avoided **Demand** consumption **and Generation** operated in **DSU Short-term Synchronous Operating Mode** per **Bulk Supply Point**;

(e) Remaining **Demand Side Unit MW Availability**;

(f) **Demand Side Unit MW Response** from each **Individual Demand Site** with a **Demand Side Unit MW Capacity** of greater than or equal to 5 **MW**;

(g) **MW Output** from **Generation Units** with a capacity greater than or equal to 5 **MW**;

(h) Mvar output from **Generation Units** with a capacity greater than or equal to 5 **MW** at **Individual Demand Sites** with a **Maximum Export Capacity** specified in the **Connection Agreement** or **DNO Connection Agreement** as applicable, as required by the TSO;

(i) Aggregate **MW Output** from **Generation Units** with a combined **Capacity** of greater than or equal to 5 **MW** on an **Individual Demand Site**, as required by the TSO; and

(j) **Demand Side Unit MW Response** from each **Individual Demand Site** that comprises the **Demand Side Unit**, as required by the **TSO**.

CC.13.4 **Demand Side Unit Operators** shall provide the **TSO** the specification of the method of aggregation of SCADA from multiple sites. The minimum specifications shall be agreed with the **TSO** in advance and shall include:

(a) signals from **Demand Side Unit Operators** shall be relayed to the **TSO** telemetry outstation interface which reflect the **Demand Side Unit MW Response** to an accuracy of within 1 MW of the actual **Demand Side Unit MW Response** within 15 seconds of change occurring to the **Demand Side Unit MW Response**; and

(b) a single failure of an item of the Demand Side Unit Operators equipment will not result in:

(i) loss of control of more than one **Individual Demand Site**;

(ii) loss of **Demand Side Unit MW Response** of more than one **Individual Demand Site**; or

(iii) the **Demand Side Unit MW Response** from generation or **Demand Side Unit MW Response** from avoided **Demand** consumption signals being incorrect by more than the **Demand Side Unit MW Capacity** of the **Individual Demand Site** with the highest **Demand Side Unit MW Capacity** comprising the **Demand Side Unit**.

CC14 FUEL SECURITY CODE

CC14.1 Each **Generator** whose **Plant** and **Equipment** is connected to the **Transmission System** and each **CDGU** connected to the **Distribution System** agrees to comply with the **Fuel Security Code** to the extent that it is expressed to apply to it and with any instructions from the **TSO** pursuant to the **Fuel Security Code**, including in relation to **CDGUs**, with **Dispatch Instructions** issued by the **TSO**.

CC15 OPERATIONAL NOTIFICATION PROCEDURE FOR GENERATING UNITS CONNECTING TO THE TRANSMISSION SYSTEM

CC15.1 The **Generator** shall demonstrate to the **TSO** that it has complied with **Generating Unit** requirements by successfully completing the Operational Notification Procedure for connection of each **Generating Unit**.

CC15.2 **Operational Notification Procedure**

The Operational Notification Procedure for connection of each **Generating Unit** requires the completion of three sequential processes, consisting of:

- Energisation Operational Notification (EON);
- Interim Operational Notification (ION); and
- Final Operational Notification (FON).

CC15.2.1 Energisation Operational Notification

The **TSO** will issue an EON to the **Generator** for a **Generating Unit** connecting to the **Transmission System**, subject to completion of the Pre-Synchronisation Checklist. This checklist will require agreement on the protection and control settings relevant to the **Connection Point**.

Upon receipt of the EON, a **Generator** may energise its internal network and auxiliaries for the associated **Generating Unit** by using the grid connection that is specified for the **Connection Point.**

CC15.2.2 Interim Operational Notification

The **TSO** will issue an ION to the **Generator** for a **Generating Unit** following receipt of all the information requested under CC10

Upon receipt of the ION, a **Generator** may operate the associated **Generating Unit** and generate power for a limited period of time, by using the grid connection that is specified for the **Connection Point**. The limited period of time shall be agreed with the TSO and shall not be longer than 24 months.

CC15.2.3 Final Operational Notification

The **TSO** will issue a FON to the **Generator** for a **Generating Unit** connected to the Transmission System, subject to completion of the Commissioning/Acceptance Tests and updated Planning Code data.

Upon receipt of the FON, a **Generator** may operate the associated **Generating Unit** and generate power by using the grid connection that is specified for the **Connection Point**.

CC15.3 A **Generator** issued with a FON shall inform the **TSO** immediately in the following circumstances:

- the facility is temporarily subject to either significant modification or loss of capability affecting its performance; or
- equipment failure leading to non-compliance with some relevant requirements.

CC15.4 Limited Operational Notification

CC15.4.1 A **Generator** shall apply to the relevant system operator for a Limited Operational Notification (LON), if the **Generator** reasonably expects the circumstances described in CC.15.3 to persist for more than three months.

CC15.4.2 The **TSO** will then issue a LON containing the following information:

- the unresolved issues justifying the granting of the LON;
- the responsibilities and timescales for the expected solution; and
- a maximum period of validity which shall not exceed 12 months. The initial period granted may be shorter with the possibility of an extension if evidence is submitted to the satisfaction of the **TSO** demonstrating that substantial progress has been made towards achieving full compliance.

CC15.4.3 The FON shall be suspended during the period of validity of the LON with regard to the items for which the LON has been issued.

CC15.4.4 The **TSO** shall have the right to refuse to allow the operation of the **Generating Unit**, once the LON is no longer valid. In such cases, the FON shall automatically become invalid.

CC15.5 If compliance tests or simulations cannot be carried out as agreed between the TSO and the Generator due to reasons attributable to the TSO, then the TSO shall not unreasonably withhold the operational notification.

CC16 OPERATIONAL NOTIFICATION PROCEDURE FOR GENERATING UNITS CONNECTING TO THE DISTRIBUTION SYSTEM

CC16.1 The **Generator** shall demonstrate to the **Commissioning/Acceptance Test Panel** that it has complied with **Generating Unit** requirements by successfully completing the Operational Notification Procedure for connection of each **Generating Unit**.

CC16.2 **Operational Notification Procedure**

The Operational Notification Procedure for connection of each **Generating Unit** requires the completion of three sequential processes, consisting of:

- Energisation Operational Notification (EON);
- Interim Operational Notification (ION); and
- Final Operational Notification (FON).

CC16.2.1 Energisation Operational Notification

The **Commissioning/Acceptance Test Panel** will issue an EON to the **Generator** for a **Generating Unit** with a **Registered Capacity** of 10MW or greater, subject to completion of the Pre-Synchronisation Checklist. This checklist will require agreement on the protection and control settings relevant to the **Connection Point**.

Upon receipt of the EON, a **Generator** may energise its internal network and auxiliaries for the associated **Generating Unit** by using the grid connection that is specified for the **Connection Point.**

CC16.2.2 Interim Operational Notification

The **Commissioning/Acceptance Test Panel** will issue an ION to the **Generator** for a **Generating Unit** following receipt of all the information requested under CC11

Upon receipt of the ION, a **Generator** may operate the associated **Generating Unit** and generate power for a limited period of time, by using the grid connection that is specified for the **Connection Point**. The limited period of time shall be agreed with the TSO and shall not be longer than 24 months.

CC16.2.3 Final Operational Notification

The **Commissioning/Acceptance Test Panel** will issue a FON to the **Generator** for a **Generating Uni**, subject to completion of the **Commissioning/Acceptance Tests** and updated **Planning Code** data.

Upon receipt of the FON, a **Generator** may operate the associated **Generating Unit** and generate power by using the grid connection that is specified for the **Connection Point**.

CC16.3 A **Generator** issued with a FON shall inform the **TSO** immediately in the following circumstances:

- the facility is temporarily subject to either significant modification or loss of capability affecting its performance; or
- equipment failure leading to non-compliance with some relevant requirements.

CC16.4 Limited Operational Notification

CC16.4.1 A **Generator** shall apply to the relevant system operator for a Limited Operational Notification (LON), if the **Generator** reasonably expects the circumstances described in CC.15.3 to persist for more than three months.

CC16.4.2 The **TSO** will then issue a LON containing the following information:

- the unresolved issues justifying the granting of the LON;
- the responsibilities and timescales for the expected solution; and
- a maximum period of validity which shall not exceed 12 months. The initial period granted may be shorter with the possibility of an extension if evidence is submitted to the satisfaction of the **TSO** demonstrating that substantial progress has been made towards achieving full compliance.

CC16.4.3 The FON shall be suspended during the period of validity of the LON with regard to the items for which the LON has been issued.

CC16.4.4 The **Commissioning/Acceptance Test Panel** shall have the right to refuse to allow the operation of the **Generating Unit**, once the LON is no longer valid. In such cases, the FON shall automatically become invalid.

CC16.5 If compliance tests or simulations cannot be carried out as agreed between the TSO and the Generator due to reasons attributable to the TSO, then the TSO shall not unreasonably withhold the operational notification.

ll **CC17 OPERATIONAL NOTIFICATION PROCEDURE FOR HVDC SYSTEMS**

CC17.1 The **HVDC System** owner shall demonstrate to the **TSO** that it has complied with **HVDC System** requirements by successfully completing the Operational Notification Procedure for connection of each **HVDC System**.

CC17.2 **Operational Notification Procedure**

The Operational Notification Procedure for connection of each **HVDC System** requires the completion of three sequential processes, consisting of:

- Energisation Operational Notification (EON);
- Interim Operational Notification (ION); and
- Final Operational Notification (FON).

CC17.2.1 **Energisation Operational Notification**

The TSO will issue an EON to the **HVDC System** owner for a **HVDC System** connecting to the **Transmission System**, subject to completion of the Pre Synchronisation Checklist. This checklist will require agreement on the protection and control settings relevant to the **Connection Point**.

Upon receipt of the EON, a **HVDC System** owner may energise its internal network and auxiliaries for the associated **HVDC System** by using the grid connection that is specified for the **Connection Point**.

CC17.2.2 **Interim Operational Notification**

The **TSO** will issue an ION to the **HVDC System** owner for a **HVDC System** following receipt of all the information requested under CC10.

Upon receipt of the ION, a **HVDC System** owner may operate the associated **HVDC System** and generate power for a limited period of time, by using the grid connection that is specified for the **Connection Point**. The limited period of time shall be agreed with the **TSO** and shall not be longer than 24 months.

CC17.2.3 **Final Operational Notification**

The **TSO** will issue a FON to the **HVDC System** owner for a **HVDC System** connected to the **Transmission System**, subject to completion of the Commissioning/Acceptance Tests and updated Planning Code data.

Upon receipt of the FON, a **HVDC System** owner may operate the associated **HVDC System** and generate power by using the grid connection that is specified for the **Connection Point**.

CC17.3 A **HVDC System** issued with a FON shall inform the TSO immediately in the following circumstances:

• the facility is temporarily subject to either significant modification or loss of capability affecting its performance; or

• equipment failure leading to non-compliance with some relevant requirements.

CC17.4 **Limited Operational Notification**

CC17.4.1 An **HVDC System** owner shall apply to the **TSO** or a Limited Operational Notification (LON), if the **HVDC System** owner reasonably expects the circumstances described in CC.17.3 to persist for more than three months.

CC17.4.2 The **TSO** will then issue a LON containing the following information:

• the unresolved issues justifying the granting of the LON;

• the responsibilities and timescales for the expected solution; and

• a maximum period of validity which shall not exceed 12 months. The initial period granted may be shorter with the possibility of an extension if evidence is submitted to the satisfaction of the **TSO** demonstrating that substantial progress has been made towards achieving full compliance.

CC17.4.3 The FON shall be suspended during the period of validity of the LON with regard to the items for which the LON has been issued.

CC17.4.4 The T**SO** shall have the right to refuse to allow the operation of the **HVDC System**, once the LON is no longer valid. In such cases, the FON shall automatically become invalid.

CC17.5 If compliance tests or simulations cannot be carried out as agreed between the **TSO** and the **HVDC System** owner due to reasons attributable to the **TSO**, then the **TSO** shall not unreasonably withhold the operational notification.

CC18 OPERATIONAL NOTIFICATION PROCEDURE FOR DC CONNECTED CONTROLLABLE PPM

CC18.1 The **Generato**r shall demonstrate to the **TSO** that it has complied with DC Connected **Controllable PPM** requirements by successfully completing the Operational Notification Procedure for connection of each DC Connected **Controllable PPM**.

CC18.2 **Operational Notification Procedure**

The Operational Notification Procedure for connection of each DC Connected **Controllable PPM** requires the completion of three sequential processes, consisting of:

- Energisation Operational Notification (EON);
- Interim Operational Notification (ION); and
- Final Operational Notification (FON).

CC18.2.1 **Energisation Operational Notification**

The **TSO** will issue an EON to the **Generato**r for a DC Connected **Controllable PPM** connecting to the **Transmission System**, subject to completion of the Pre-Synchronisation Checklist. This checklist will require agreement on the protection and control settings relevant to the **Connection Point**.

Upon receipt of the EON, a **Generator** may energise its internal network and auxiliaries for the associated DC Connected **Controllable PPM** by using the grid connection that is specified for the **Connection Point**.

CC18.2.2 **Interim Operational Notification**

The **TSO** will issue an ION to the **Generator** for a DC Connected **Controllable PPM** following receipt of all the information requested under CC10

Upon receipt of the ION, a **Generato**r may operate the associated DC Connected **Controllable PPM** and generate power for a limited period of time, by using the grid connection that is specified for the **Connection Point**. The limited period of time shall be agreed with the **TSO** and shall not be longer than 24 months.

CC18.2.3 **Final Operational Notification**

The **TSO** will issue a FON to the **Generator** for a DC Connected **Controllable PPM** connected to the Transmission System, subject to completion of the Commissioning/Acceptance Tests and updated Planning Code data.

Upon receipt of the FON, a **Generator** may operate the associated DC Connected **Controllable PPM** and generate power by using the grid connection that is specified for the **Connection Point**.

CC18.3 A DC Connected **Controllable PPM** issued with a FON shall inform the **TSO** immediately in the following circumstances:

• the facility is temporarily subject to either significant modification or loss of capability affecting its performance; or

• equipment failure leading to non-compliance with some relevant requirements.

CC18.4 **Limited Operational Notification**

CC18.4.1 A **Generato**r shall apply to the **TSO** for a Limited Operational Notification (LON), if the **Generator** reasonably expects the circumstances described in CC.18.3 to persist for more than three months.

CC18.4.2 The **TSO** will then issue a LON containing the following information:

• the unresolved issues justifying the granting of the LON;

• the responsibilities and timescales for the expected solution; and

• a maximum period of validity which shall not exceed 12 months. The initial period granted may be shorter with the possibility of an extension if evidence is submitted to the satisfaction of the **TSO** demonstrating that substantial progress has been made towards achieving full compliance.

CC18.4.3 The FON shall be suspended during the period of validity of the LON with regard to the items for which the LON has been issued.

CC18.4.4 The **TSO** shall have the right to refuse to allow the operation of the DC Connected **Controllable PPM,** once the LON is no longer valid. In such cases, the FON shall automatically become invalid.

CC18.5 If compliance tests or simulations cannot be carried out as agreed between the **TSO** and the **Generator** due to reasons attributable to the **TSO**, then the **TSO** shall not unreasonably withhold the operational notification.

CONNECTION CONDITIONS SCHEDULE 1

PART I

TECHNICAL CRITERIA FOR GENERATING UNITS CONNECTED TO THE TRANSMISSION SYSTEM OTHER THAN THOSE COMPRISED WITHIN PPMS

CC.S1.1.1 Applicability of Technical Design and Operational Criteria

(a) In this Schedule 1, Part I all references to **Generating Units** shall be read and construed as references only to **CCGT Modules**, **Steam Turbine Units** and/or **Gas Turbine Units** connected to the **Transmission System**. Such references shall not be read or construed as references to **Generating Units** connected to the **Transmission System** that form part of a PPM.

(b) At the **Connection Point** all **Generating Units** with an **Output** of 5 **MW** or more shall, in addition to the requirements of CC6, meet the following technical design and operational criteria. This Schedule 1, Part I contains more detailed requirements for **Generating Units** than those set out in CC6 and is intended to be complementary to CC6. However, in the event of any conflict between the requirements of CC6 and the requirements of this Schedule 1, the provisions of this Schedule 1 shall prevail. Detailed information relating to a particular connection will, where indicated below, be made available by the **TSO** on request by the **Generator**.

(c) **Generating Units** with an **Output** of 5 **MW** or more shall, as a minimum requirement, and in addition to the requirements of CC6, comply with all relevant Engineering Recommendations and relevant regulations and the particular requirements of the **TSO** which will take account of the conditions prevailing on the **Transmission System** at the **Connection Point** at the relevant time. The **TSO**

will notify its particular requirements to the **Generator** during the course of the **Generator's** application for connection to the **Transmission System**.

(d) A **Generating Unit** with a **Registered Capacity** greater than the **MEC** at the **Connection Point**, as agreed with the **TSO** in the **Connection Agreement**, shall demonstrate Grid Code compliance with the technical design and operational requirements of the **Generating Unit** set out in Grid Code CC5, CC6, CC7 and CC8. Under such circumstances Grid Code compliance shall be demonstrated at the **MEC** rather than at the **Generating Unit Registered Capacity** to ensure the safe operation of the **Generators Plant** and **Apparatus** and the **TO's Plant** and **Apparatus**. A **Generator** shall be issued with **Agreed** compliance **Testing and Monitoring Procedures** throughout the connection and commissioning programme of the **Generators** connection.

CC.S1.1.2 **Generating Unit** Connections

Each connection between a **Generating Unit** and the **Transmission System** unless specified otherwise in the **Connection Agreement** must be controlled by a circuit breaker capable of interrupting the maximum short circuit current at the point of connection. The short circuit current design values at a **Connection Point** will be set out in the **Connection Agreement**.

CC.S1.1.3 **Generating Plant** Performance Requirements

CC.S1.1.3.1 For **Generating Units** not subject to **Central Dispatch** the electrical parameters required to be achieved at the **Generator Terminals** shall be specified by the **TSO** in the **Connection Agreement** or in a **Request for Proposal**, as the case may be.

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CC.S1.1.3.2 For **CDGUs** and for **CCGT Installations** (in relation to the **CCGT Modules** therein) the **Reactive Power** capability shall as a minimum be:

(i) rated power factor (lagging) = 0.8;

(ii) rated power factor (leading) = 0.95; and

(iii) short circuit ratio not less than 0.5.

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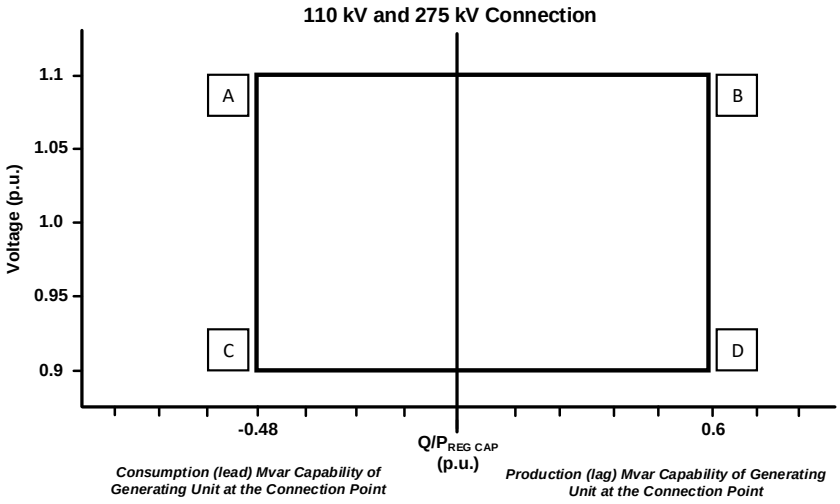
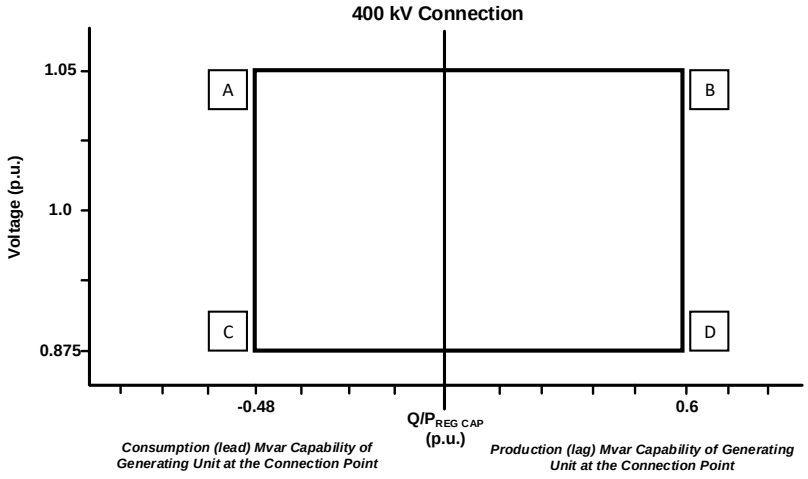
CC.S1.1.3.3 A **Generating Unit** shall continuously control voltage at the **Connection Point** within its **Reactive Power** capability limits.

(a) For **Generating Units**, the minimum **Reactive Power** capability is defined in the characteristic below, within the voltage limits specified under CC5.4.



Point A	**Mvar** consumption (lead) capability of the **Generating Unit** at **Registered Capacity** and **Voltage** of 1.1 p.u. at the **Connection Point**
Point B	**Mvar** consumption (lag) capability of the **Generating Unit** at **Registered Capacity** and **Voltage** of 1.1 p.u. at the **Connection Point**
Point C	**Mvar** consumption (lead) capability of the **Generating Unit** at **Registered Capacity** and **Voltage** of 0.9 p.u. at the **Connection Point**
Point D	**Mvar** consumption (lag) capability of the **Generating Unit** at **Registered Capacity** and **Voltage** of 0.9 p.u. at the **Connection Point**



Point A	**Mvar** consumption (lead) capability of the **Generating Unit** at **Registered Capacity** and **Voltage** of 1.05 p.u. at the **Connection Point**
Point B	**Mvar** consumption (lag) capability of the **Generating Unit** at **Registered Capacity** and **Voltage** of 1.05 p.u. at the **Connection Point**
Point C	**Mvar** consumption (lead) capability of the **Generating Unit** at **Registered Capacity** and **Voltage** of 0.875 p.u. at the **Connection Point**

Point D	**Mvar** consumption (lag) capability of the **Generating Unit** at **Registered Capacity** and **Voltage** of 0.875 p.u. at the **Connection Point**

(b) The **Generating Unit** shall be capable of moving to any operating point within the profiles above in appropriate timescales to target values requested by the **TSO**.

(c) With regard to **Reactive Power** below **Registered Capacity**, when operating at an **Active Power** output below **Registered Capacity**, the **Generating Unit** shall be capable of operating at every possible operating point in the **Reactive Power** capability of the **Generating Unit**, at least down to **Minimum Generation**. Even at reduced **Active Power** output, **Reactive Power** supply at the connection point shall correspond fully to the **Reactive Power** capability of that **Generating Unit**, taking the auxiliary supply power and the active and reactive power losses of the step-up transformer if applicable, into account.

(d) **Generating Units** shall fulfil the following requirements relating to robustness:

(i) in the event of power oscillations, **Generating Units** shall retain steady-state stability when operating at any point along the characteristics defined in CC.S1.1.3.3,

(ii) without prejudice to CC8.8.6.4, **Generating Units** shall be capable of remaining connected to the **Power System** without power reduction as long as voltage and frequency remain within the limits specified in CC5,

(iii) **Generating Units** shall be capable of remaining connected to the **Power System** during single-phase or three-phase auto –reclosures on meshed network lines, if applicable to which they are connected. The details of that capability shall be subject to coordination and agreements on protection schemes and settings as referred to in CC6.4.4,

(iv) the **TSO** and the **Generator** shall enter into an agreement regarding technical capabilities of the **Generating Unit** to aid angular stability under fault conditions.

(e) **Generating Units** shall fulfil the following requirements relating to voltage stability:

(i) without prejudice to CC.S1.1.9, **Generating Units** shall be capable of staying connected to the **Power System** and operating within the voltage ranges as specified in the table below;

Connection Voltage	Voltage Range	Time period for operation
110 kV	0.9 p.u. – 1.1 p.u.	unlimited
275 kV	0.9 p.u. – 1.09 p.u.	unlimited
400 kV	0.9 p.u. – 1.05 p.u.	unlimited

it is permissible to relax the 275 kV connection voltage range

requirement to 1.1 p.u. if lasting for no longer than 15 minutes,

(ii) the **TSO** may specify shorter periods of time during which **Generating Units** shall be capable of remaining connected to the **Power System** in the event of simultaneous overvoltage and underfrequency or simultaneous undervoltage and overfrequency,

(iii) wider voltage ranges or longer time periods for operation may be agreed with the **TSO** and **Generator**. If wider voltage ranges or longer minimum times for operation are economically and technically feasible, the **Generator** shall not unreasonably withhold an agreement,

(f) with regard to the voltage control system;

(i) the parameters and settings of the components of the voltage control system shall be agreed between the **Generator** and the **TSO**;

(ii) the agreement referred to in (a) shall cover the specifications and performance of an automatic voltage regulator (AVR) with regard to steady-state and transient voltage control and the specifications and performance of the excitation control system. The latter shall include:

- bandwidth limitation of the output signal to ensure the highest frequency of response cannot excite torsional oscillations on other **Generating Units** connected to the **Power System**;
- an underexcitation limiter to prevent the AVR from reducing the **Generation Units** excitation to a level which would endanger synchronous stability;
- an overexciatation limiter to ensure that the alternator excitation is not limited to less than the maximum value that can be achieved whilst ensuring that the **Generating Unit** is operating within its design limits;
- a stator current limiter; and
- a power system stabiliser function to attenuate power oscillations, this will be assessed by the **TSO** on a case by case basis.

CC.S1.1.3.4 The **TSO** may specify supplementary **Reactive Power** capability to be provided if the connection point of a **Generating Unit** is neither located at the high-voltage terminals of the step-up transformer to the voltage level of the connection point nor at the **Generating Unit** terminals if no step-up transformer exists. This supplementary Reactive Power shall compensate the **Reactive Power** demand of the high-voltage line or cable between the high-voltage terminals of the step-up transformer of the Generating Unit or its alternator terminals, if no step-up transformer exists, and the connection point and shall be provided by the responsible owner of that line or cable.

CC.S1.1.3.5 For **CDGUs** and **CCGT Installations** the minimum connected impedance applicable to the generator and **Generator Transformer** will be specified in the **Connection Agreement**. The **TSO**'s requirements for the impedances will reflect the needs of the **Transmission System** from the fault level and stability points of view.

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CC.S1.1.3.6 A **Generating Unit** must be capable of continuously supplying its **Registered Capacity** at a stable **Output** within the **System Frequency** range 49.5 Hz to 50.5 Hz. Within the **Frequency** range 49.5 Hz to 50.5 Hz there must be no reduction in **Output** whilst **Frequency** is falling. Any decrease in **Output** whilst **Frequency** is falling to a level below **Registered Capacity** occurring in the **Frequency** range 49.5 Hz to 47 Hz must not be more than pro rata with any decrease below nominal **Frequency**.

CC.S1.1.3.7 The **Output** should not be affected by voltage changes in the normal operating range specified in CC5.4.

CC.S1.1.3.8 A **Generating Unit** must be capable of remaining **Synchronised** to the **NI System** at an **Output** which is no greater than the lower of 80 **MW** or 40% of maximum continuous rating.

CC.S1.1.3.9 **Start-Up** and Ramp Rates

(a) A **Generating Unit** must be capable of **Start-Up**:

(i) from cold within 14 hours;
(ii) from warm within 5 hours;
(iii) from hot within 3 hours.

The block **Load** on synchronising must be no greater than 40 **MW**.

(b) A **Generating Unit** which is in a hot condition must be capable of ramping up from part-load pursuant to a **Dispatch** instruction at a rate of at least 3% of MCR per minute.

(c) A **Generating Unit** must be capable of de-loading at a rate of at least 3% of MCR per minute.

CC.S1.1.4 **Black Start Capability**

(a) The **NI System** is equipped with a **Black Start Capability** (to be utilised in accordance with OC7) achieved by incorporating such a capability at a number of strategically located **Power Station**s.

(b) Each **Connection Agreement** relating to a **Power Station** containing **CDGUs** or **CCGT Installations** will reflect whether any of such **CDGUs** or **CCGT**

Installations has a restart capability without connection to an external power supply (i.e. power which has not been generated at the **Power Station**). Such **Generating Plant** will be specified as a **Black Start Station** in the **Connection Agreement**.

(c) In order to ensure that the **NI System** continues to have a **Black Start Capability**, the **TSO** will require, as a condition of an offer of connection or as a term of the **Request for Proposal**, certain new **Generating Plants** to be **Black Start Stations** and **Users** must, in relation to such new **Generating Plant**, ensure that it has a **Black Start Capability**.

CC.S1.1.5 **Generating Unit** Control Arrangements

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CC.S1.1.5.1 Each **Generating Unit** must be capable, in accordance with CC.S1.1.5.2 and CC.S1.1.5.3, of contributing appropriately to **Frequency** and voltage control by continuous modulation of **Active Power** and **Reactive Power** supplied to the **Transmission System**.

CC.S1.1.5.2 Each **Generating Unit** with a **Registered Capacity** of 5 **MW** or more must be fitted with a fast acting proportional turbine speed governor to provide **Frequency Control** under normal operational conditions as specified by the **TSO** in the relevant **Connection Agreement**. Where a **Generating Unit** or **Power Station** becomes isolated from the rest of the **Transmission System** but is still supplying **Customers**, the speed governor must also be able to contribute to controlling **NI System Frequency** to below 52 Hz. As stated in CC5.3.2, the **NI System Frequency** could rise to 52 Hz or fall to 47 Hz. For steam turbine **Generating Units** the governor must be designed and operated to the relevant requirements of BS132. For gas turbine **Generating Units** the governor must be capable of operating with a nominal droop characteristic of 4%.

CC.S1.1.5.3 The **TSO** may specify in the relevant **Connection Agreement** that a continuously acting fast response automatic excitation control system is required to control the generator voltage without instability over the entire operating range of the **Generating Unit** or **Power Station**. This will be dependent on the size and type of **Generating Unit** or **Power Station** and the part of the **Transmission System** to which it is connected.

CC.S1.1.5.4 The **TSO** may specify the requirement for tap changing facilities on the **Generator Transformers** for all **Generating Units**. The tapping range and the step sizes will then be specified in the respective **Connection Agreements**.

CC.S1.1.5.5 The **TSO** may specify in the relevant **Connection Agreement** that a **Generating Unit** must be fitted with a **Unit Load Controller**. Where so specified, the **Generator** must ensure that the **Unit Load Controller** is in operation at all times and in accordance with the settings for **Frequency** trigger and reset point, time delay and droop as specified in the relevant **Connection Agreement** or such other settings as the **TSO** may notify to the **Generator** in writing on not less than two **Business Days'** notice, unless directed otherwise by the **TSO**.

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CC.S1.1.5.6 The **TSO** may specify in the relevant **Connection Agreement** that a **Generating Unit** must remain synchronised during and following any fault which could result in voltage dips at the **Connection Point** of no greater than 95% (5% retained).

CC.S1.1.6 Coordination with Existing **Protection**

CC.S1.1.6.1 Each **Generator** must meet, in relation to each of its **Generating Units**, the target clearance times for fault current interchange with the **Transmission System** in order to reduce to a minimum the impact on the **Transmission System** of faults on circuits owned by **Generator**s. The target clearance times are measured from fault current inception to arc extinction and will be specified by the **TSO** to meet the requirements of the relevant part of the **Transmission System**. A **Generator** may obtain relevant details specific to its **Generating Units** pursuant to CC.S1.1. The **TSO** shall ensure that (subject to any necessary discrimination) the same target fault clearance times can be achieved by its own **Plant** and **Apparatus** at each **Connection Point**.

CC.S1.1.6.2 Unless otherwise agreed, the fault clearance times specified in the **Connection Agreement** shall not be greater than:

(a) 100 ms at 275 kV; and

(b) 120 ms at 110 kV and below;

but, if otherwise agreed, nothing in this CC.S1.6.2 shall prevent a **Generating Unit** or the **TO's Plant** and **Apparatus** at the **Connection Point** from having faster clearance times (subject to necessary discrimination being maintained). The times specified in the **Connection Agreement** will reflect the **TSO 's** view of the requirements of the **Transmission System,** and the **User's System**, for the expected life time of the **Protection** (for example, 15 years). The probability that the fault clearance times stated in the **Connection Agreement** will be exceeded by any given fault must be less than 2%.

CC.S1.1.6.3 To cover for failure of the above **Protection** systems to meet the above fault clearance times, back up **Protection** shall be provided by the **Generator**. The back up **Protection** shall be required to discriminate with other **Protections** fitted on the **Transmission System**. Relevant details will be made available to a **Generator** upon request pursuant to CC.S1.1.

CC.S1.1.6.4 For **Generating Units** connected to the **Transmission System** the **Connection Agreement** will specify the **Protection** to be fitted which may include:

(a) circuit breaker fail **Protection**; and/or

(b) loss of excitation **Protection**; and/or

(c) pole slipping **Protection**.

CC.S1.1.6.5 The setting of any **Protection** controlling a circuit breaker or the operating values of any automatic switching device at any **Connection Point** shall have been agreed between the **TSO** and the **User** during the course of the application for a **Connection Agreement**. The settings and operating values will only be changed if both the **TSO** and the **User** agree provided that neither the **TSO** nor the **User** shall unreasonably withhold their consent.

CC.S1.1.6.6 If in the opinion of the **TSO** following an overall review of **Transmission System Protection** requirements improvements to any **Generating Unit Protection** scheme are necessary, the relevant provisions of the **Connection Agreement** shall be followed.

CC.S1.1.6.7 The **Generating Unit Protection** must co-ordinate with any auto reclose policy specified by the **TSO**.

CC.S1.1.7 Negative Phase Sequence Loadings

Generating Units shall be capable of withstanding, without tripping, a negative phase sequence loading incurred by clearance of a close-up phase-to-phase fault by **System** back-up **Protection** which will be within the **Apparatus** short time rating. The **TSO** will inform the **Generator** of the expected negative phase sequence loadings during the course of an application for a **Connection Agreement**.

CC.S1.1.8 Neutral **Earthing**

CC.S1.1.8.1 The winding configuration and method of **Earthing** of **Generating Units** and associated **Generator Transformer**s shall be agreed with the **TSO** or, if agreement cannot be reached, determined by the **TSO**.

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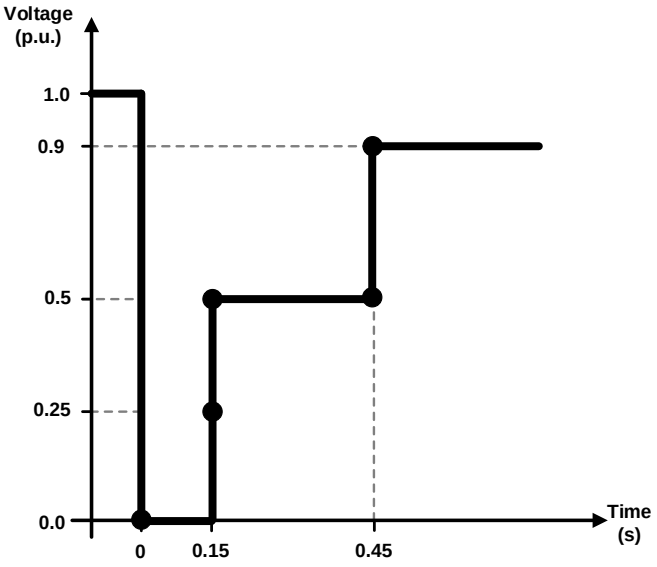
CC.S1.1.9 The **Active Power** output measured at each **Generating Unit** connection point should not be affected by;

(i) voltage changes in the normal operating range specified in CC5.4, and

(ii) secured symmetrical and asymmetrical faults.

CC.S1.1.9.1 In the event of a step change in voltage each **Generating Unit** shall remain connected to the **Transmission System** as specified in the following diagram.



CC.S1.1.9.2 The **Generating Unit** shall be capable of remaining connected to the network and continuing to operate stably while the **Voltage** remains above retained voltage (0 p.u.) during a fault. The **Generating Unit's** internal protection schemes and settings shall not unduly jeopardise fault ride through performance while the **Voltage** remains above retained voltage (0 p.u.).

CC.S1.1.9.3 Without prejudice to CC.S1.1.9.2 and with due regard to CC.S1.1.6, undervoltage protection (either fault ride through capability or minimum **Voltage** specified at the **Connection Point Voltage**) shall be set by the **Generator** according to the widest possible technical capability of the **Generating Unit**, unless the **TSO** requires narrower settings in accordance with CC6.4.4. The settings shall be justified by the **Generator** in accordance with this principle.

CC.S1.1.9.4 **Generating Units** shall be capable of staying connected to the network and operating stably after the **Power System** has been disturbed by secured faults. This capability should be in accordance with CC.S1.1.9.1. Following the fault clearance the **Generating Unit** shall return to prefault conditions subject to its normal **Governor Control System** and **Automatic Voltage Regulator** response unless oteherwise instructed by the **TSO**.

CC.S1.1.9.5 The **TSO** shall specify the pre-fault and post-fault conditions for the fault ride through capability in terms of:

(i) the calculation of the pre-fault minimum short circuit capacity at the connection point,

(ii) pre-fault **MW** and **Mvar** operating point of the Generating Unit at the **Connection Point** and **Voltage** at the **Connection Point**, and

(iii) calculation of the post-fault minimum short circuit capacity at the connection point;

the **TSO** will publish this data in the Transmission Forecast Statement which will be made publicly available via the **TSO's** website.

CC.S1.1.9.6 At the request of a **Generator**, the **TSO** shall provide the pre-fault and post fault conditions to be considered for fault ride through capability as an outcome of the calculations at the **Connection Point** as specified in CC.S1.1.9.5 :

(i) pre-fault short circuit capacity at each **Connection Point** expressed in MVA,

(ii) pre-fault **MW** and **Mvar** operating point of the Generating Unit at the **Connection Point** and **Voltage** at the **Connection Point**, and

(iii) post-fault minimum short circuit capacity at each connection point expressed in **MVA.**

alternatively, the **TSO** may provide generic values derived from typical cases.

CC.S1.1.9.7 The **TSO** and the **Generator** shall enter into an agreement regarding technical capabilities of the **Generating Unit** to aid angular stability under fault conditions.

PART II

TECHNICAL CRITERIA FOR GENERATING UNITS CONNECTED TO THE DISTRIBUTION SYSTEM OTHER THAN THOSE COMPRISED WITHIN PPMS

CC.S1.2.1 Applicability of Technical Design and Operational Criteria

(a) In this Schedule 1, Part II all references to **Generating Units** shall be read and construed as references only to **CDGUs** connected to the **Distribution System** other than **PPMs**. Such references shall not be read or construed as references to **Generating Units** connected to the **Distribution System** that form part of a **PPM**.

(b) At the point of connection to the **Distribution System**, all **Generating Units** with an **Output** of 10 **MW** or more shall meet the following technical design and operational criteria.

(c) **Generating Units** with an **Output** of 10 **MW** or more shall, as a minimum requirement comply with all relevant Engineering Recommendations and relevant regulations and the particular requirements of the **TSO** which will take account of the conditions prevailing on the **Transmission System** at the closest electric **Bulk Supply Point** at the relevant time. The **TSO** will notify its particular requirements to the **Generator** during the course of the **Generator's** submission of information under CC11.

(d) The **DNO** shall ensure that protection equipment applied to **Generators**, with an output of 5**MW** or more, in compliance with the requirements of Engineering Recommendation G59/1/NI (as amended, updated or superseded), are configured such that the **Generators** remain connected to the **NI System** whilst the frequency remains within the limits given in these **Connection Conditions** unless alternative arrangements have been agreed with the **TSO**.

(e) A **Generating Unit** with a **Registered Capacity** greater than the **MEC** at the **Connection Point**, as agreed in the relevant **Connection Agreement**, shall demonstrate Grid Code compliance with the technical design and operational requirements of the **Generating Unit** set out in Grid Code CC5, CC6, CC7 and CC8. Under such circumstances Grid Code compliance shall be demonstrated at the **MEC** rather than at the **Generating Unit Registered Capacity** to ensure the safe operation of the **Generators Plant** and **Apparatus** and the **DNO's Plant** and **Apparatus**. A **Generator** shall be issued with **Agreed compliance Testing and Monitoring Procedures** throughout the connection and commissioning programme of the **Generators** connection.

CC.S1.2.2 **Generating Unit** Connections

For **Generating Units** subject to **Central Dispatch**, each connection between a **Generating Unit** and the **Distribution System** where necessary must be controlled by a circuit breaker capable of synchronising at the point of connection.

CC.S1.2.3 **Generating Plant** Performance Requirements

CC.S1.2.3.1 A **Generating Unit** must be capable of continuously supplying its **Registered Capacity** at a stable **Output** within the **System Frequency** range 49.5 Hz to 50.5 Hz. Within the **Frequency** range 49.5 Hz to 50.5 Hz there must be no reduction in **Output** whilst **Frequency** is falling. Any decrease in **Output** whilst **Frequency** is falling to a level below **Registered Capacity** occurring in the **Frequency** range 49.5 Hz to 47 Hz must not be more than pro rata with any decrease below nominal **Frequency**.

CC.S1.2.3.2 The **Output** should not be affected by voltage changes in the normal operating range specified in the Electricity Supply Regulations (N.I.) 1991.

CC.S1.2.3.3 A **Generating Unit** must be capable of remaining **Synchronised** to the **NI System** at an **Output** which is no greater than the lower of 80 **MW** or 40% of maximum continuous rating.

CC.S1.2.3.4 **Start-Up** and Ramp Rates

(a) A **CDGU** must be capable of **Start-Up**:

(i) from cold within 14 hours;
(ii) from warm within 5 hours;
(iii) from hot within 3 hours.

The block **Load** on synchronising must be no greater than 40 **MW**.

(b) A **CDGU** which is in a hot condition must be capable of ramping up from part-load pursuant to a **Dispatch** instruction at a rate of at least 3% of MCR per minute.

(c) A **CDGU** must be capable of de-loading at a rate of at least 3% of MCR per minute.

CC.S1.2.4 **Generating Unit** Control Arrangements

CC.S1.2.4.1 Each **Generating Unit** must be capable, in accordance with CC.S1.2.4.2, of contributing appropriately to **Frequency** control by continuous modulation of **Active Power** supplied to the **NI System**.

CC.S1.2.4.2 Each **Generating Unit** which is a **CDGU,** with a **Registered Capacity** of 10 **MW** or more must be fitted with a fast acting proportional turbine speed governor to provide

Frequency Control under normal operational conditions as specified by the **TSO** from time to time. For steam turbine **Generating Units** the governor must be designed and operated to the relevant requirements of BS132. For gas turbine **Generating Units** the governor must be capable of operating with a nominal droop characteristic of 4%.

CC.S1.2.4.3 For Generating Units with a **Registered Capacity** of 10 **MW** or more, the **TSO** shall specify that a **Generating Unit** must be fitted with a **Unit Load Controller**. Where so specified, the **Generator** must ensure that the **Unit Load Controller** is in operation at all times and in accordance with the settings for **Frequency** trigger and reset point, time delay and droop as specified by the **TSO**.

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CC.S1.2.4.4 The **TSO** may specify in the relevant **Transmission Use of System Agreement** or **Grid Code Compliance Agreement** that a **Generating Unit** must remain synchronised during and following any fault which could result in voltage dips at the **Connection Point**. The magnitude and duration of such fault ride through capability will need to be agreed with the **User** and the **DNO**.

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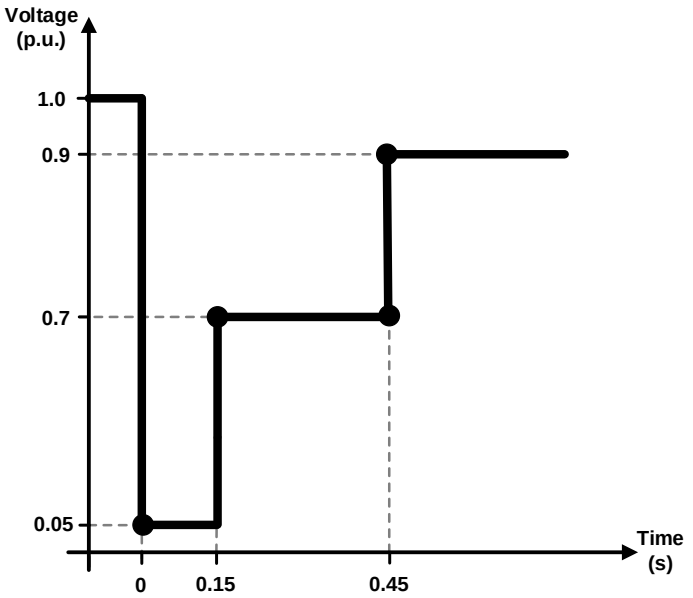
CC.S1.2.5 The **Active Power** output measured at each **Generating Unit** connection point should not be affected by;

(i) voltage changes in the normal operating range specified in CC5.4, and

(ii) secured symmetrical and asymmetrical faults.

CC.S1.2.5.1 In the event of a step change in **Voltage**, **Generating Units** with a **Registered Capacity** of 5 **MW** or more shall remain connected to the **Distribution System** as specified in the following diagram.



CC.S1. 2.5.2 The **Generating Unit** shall be capable of remaining connected to the network and continuing to operate stably while the **Voltage** remains above retained voltage (0.05 p.u.) during a fault. The **Generating Unit's** internal protection schemes and settings shall not unduly jeopardise fault ride through performance while the **Voltage** remains above retained voltage (0.05 p.u.).

CC.S1. 2.5.3 Without prejudice to CC.S1. 2.5.2, undervoltage protection (either fault ride through capability or minimum **Voltage** specified at the **Connection Point Voltage**) shall be set by the **Generator** according to the widest possible technical capability of the **Generating Unit**, unless the **TSO** requires narrower settings in accordance with CC6.4.4. The settings shall be justified by the **Generator** in accordance with this principle.

CC.S1. 2.5.4 **Generating Units** shall be capable of staying connected to the network and operating stably after the **Power System** has been disturbed by secured faults. This capability should be in accordance with CC.S1.2.5.1.

CC.S1.2.5.5 The **TSO** shall specify the pre-fault and post-fault conditions for the fault ride through capability in terms of:

(iv) the calculation of the pre-fault minimum short circuit capacity at the connection point,

(v) pre-fault **MW** and **Mvar** operating point of the Generating Unit at the **Connection Point** and **Voltage** at the **Connection Point**, and

(vi) calculation of the post-fault minimum short circuit capacity at the connection point;

the **TSO** will publish this data in the Transmission Forecast Statement which will be made publicly available via the **TSO's** website.

CC.S1.2.5.6 At the request of a **Generator**, the **TSO** shall provide the pre-fault and post fault conditions to be considered for fault ride through capability as an outcome of the calculations at the **Connection Point** as specified in CC.S1.1.9.5 :

(iv) pre-fault short circuit capacity at each **Connection Point** expressed in MVA,

(v) pre-fault **MW** and **Mvar** operating point of the Generating Unit at the **Connection Point** and **Voltage** at the **Connection Point**, and

(vi) post-fault minimum short circuit capacity at each connection point expressed in **MVA.**

alternatively, the **TSO** may provide generic values derived from typical cases.

PART I

TECHNICAL CRITERIA FOR PPMS CONNECTED TO THE TRANSMISSION SYSTEM

CC.S2.1.1 Applicability of Technical Design and Operational Criteria

(a) In this Schedule 2, Part I all references to **Generating Units** shall be read and construed as references only to **Generating Units** connected to the **Transmission System** that form part of a **PPM**. It shall not be deemed to refer to **CCGT Modules**, **Steam Turbine Units** and/or **Gas Turbine Units**.

(b) In this Schedule 2, Part I unless otherwise specified all references to measurements shall be deemed to be applicable at the **Connection Point** of the **PPM**.

(c) This Schedule 2, Part I contains technical, design and operational requirements for **PPMs** that are more detailed than those set out in CC6 and is intended to be complementary to CC6. However, in the event of any conflict between the requirements of CC6 and the requirements of this Schedule 2, the provisions of this Schedule 2 shall prevail. Detailed information relating to a particular connection will, where indicated below, be made available by the **TSO** on request by the **Generator**. A number of the requirements in this Schedule 2 (and specifically for **WFPS** the **WFPS Settings Schedule** and **PPMS** the **PPM Settings Schedule)** are applicable only to **Controllable PPMs** or **Dispatchable PPMs**. Such requirements are not, by definition, applicable to a **PPMs** first connected to the **Transmission System** before 1 April 2005 whose generators comprise a **Registered Capacity** of 5 **MW** or more, unless that **PPM** is subject to material modification, whereupon such a **PPM** shall, for the purposes of this Schedule 2 (and specifically for **WFPS** the **WFPS Settings Schedule** and **PPMS** the **PPM Settings Schedule**), be treated as a **Controllable PPM** or **Dispatchable PPM**.

(d) A **PPM** that is not a **Controllable PPM** or a **Dispatchable PPM** shall, as a minimum requirement, and in addition to the requirements of CC6, comply with all relevant Engineering Recommendations and relevant regulations and the particular requirements of the **TSO** which will take account of the conditions prevailing on the **Transmission System** at the **Connection Point** at the relevant time. The **TSO** will notify its particular requirements to the **Generator** during the course of the **Generator's** application for connection to the **Transmission System**.

(e) A **PPM** with a **Registered Capacity** greater than the **MEC** at the **Connection Point**, as agreed with the **TSO** in the **Connection Agreement**, shall demonstrate Grid Code compliance with the technical design and operational requirements of the **Generating Unit** set out in Grid Code CC5, CC6, CC7 and CC8. Under such circumstances Grid Code compliance shall be demonstrated at the **MEC** rather than at the **PPM Registered Capacity** to ensure the safe operation of the **Generators Plant** and **Apparatus** and the **TO's Plant** and **Apparatus**. The

Generator shall demonstrate Grid Code compliance in accordance with the **WFPS Setting Schedule** or **PPM Setting Schedule** which may be reviewed from time to time by the **TSO**.

CC.S2.1.2 **PPM** Connections

Each connection between a **PPM** and the **Transmission System** unless specified otherwise in the **Connection Agreement** must be controlled by a circuit breaker capable of interrupting the maximum short circuit current at the point of connection. The short circuit current design values at a **Connection Point** will be set out in the **Connection Agreement**.

CC.S2.1.3 **PPM** Performance Requirements

CC.S2.1.3.1 For **PPMs** that are not **Controllable PPMs** or **Dispatchable PPMs** the electrical parameters required to be achieved at the **Generator Terminals** shall be specified by the **TSO** in the **Connection Agreement** or in a **Request for Proposal**, as the case may be. For **PPMs** whose generators comprise a **Registered Capacity** of 2 **MW** or more**,** but less than 5 **MW**, the electrical parameters achieved at the **Generator Terminals** shall be monitored by the **TSO.**

CC.S2.1.3.2 A **PPM** shall continuously control voltage at the **Connection Point** within its **Reactive Power** capability limits. For **PPMs**, the minimum **Reactive Power** capability is defined in the characteristic below, within the voltage limits specified under CC5.4.

There are three **Voltage Control** modes:

(i) **Voltage Control** mode

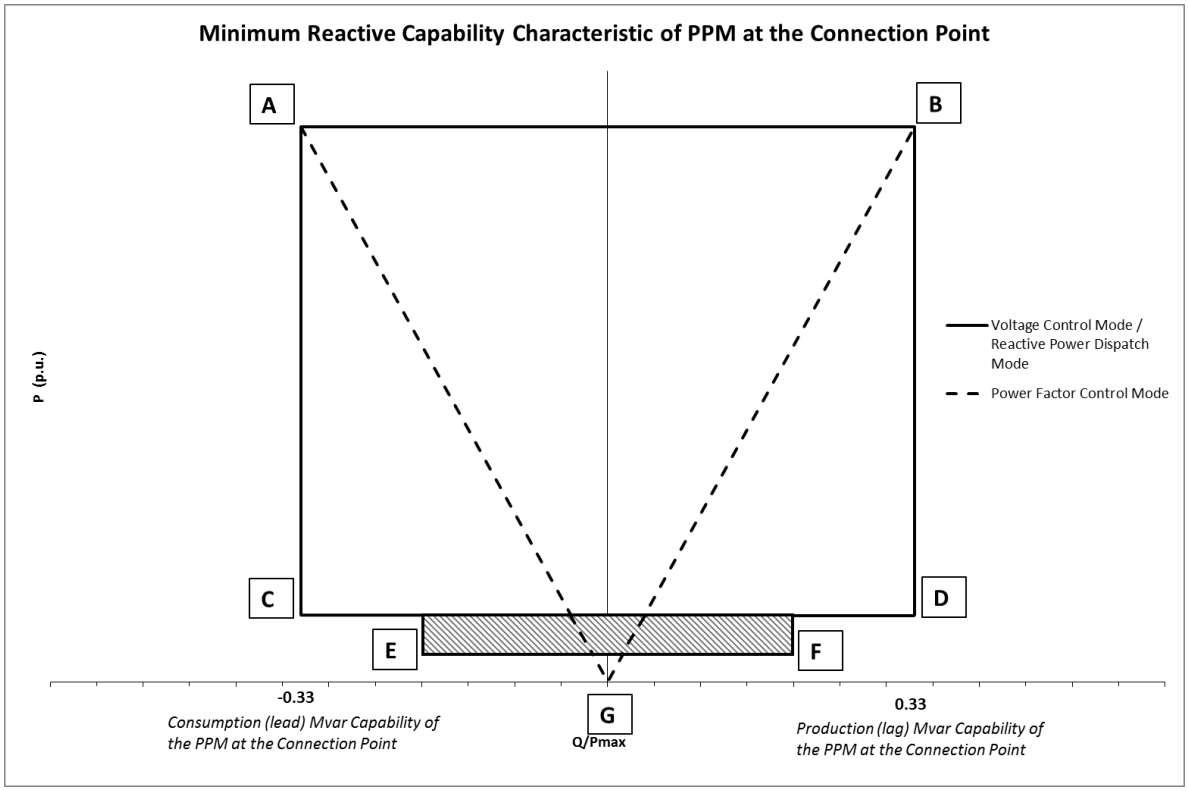
(ii) power factor control mode

(iii) **Reactive Power Dispatch**

Whilst the **PPM** with the exception of an **ESPS** is operating in **Voltage Control** mode the minimum reactive capability is defined by the envelope ABCDEF in the **Voltage Control** characteristic shown below. Points E and F will be defined by the **Generator** six weeks prior to energisation and confirmed by the **TSO** through Compliance testing. Whilst the **PPM** with the exception of an **ESPS** is operating in power factor control mode the reactive capability is defined by the envelope AGB in the power factor control mode characteristic shown below. Whilst the **PPM** with the exception of an **ESPS** is operating in **Reactive Power Dispatch** control mode, the **PPM**, as a minimum, must be capable of exporting or importing **Mvars** within the envelope ABCDEF.

For the avoidance of doubt, all measurements refer to the **Connection Point**.

All **PPMs** with the exception of an **ESPS** must be capable of responding to variations in the voltage of the **NI System** in accordance with the following diagram.

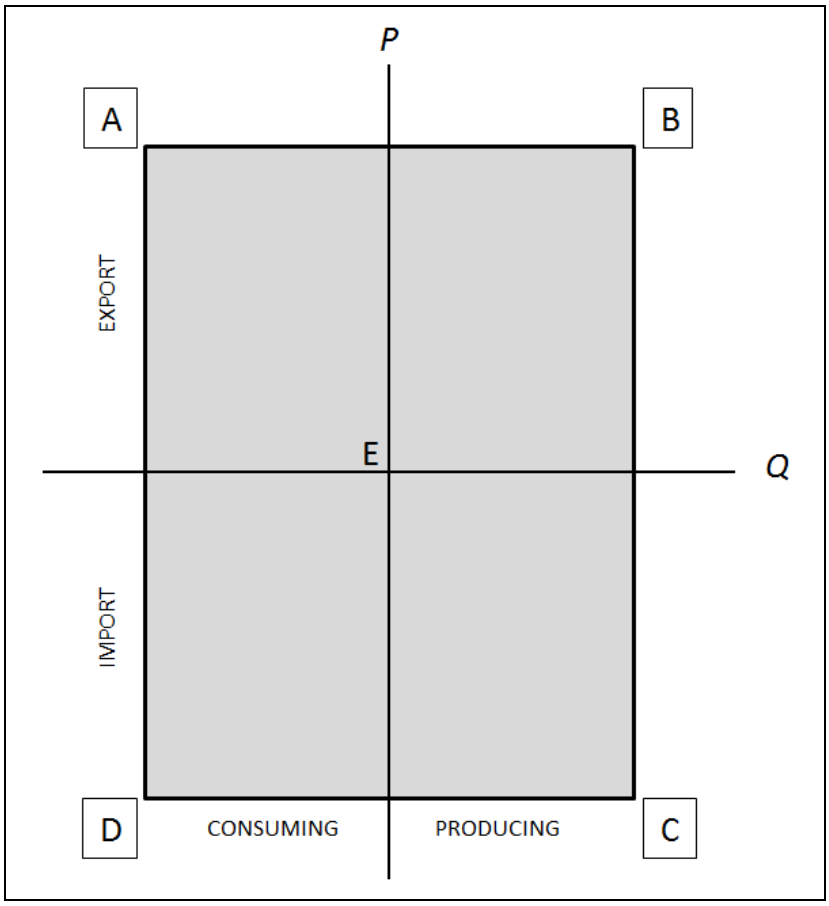


Point A	**Mvar** consumption (lead) capability of the **PPM** at **Registered Capacity** at the **Connection Point**
Point B	**Mvar** production (lag) capability of the **PPM** at **Registered Capacity** at the **Connection Point**
Point C	**Mvar** consumption (lead) capability of the **PPM** when **Output** is 12% of **Registered Capacity** at the **Connection Point**
Point D	**Mvar** production (lag) capability of the **PPM** when **Output** is 12% of **Registered Capacity** at the **Connection Point**
Point E	**Mvar** consumption (lead) capability when any of the **Generating Units** begins to export **Active Power** at the **Connection Point** (to be defined by **Generator**)
Point F	**Mvar** production (lag) capability when any of the **Generating Units** begins to export **Active Power** at the **Connection Point** (to be defined by **Generator**)

Diagram and Table showing the minimum Reactive Capability characteristic for non **ESPS PPMs**

Whilst the **PPM** consisting of an **ESPS** is operating in **Voltage Control** mode the minimum reactive capability is defined by the envelope ABCD in the **Voltage Control** characteristic shown below. Whilst the **PPM** consisting of an **ESPS** is operating in power factor control mode the reactive capability is enclosed by the envelope AEBA and DECD in the power factor control mode characteristic shown below. Whilst the **PPM** consisting of an **ESPS** is operating in **Reactive Power Dispatch** control mode, the **PPM**, as a minimum, must be capable of exporting or importing **Mvars** within the envelope ABCD.

For the avoidance of doubt, all measurements refer to the **Connection Point**.
PPMs consisting of **ESPSs** must be capable of responding to variations in the voltage of the **NI System** in accordance with the following diagram.



Point A	**Mvar** consumption (lead) capability of the **PPM** at **Registered Capacity** at the **Connection Point** and a Q/P ratio of -0.33 is equivalent to a leading power factor of -0.95.
Point B	**Mvar** production (lag) capability of the **PPM** at **Registered Capacity** at the **Connection Point** and a Q/P ratio of 0.33 is equivalent to a lagging power factor of 0.95
Point C	**Mvar** production (lag) capability of the **PPM** when **Output** is at **Maximum Import Capacity** (kW) and a Q capability equal to that of Point B at the **Connection Point**
Point D	**Mvar** consumption (lead) capability of the **PPM** when **Output** is at **Maximum Import Capacity** (kW) and a Q capability equal to that of Point A at the **Connection Point**
Point E	Is the intersection of the P and Q axes and represents zero active or reactive power flow.

Diagram and Table showing the minimum Reactive Capability characteristic for **ESPS PPMs**

All **PPMs** must be capable of responding to variations in the voltage of the **NI System** in accordance with CC5.4.

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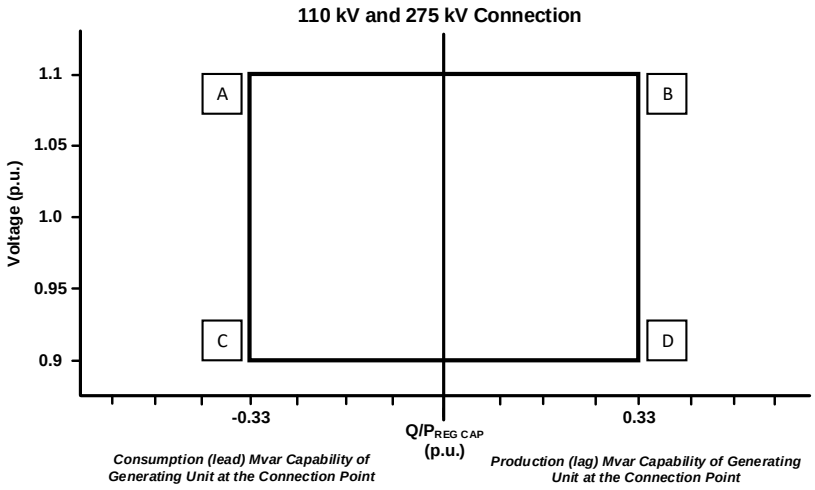
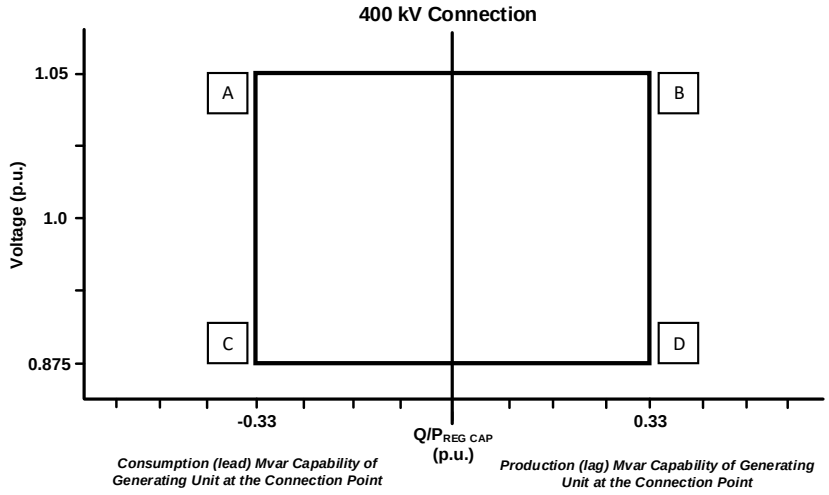
CC.S2.1.3.3 **PPMs** shall fulfil requirements in relation to voltage stability as defined in the characteristic below;

(a) For **PPMs**, the minimum **Reactive Power** capability is defined in the characteristic below, within the voltage limits specified under CC5.4.



Point A	**Mvar** consumption (lead) capability of the **PPM** at **Registered Capacity** and **Voltage** of 1.1 p.u. at the **Connection Point**
Point B	**Mvar** consumption (lag) capability of the **PPM** at **Registered Capacity** and **Voltage** of 1.1 p.u. at the **Connection Point**
Point C	**Mvar** consumption (lead) capability of the **PPM** at **Registered Capacity** and **Voltage** of 0.9 p.u. at the **Connection Point**
Point D	**Mvar** consumption (lag) capability of the **PPM** at **Registered Capacity** and **Voltage** of 0.9 p.u. at the **Connection Point**



Point A	**Mvar** consumption (lead) capability of the **PPM** at **Registered Capacity** and **Voltage** of 1.05 p.u. at the **Connection Point**
Point B	**Mvar** consumption (lag) capability of the **PPM** at **Registered Capacity** and **Voltage** of 1.05 p.u. at the **Connection Point**
Point C	**Mvar** consumption (lead) capability of the **PPM** at **Registered Capacity** and **Voltage** of 0.875 p.u. at the **Connection Point**
Point D	**Mvar** consumption (lag) capability of the **PPM** at **Registered Capacity** and **Voltage** of 0.875 p.u. at the **Connection Point**

(b) The **TSO** may specify supplementary **Reactive Power** to be provided if the **Connection Point** of a **PPM** is neither located at the high-voltage terminals of the step-up transformer to the voltage level of the **Connection Point** nor the converter terminals, if no step-up transformer exists. This supplementary **Reactive Power** demand of the high-voltage line or cable between the high-voltage terminals of the step-up transformer of the **PPM** or its converter terminals if no step-up transformer exits, and the **Connection Point**. This supplementary **Reactive Power** shall be provided by the responsible owner of that line or cable.

(c) When operating at an **Active Power** output below **Registered Capacity**, the **PPM** shall be capable of providing **Reactive Power** at any operating point inside characteristic above. If all **Generating Units** of that **PPM** are technically available that is to say they are not out of service due to maintenance or failure, otherwise there may be less **Reactive Power** capability taking into consideration the technical availabilities.

(d) The **PPM** shall be capable of moving to any operating point within the characteristic specified in CC.S2.1.3.3in appropriate timescales to target values requested by the **TSO**.

(e) For the purpose of **Reactive Power Dispatch**, the **PPM** shall be capable of setting the **Reactive Power** setpoint anywhere in the **Reactive Power** range specified in CC.S2.1.3.3 and with regard to CC.S2.1.3.3 (b). The setting steps shall be no

greater than 5 **MVAr** or 5 % (whichever is the minimum) of full **Reactive Power** at the **Connection Point** to an accuracy within plus or minus 5 **MVAr** or plus or minus 5 % (whichever is the minimum) of the full **Reactive Power**.

(f) The **PPM** shall be capable of contributing to damping of power oscillations. The voltage and reactive power control characteristics of the **PPM** must not adversely affect the damping of power oscillations.

CC.S2.1.3.4 **PPMS** shall fulfil the following requirements relating to robustness:

(i) in the event of power oscillations, **PPMS** shall retain steady-state stability when operating at any point along the characteristics defined in CC.S2.1.3.3,

(ii) without prejudice to CC8.8.6.4, **PPMS** shall be capable of remaining connected to the **Power System** without power reduction as long as voltage and frequency remain within the limits specified in CC5,

(iii) **PPMS** shall be capable of remaining connected to the **Power System** during single-phase or three-phase auto–reclosures on meshed network lines, if applicable to which they are connected. The details of that capability shall be subject to coordination and agreements on protection schemes and settings as referred to in CC6.4.4.

CC.S2.1.3.5 **PPMS** shall fulfil the following requirements relating to voltage stability:

(i) without prejudice to CC.S2.1.4 **PPMS** shall be capable of staying connected to the **Power System** and operating within the voltage ranges as specified in the table below;

Connection Voltage	Voltage Range	Time period for operation
110 kV	0.9 p.u. – 1.1 p.u.	unlimited
275 kV	0.9 p.u. – 1.09 p.u.	unlimited
400 kV	0.9 p.u. – 1.05 p.u.	unlimited

it is permissible to relax the 275 kV connection voltage range requirement to 1.1 p.u. if lasting for no longer than 15 minutes,

(ii) the **TSO** may specify shorter periods of time during which **PPMS** shall be capable of remaining connected to the **Power System** in the event of simultaneous overvoltage and underfrequency or simultaneous undervoltage and overfrequency

(iii) wider voltage ranges or longer time periods for operation may be agreed with the **TSO** and **Generator**. If wider voltage ranges or longer minimum times for operation are economically and technically feasible, the **Generator** shall not unreasonably withhold an agreement,

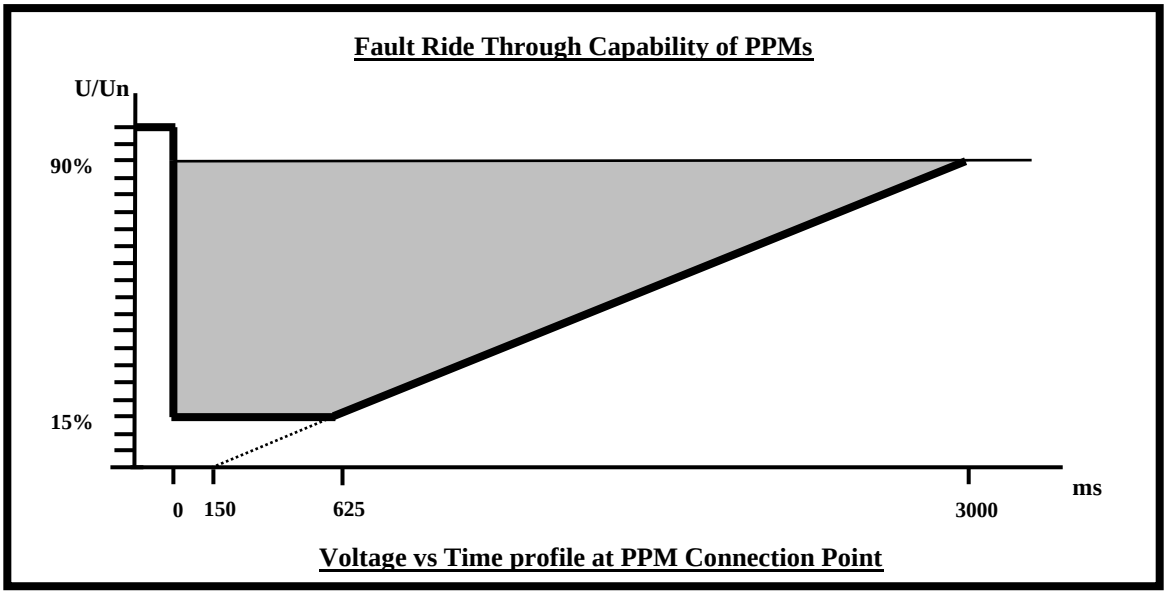
CC.S2.1.3.6 For **PPMs** the minimum connected impedance applicable to the whole **PPM** as a single unit will be specified in the **Connection Agreement**. The **TSO's** requirements

for the impedance will reflect the needs of the **Transmission System** from the fault level and stability points of view.

CC.S2.1.3.7 Given resource levels equal to or greater than the level required to generate **Active Power**, and equal to or lower than the level at which the **PPM** can no longer safely produce **Active Power**, for operation of the generators in the **PPM**, both as specified within the **Connection Agreement** for the particular site, a **PPM** must be capable of continuously supplying **Output** in accordance with the power curve as specified/set out in the **Connection Agreement** within the **System Frequency** range 49.5 Hz to 50.5 Hz. Within the **Frequency** range 49.5 Hz to 50.5 Hz there must be no reduction in **Output** whilst **Frequency** is falling. Any decrease in **Output** to a level below the **Output** to be delivered in accordance with the power curve as specified/set out in the **Connection Agreement** occurring in the **Frequency** range 49.5 Hz to 47 Hz must not be more than pro rata with any decrease below nominal **Frequency**.

CC.S2.1.3.8 The **Output** measured at each generator terminal should not be affected by voltage changes in the normal operating range specified in CC5.4.

CC.S2.1.3. 9 (a) In the event of a step change in voltage each **PPM** first connected to the **Transmission System** on or after 1 April 2005 shall remain connected to the **Transmission System** as specified in the following diagram and the remainder of this CC.S2.3.6.



(b) **WFPSs** first connected to the **Transmission System** prior to 1 April 2005 shall not be required to comply with the requirements in the above diagram save where the **PPM** is subject to material modification involving the installation of additional **Generating Units** in which case an assessment will be carried out by the **TSO** with the **Generator** to establish which elements of **Non-RfG Generation Units** and **RfG Generation Units** of the Grid Code are applicable.

(c) The speed of response of the **PPM** control system should be such that following a step change in voltage and recovery to the normal operating range the **PPM** should achieve and maintain on average at least 90% of its steady state active power response, measured by **Output**, at the **Connection Point** within 500ms of the voltage recovery to the normal range for faults cleared within 140ms. For longer duration faults, the **PPM** shall provide at least 90% of its steady state active power response, measured by **Output**, at **the Connection Point** within 1 second of the voltage recovery to the normal range.

(d) **PPMs** shall not consume on average more reactive power in the 10 seconds following a disturbance on the **Transmission System** than they did immediately before the occurrence of the disturbance. Where a **PPM** is supporting the **Transmission System** voltage through reactive power export, it shall not draw reactive power during or immediately following the disturbance.

(e) In order to ensure the continued performance of each **PPM** the **Generator** shall meet the reasonable costs of the **TSO** in providing and maintaining a **Monitoring**, recording and transmitting device.

(f) Each **PPM** shall be capable of satisfactory operation at any voltage within the range 0% - 120% for the minimum time periods specified below. Other voltage thresholds may be possible but agreement between the **Generator** and the **TSO** must be reached about their suitability at the application stage for connection.

Minimum time periods:

Voltage Range (U/Un)	**Time requirement, minimum**
115% - 120%	2 seconds
110% - 115%	10 seconds
90% - 110%	Continuous operation
0% - 90%	As per Fault Ride Through Capability of PPMs chart (CC.S2.1.3.7(a))

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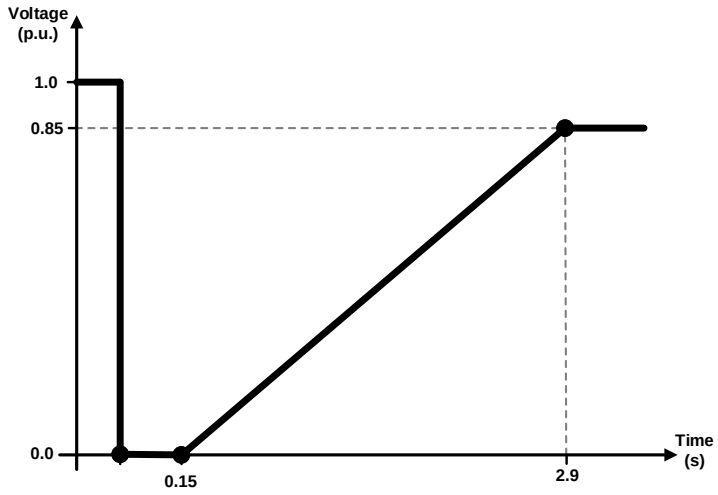
CC.S2.1.4 The **Active Power** output measured at each **PPM** connection point should not be affected by;

(i) voltage changes in the normal operating range specified in CC5.4, and

(ii) secured symmetrical and asymmetrical faults.

In the event of a step change in voltage each **PPM** shall remain connected to the **Transmission System** as specified in the following diagram.



CC.S2.1.4.1 The **PPM** shall be capable of remaining connected to the network and continuing to operate stably while the **Voltage** remains above retained voltage (0 p.u.) during a fault. The **PPM's** internal protection schemes and settings shall not unduly jeopardise fault ride through performance while the **Voltage** remains above retained voltage (0 p.u.).

CC.S2.1.4.2 Without prejudice to CC.S2.1.4 and with due regard to CC.S2.1.8, undervoltage protection (either fault ride through capability or minimum **Voltage** specified at the **Connection Point Voltage**) shall be set by the **Generator** according to the widest possible technical capability of the **PPM**, unless the **TSO** requires narrower settings in accordance with CC6.4.4.The settings shall be justified by the **Generator** in accordance with this principle.

CC.S2.1.4.2 **PPMS** shall be capable of staying connected to the network and operating stably after the **Power System** has been disturbed by secured faults. This capability should be in accordance with CC.S2.1.4.

CC.S2.1.4.3 The **TSO** shall specify the pre-fault and post-fault conditions for the fault ride through capability in terms of:

(i) the calculation of the pre-fault minimum short circuit capacity at the connection point,

(ii) pre-fault **MW** and **Mvar** operating point of the Generating Unit at the **Connection Point** and **Voltage** at the **Connection Point**, and

(iii) calculation of the post-fault minimum short circuit capacity at the connection point;

the **TSO** will publish this data in the Transmission Forecast Statement which will be made publicly available via the **TSO's** website.

CC.S2.1.4.4 At the request of a **Generator**, the **TSO** shall provide the pre-fault and post fault conditions to be considered for fault ride through capability as an outcome of the calculations at the **Connection Point** as specified in CC.S2.1.4.3:

(i) pre-fault short circuit capacity at each **Connection Point** expressed in MVA,

(ii) pre-fault **MW** and **Mvar** operating point of the Generating Unit at the **Connection Point** and **Voltage** at the **Connection Point**, and

(iii) post-fault minimum short circuit capacity at each connection point expressed in **MVA.**

alternatively, the **TSO** may provide generic values derived from typical cases.

CC.S2.1.4.5 A **PPM** shall be capable of providing fast fault current at the connection point in the case of symmetrical and asymmetrical faults, under the following conditions:

(a)the **PPM** shall be capable of activating the supply of fast fault current either by:

(i) ensuring the supply of the fast fault current at the connection point, or

(ii) measuring voltage deviations at the terminals of the individual **Generating Units** of the **PPM** and providing fast fault current at the terminals of these units;

(b) the **PPM** shall provide fast fault current at the connection point;

(i) during voltage dips below 0.9 p.u., and

(ii) until voltage has recovered to within normal operating voltage range,

(c) the **PPM** shall prioritise reactive current injection during the duration of

the voltage deviation remaining within the rating of **PPM** capability. The **PPM** shall provide fast fault current injection with a rise time no greater than 100 ms and a settling time no greater than 300 ms,

CC.S2.1.4.6 Regarding post-fault **Active Power** recovery the speed of response of the **PPM** control system should be such that following a step change in voltage and recovery to the normal operating range the **PPM** should achieve and maintain on average at least 90% of its steady state active power response, measured by **Output**, at the **Connection Point** within 500ms of the voltage recovery to the normal range for faults cleared within 140ms. For longer duration faults, the **PPM** shall provide at least 90% of its steady state active power response, measured by **Output**, at **the Connection Point** within 1 second of the voltage recovery to the normal range. The **PPM** control system shall ensure that any **Active Power** oscillations following post fault **Active Power** recovery must be adequately damped.

CC.S2.1.5 Ramp Rates

For PPMs with the exception of ESPSs:

(a) The **PPM** control system shall be capable of controlling the ramp rate of its **Active Power Output**. There shall be three ramp rate capabilities designated, **Resource Following Ramp Rate, Active Power Control Set-Point Ramp Rate** and **Frequency Response Ramp Rate**. The **PPM** control system shall operate the ramp rates with the following order of priority (high to low): **Frequency Response Ramp Rate; Active Power Control Set-Point Ramp Rate; Resource Following Ramp Rate**. It shall be possible to vary the **Resource Following Ramp Rate** over a range between 1% and 100% of **Registered Capacity** per minute. The ramp rate is the average rate of change in **Output** measured over any 10 minute period. The ramp rate averaged over 1 minute should not exceed 3 times the average ramp rate over 10 minutes.

(b) A **Controllable PPM** or a **Dispatchable PPM** shall have a ramp **Frequency** controller, which on **Start-Up** and during normal operation of any **Controllable PPM** or **Dispatchable PPM** shall only allow an increase in **Active Power Output** when the **System Frequency** is below a set value. This set value in the ramp **Frequency** controller should be capable of being set in the range 50.0 Hz to 52.0 Hz in steps of 0.1 Hz.

(c) During operation the **TSO** may send to the **Generator** a positive ramp blocking signal if the **NI System** would otherwise be at risk from excess **Frequency** movements. This signal is designed to restrain **PPMs** from ramping above the previous 10 minute average level at the time of receiving the signal. The **PPM** may continue to supply **Output** up to this level until the signal is removed. The **TSO** will remove the ramp blocking signal as soon as stable conditions on the **NI System** are restored, as determined by the **TSO**.

(d) Unless the **Controllable PPM** or **Dispatchable PPM** has a continually manned control point the **TSO** shall send SCADA signals indicating that a process of increasing/decreasing maximum **Output** is to be initiated and the time interval over which the increase/decrease of

Output is to be achieved. A **Controllable PPM** or **Dispatchable PPM** receiving such a signal shall send a SCADA signal in response confirming that it has received the SCADA signal from the **TSO**. The increase/decrease in **Active Power Output** of the **Controllable PPM** or **Dispatchable PPM** shall be at the **Active Power Control Set-Point Ramp Rate**. For the avoidance of doubt nothing in this CC.S2.1.~~3.8~~5(d) shall be construed as requiring a **Controllable PPM** or **Dispatchable PPM** to operate beyond its technical limits.

(e) Upon removal of an **Active Power Dispatch Instruction** sent by the **TSO** via SCADA when the **PPM** is operating in an **Active Power** control mode and under normal operational conditions, the **PPM** shall ramp at the **Resource Following Ramp Rate**.

(f) The ramp rate requirements for **PPMs** need not be met in the case of the resource availability falling at a greater rate than that which would be required to control the **Output** to be within the ramp rate.

(g) In the absence of a **TSO Dispatch Instruction**, each **Generating Unit** comprising a **Controllable PPM** or **Dispatchable PPM** must operate as per the power curve submitted to the **TSO** and remain connected to the **NI System** between the upper and lower limit of resource level needed for a **Generating Unit** to generate **Active Power**.

For PPMs consisting of ESPSs:

(h) The **PPM** control system shall be capable of controlling the ramp rate of its **Active Power**. There shall be three ramp rate capabilities designated, **Capacity Limited Ramp Rate, Active Power Control Set-Point Ramp Rate** and **Frequency Response Ramp Rate**. These ramp rates co-exist and the **PPM** control system shall operate the ramp rates with the following order of priority (high to low): **Capacity Limited Ramp Rate**; **Frequency Response Ramp Rate; Active Power Control Set-Point Ramp Rate**. It shall be possible to vary the **Capacity Limited Ramp Rate** between the following values. Minimum value shall be the lower of 10% **Registered Capacity** per minute or 5MW per minute. If 5MW is lower than 1% of **Registered Capacity**, then the minimum value shall be 1% of **Registered Capacity** per minute. Maximum value shall be 100% of **Registered Capacity** per minute. It shall be possible to vary the **Active Power Control Set-Point Ramp Rate** over a range between 1% and 100% of **Registered Capacity** per minute. The ramp rate is the average rate of change in **Active Power** measured over any 10 minute period. The ramp rate averaged over 1 minute should not exceed 3 times the average ramp rate over 10 minutes.

(i) Unless the **Controllable PPM** or **Dispatchable PPM** has a continually manned control point the **TSO** shall send SCADA signals indicating that a process of increasing/decreasing Active Power is to be initiated. A **Controllable PPM** or **Dispatchable PPM** receiving such a signal shall send a SCADA signal in response confirming that it has received the SCADA signal from the **TSO**. The increase/decrease in **Active Power Output** of the **Controllable PPM** or **Dispatchable PPM** shall be at the **Active Power Control Set-Point Ramp Rate**. For the avoidance of doubt nothing in this CC.S2.1.5(i) shall be construed as requiring a **Controllable PPM** or **Dispatchable PPM** to operate beyond its technical limits.

(j) The ramp rate requirements for **PPMs** need not be met in the case of the **ESPSs** import/export energy capacity becoming limited. Under these conditions the **ESPS** shall ramp at the **Capacity Limited Ramp Rate**.

CC.S2.1.6 **Black Start Capability**

A **PPM** is not required to provide **Energy** to any part of the **NI System** during the restoration of power process following a **Black Start** and therefore does not require a **Black Start Capability**. For the avoidance of doubt a **PPM** will be disconnected from the **NI System** during **Black Start** conditions until the **NI System** is restored to a stable operating mode, as determined by the **TSO**.

CC.S2.1.7 **PPM** Control Arrangements

CC.S2.1.7.1 Each **Controllable PPM** or **Dispatchable PPM** must be capable, in accordance with CC.S2.1.7.2 and CC.S2.1.7.3, of contributing appropriately, as reasonably specified by the **TSO**, to **Frequency** and voltage by continuous modulation of **Active** and **Reactive Power** supplied to the **Transmission System**.

CC.S2.1.7.2

(a) Each **Controllable PPM** or **Dispatchable PPM** must be fitted with a **Fast Acting** proportional power governor to provide **Frequency Control** under normal operational conditions. This **Fast Acting** proportional governor should be equipped with controls which allow the droop or equivalent for **PPMs** consisting of **ESPSs** to be set independently in the range 2% to 20% above and below 50.0 Hz. A deadband within which no control will be exercised must be capable of being set with a lower limit between 49.0 Hz and 50.0 Hz in steps of 0.05 Hz and an upper limit between 50.0 Hz and 51.0 Hz in steps of 0.05 Hz. Whilst responding to **Frequency** excursions on the **System** the change in **Active Power** of the **Controllable PPM** or **Dispatchable PPM** shall be at the **Frequency Response Ramp Rate**. In addition a high **Frequency** trip facility must be provided capable of being set in the range 51.0 Hz to 52.0 Hz in steps of 0.1 Hz. Where a **Controllable PPM** or **Dispatchable PPM** becomes isolated from the rest of the **Transmission System** the **Controllable PPM** or **Dispatchable PPM** must immediately detect the condition and shut itself down.

(b) Under certain **System** conditions the **TSO** may require a **Controllable PPM** or a **Dispatchable PPM** to operate below its maximum instantaneous **Output** on a droop or equivalent for **PPMs** consisting of **ESPSs** setting to be set in the range 2% to 20%. In this mode of operation the **Controllable PPM** or **Dispatchable PPM** will be providing some of the **System** reserve. The **Controllable PPM** or **Dispatchable PPM** controller must be capable of being set to operate in a constrained manner within the range of at least 50% to 100% of maximum instantaneous **Output**.

CC.S2.1.7.3

(a) Each **Controllable PPM** or **Dispatchable PPM** must be fitted with a **Fast Acting** control system capable of being switched to control the **Controllable PPM** or **Dispatchable PPM** voltage; power factor or the **Reactive Power** output at the **Connection Point**. These control modes must maintain the voltage at the **Connection Point** within a voltage band as specified within the **Connection Agreement** for the particular site, and in any case within statutory limits as specified under CC5.4. A **PPM** shall be capable of continuously controlling voltage at the **Connection Point** within its **Reactive Power** capability limits when instructed to do so by the **TSO** via SCADA signals. If the voltage exceeds the specified band the power factor control or **Reactive Power** control must revert to voltage control. The control of voltage, power factor and **Reactive Power Dispatch** must ensure stable operation over the entire operating range of the **Controllable PPM** or **Dispatchable PPM**. In the event that action by the **Controllable PPM** or **Dispatchable PPM** active and reactive power control functions is unable to achieve a sustained voltage within the statutory limits, the **Controllable PPM** or **Dispatchable PPM** must detect this and immediately shut down.

(b) Other voltage control schemes may be possible but agreement between the **Generator** and the **TSO** must be reached at the application stage for connection about their suitability. If voltage control is implemented for the **Controllable PPM** or **Dispatchable PPM**, rather than on individual **Generating Units**, then the range of power factor available should not be less than that which would have been available if voltage control had been on individual **Generating Units**. Voltage control schemes based upon equipment located on the **TSO's** side of the connection may be possible, but such schemes are considered special, and the details, responsibilities and cost schedule must be agreed between the **Generator** and the **TSO** in the **Connection Agreement**.

(c) In order to deal with **Controllable PPMs** or **Dispatchable PPMs** inducing power fluctuations, an additional control loop must be provided by the **Generator** to ensure that the **Generating Unit** control system, wind turbulence or other factors in the **Controllable PPM** or **Dispatchable PPM** cannot produce power oscillations between 0.25 Hz and 1.75 Hz. It should be designed and operated to ensure that the total peak-to-peak **MW** oscillation within this **Frequency** range is less than 1% of the **Registered Capacity** of the **Controllable PPM** or **Dispatchable PPM.**

CC.S2.1.7.4 The **TSO** may specify the requirement for tap changing facilities on the **Site** Transformer(s) for **PPMs**. Where a suitable **Site** Transformer does not exist the requirement may be applied to individual **Generator Transformers**. The tapping range and the step sizes will then be specified in the respective **Connection Agreements**.

CC.S2.1.8 Coordination with Existing **Protection**

CC.S2.1.8.1 A **Generator** must meet, in relation to a **PPM**, the target clearance times for fault current interchange with the **Transmission System** in order to reduce to a minimum the impact on the **Transmission System** of faults on circuits owned by **Generators**.

The target clearance times are measured from fault current inception to arc extinction and will be specified by the **TSO** to meet the requirements of the relevant part of the **Transmission System**. A **Generator** may obtain relevant details specific to its **PPM** pursuant to CC.S2.1.

CC.S2.1.8.2 Unless otherwise agreed in the **Connection Agreement**, nothing in this CC.S2.6.2 shall prevent a **PPM** or the **TO's Plant** and **Apparatus** at the **Connection Point** from having faster clearance times than those specified in the **Connection Agreement** (subject to necessary discrimination being maintained). The times specified in the **Connection Agreement** will reflect the **TSO's** view of the requirements of both the **Transmission System** and the **User's System** for the expected life time of the **Protection** (for example, 15 years). The probability that the fault clearance times stated in the **Connection Agreement** will be exceeded by any given fault must be less than 2%.

CC.S2.1.8.3 To cover for failure of the above **Protection** systems to meet the above fault clearance times, back up **Protection** shall be provided by the **Generator**. The backup **Protection** shall be required to discriminate with other protections fitted on the **Transmission System**. Relevant details will be made available to a **Generator** upon request pursuant to CC.S2.1.

CC.S2.1.8.4 For **PPMs** connected to the **Transmission System** the **Connection Agreement** will specify the **Protection** to be fitted, which may include circuit breaker fail **Protection**.

CC.S2.1.8.5 The setting of any **Protection** controlling a circuit breaker or the operating values of any automatic switching device at any **Connection Point** shall have been agreed between the **TSO** and the **User** during the course of the application for a **Connection Agreement**. The settings and operating values will only be changed if both the **TSO** and the **User** agree provided that neither the **TSO** nor the **User** shall unreasonably withhold their consent.

CC.S2.1.8.6 If in the opinion of the **TSO** following an overall review of **Transmission System Protection** requirements improvements to any **PPM Protection** scheme are necessary, the relevant provisions of the **Connection Agreement** shall be followed.

CC.S2.1.8.7 The **PPM Protection** must co-ordinate with any auto reclose policy specified by the **TSO**.

CC.S2.1.9 Negative Phase Sequence Loadings

PPMs shall be capable of withstanding, without tripping, a negative phase sequence loading incurred by clearance of a close-up phase-to-phase fault by **System** back-up **Protection** which will be within the **Apparatus** short time rating the **TSO** will inform the **Generator** of the expected negative phase sequence loadings during the course of an application for a **Connection Agreement**.

CC.S2.1.10 Neutral **Earthing**

CC.S2.1.10.1 The winding configuration and method of **Earthing** of **PPMs** and associated **Generator Transformers** shall be agreed with the **TSO** or, if agreement cannot be reached, determined by the **TSO**.

CC.S2.1.11 **Automatic Load Shedding Devices**

CC.S2.1.11.1 There is an expectation that **PPMs** will continue to operate outside statutory **Frequency** limits. However, it is likely that this could mean connection within an **Automatic Load Shedding** zone as detailed in OC4. Consequently, **Users** shall ensure that **Protection** on **PPMs** shall have settings to co-ordinate with the settings on the **Automatic Load Shedding** equipment as detailed by the **TSO** on request by the **User**.

CC.S2.1.11.2

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(a) Each **PPM** shall be capable of satisfactory operation at any **Frequency** within the range of 47.0 Hz to 52.0 Hz for the minimum time periods specified below unless the **TSO** has agreed to the use of any **Frequency** level relays which will trip the **PPM** within this **Frequency** range.

Minimum time periods:

Frequency Range	**Time requirement, minimum**
50.5 Hz – 52.0 Hz	60 minutes
49.5 Hz – 50.5 Hz	Continuous operation
47.5 Hz – 49.5 Hz	60 minutes
47.0 Hz – 47.5 Hz	20 seconds

(b) Where **PPMs** are equipped with **Rate of Change of Frequency** relays or other devices which measure and operate in relation to a **Rate of Change of Frequency** (e.g. a governor) the procedure in CC.S2.9.2(c) below will be followed to ensure satisfactory operation of the **PPMs**.

(c) (i) At a reasonable time prior to a **PPM** being connected to the **Transmission System**, and prior to any relevant modification to a **PPM** or any relevant **Power Station Equipment**, the **Generator** shall contact the **TSO** with details of the proposed rate-of-change-of-**Frequency** setting.

(ii) The **TSO** shall, within a reasonable period and in any case no more than 28 days, discuss with the **Generator** whether the proposed settings are satisfactory. The agreed settings shall be specified in the **Connection Agreement**.

(iii) In relation to any **Generator** which has agreed the settings with the **TSO** under these provisions, the **TSO** shall notify that **Generator** of any change of which it is aware in the expected rate-of-change-of-**Frequency** on the **NI System** which may require new settings to be agreed.

CC.S2.1.11.3 Each **Generator** shall be responsible for protecting the **PPMs** owned or operated by it against the risk of damage which might result from any **Frequency** excursion outside the range 52 Hz to 47 Hz and for deciding whether or not to interrupt the connection between its **Plant** and/or **Apparatus** and the **Transmission System** in the event of such a **Frequency** excursion.

CC.S2.1.12 Additional information

CC.S2.1.12.1 Each **Generator**, in relation to a **WFPS**, shall provide the calculated **Output** for the **WFPS** as part of the application for connection of that **WFPS** to the **Transmission System**. This will take the form of a diagram showing wind speed and direction against electrical output in **MW**, in "rose" format. In relation to **PPM** that are not **WFPS**, an equivalent diagram relating to the input resource of that **PPM** shall be provided. Following connection, the **WFPS** shall be monitored for a period to confirm the validity of the calculations, which may be used for future **Output** predictions. This **Monitoring** shall be completed before a Final Operational Notification is issued.

CC.S2.1.12.2 For the avoidance of doubt all requirements in this Schedule 2, Part I, shall be applicable to **Energy Storage Power Stations (ESPS)** under the full range of operation and shall not be interpreted to only apply during times the **ESPS** is providing **Active Power** or **Reactive Power** to the **System**.

PART II

TECHNICAL CRITERIA FOR PPMS CONNECTED TO THE DISTRIBUTION SYSTEM

CC.S2.2.1 Applicability of Technical Design and Operational Criteria

(a) In this Schedule 2, Part II all references to **Generating Units** shall be read and construed as references only to **Generating Units** connected to the **Distribution System** that form part of a **PPM**. It shall not be deemed to refer to **CCGT Modules**, **Steam Turbine Units** and/or **Gas Turbine Units**.

(b) In this Schedule 2, Part II unless otherwise specified all references to measurements shall be deemed to be applicable at the connection to the **Distribution System** of the **PPM**.

(c) This Schedule 2, Part II contains technical, design and operational requirements for **PPMs**. Detailed information relating to a particular connection will, where indicated below, be made available by the **TSO** on request by the **Generator**. A number of the requirements in this Schedule 2 (and specifically for **WFPS** the **WFPS Settings Schedule** and **PPMS** the **PPM Settings Schedule**) are applicable only to **Controllable PPMs** or **Dispatchable PPMs**. Such requirements are not, by definition, applicable to a **PPM** first connected to the **Distribution System** before 1 April 2005 whose generators comprise a **Registered Capacity** of 5 **MW** or more, unless that **PPM** is subject to material modification, whereupon such a **PPM** shall, for the purposes of this Schedule 2 (and specifically for WFPS the **WFPS Settings Schedule** and **PPMS** the **PPM Settings Schedule**), be treated as a **Controllable PPM** or **Dispatchable PPM**.

(d) A **Controllable PPM** or a **Dispatchable PPM** shall, as a minimum requirement comply with all relevant Engineering Recommendations and relevant regulations and the particular requirements of the **TSO** which will take account of the conditions prevailing on the **Transmission System** at the closest electric **Bulk Supply Point** at the relevant time. The **TSO** will notify its particular requirements to the **Generator** during the course of the **Generator's** submission of information under CC11.

(e) A **PPM** with a **Registered Capacity** greater than the **MEC** at the **Connection Point**, as agreed in the relevant **Connection Agreement**, shall demonstrate Grid Code compliance with the technical design and operational requirements of the **Generating Unit** set out in Grid Code CC5, CC6, CC7 and CC8. Under such circumstances Grid Code compliance shall be demonstrated at the **MEC** rather than at the **PPM Registered Capacity** to ensure the safe operation of the **Generators Plant** and **Apparatus** and the **DNO's Plant** and **Apparatus**. The **Generator** shall demonstrate Grid Code compliance in accordance with the **WFPS Setting Schedule** or **PPM Setting Schedule** which may be reviewed from time to time by the **TSO**.

(f) The **DNO** shall ensure that protection equipment applied to **Generators**, with an output of 5**MW** or more, in compliance with the requirements of Engineering Recommendation G59/1/NI (as amended, updated or superseded), are configured such that the **Generators** remain connected to the **NI System** whilst the frequency remains within the limits given in these **Connection Conditions** unless alternative arrangements have been agreed with the **TSO**.

CC.S2.2.2 **PPM** Connections

Each connection between a **PPM** and the **Distribution System** must be controlled by a circuit breaker.

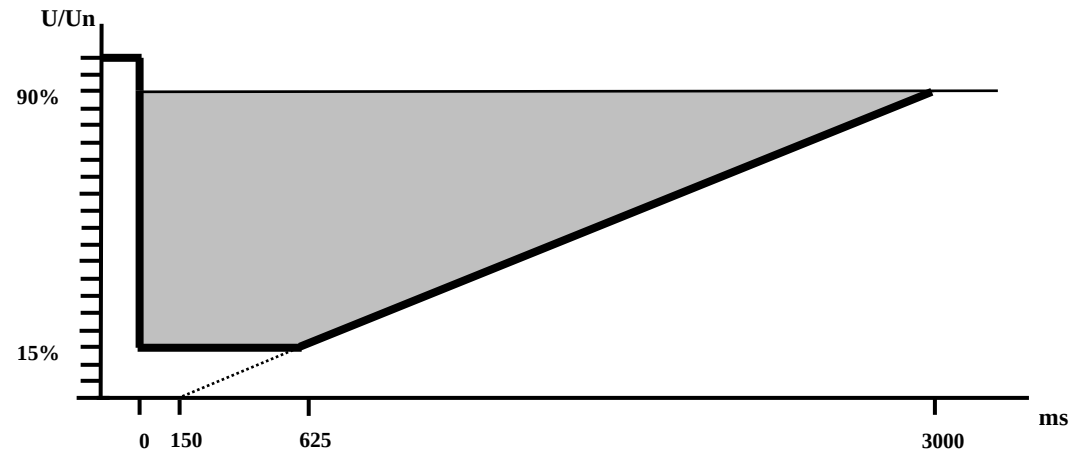
CC.S2.2.3 **PPM** Performance Requirements

CC.S2.2.3.1 Within the **Frequency** range 49.5 Hz to 50.5 Hz there must be no reduction in **Output** whilst **Frequency** is falling. Any decrease in **Output** to a level below the **Output** to be delivered in accordance with the power curve occurring in the **Frequency** range 49.5 Hz to 47 Hz must not be more than pro rata with any decrease below nominal **Frequency**.

CC.S2.2.3.2 The **Output** measured at each generator terminal should not be affected by voltage changes in the normal operating range specified in the Electricity Supply Regulations (N.I.) 1991.

CC.S2.2.3.3 (a) In the event of a step change in voltage each **PPM** first connected to the **Distribution System** on or after 1 April 2005 shall remain connected to the **Distribution System** as specified in the following diagram and the remainder of this CC.S2.2.3.3.

Fault Ride Through Capability of PPMs



Voltage vs Time profile at PPM Connection Point

(b) **PPMs** first connected to the **Distribution System** prior to 1 April 2005 shall not be required to comply with the requirements in the above diagram save where the **PPM** is subject to material modification involving the installation of additional **Generating Units** in which case an assessment will be carried out by the **TSO** with the **Generator** to establish which elements of **Non-RfG Generation Units** and **RfG Generation Units** of the Grid Code are applicable.

(c) The speed of response of the **PPM** control system should be such that following a step change in voltage and recovery to the normal operating range the **PPM** should achieve and maintain on average at least 90% of its steady state active power response, measured by **Output**, at the point of connection to the **Distribution System** within 500ms of the voltage recovery to the normal range for faults cleared within 140ms. For longer duration faults, the **PPM** shall provide at least 90% of its steady state active power response, measured by **Output**, at the Point of connection to the **Distribution System** within 1 second of the voltage recovery to the normal range.

(d) In order to ensure the continued performance of each **PPM** the **Generator** shall meet the reasonable costs of the **TSO** in providing and maintaining a **Monitoring**, recording and transmitting device.

(e) Each **PPM** shall be capable of satisfactory operation at any voltage within the range 0% - 120% for the minimum time periods specified below. Other voltage thresholds may be possible but agreement between the **Generator** and the **TSO** about their suitability must be reached at the application stage for connection.

Minimum time periods:

Voltage Range (U/Un)	**Time requirement, minimum**
115% - 120%	2 seconds
110% - 115%	10 seconds
90% - 110%	Continuous operation
0% - 90%	As per Fault Ride Through Capability of PPMs chart (CC.S2.2.3.3(a))

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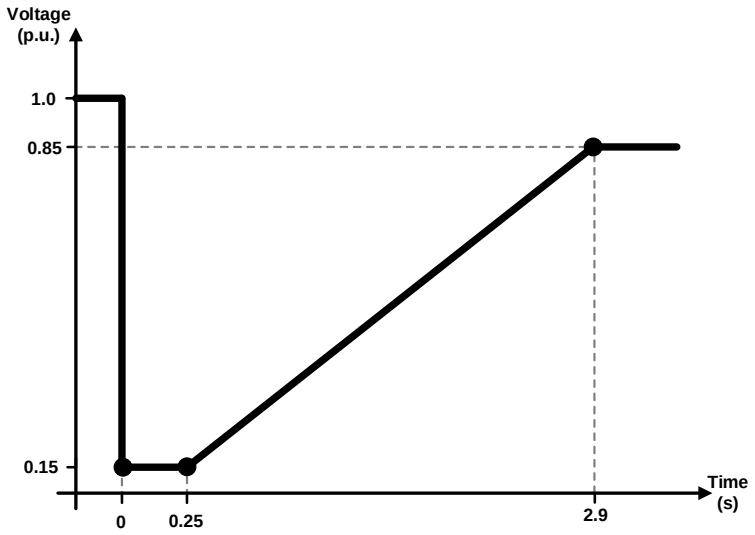
CC.S2.2.3.4 The **Active Power** output measured at each **PPM** connection point should not be affected by;

(i) voltage changes in the normal operating range specified in CC5.4, and

(ii) secured symmetrical and asymmetrical faults.

In the event of a step change in voltage each **PPM** with a **Registered Capacity** of 5 **MW** or more shall remain connected to the **Distribution System** as specified in the following diagram.



CC. S2.2.3.5 The **PPM** shall be capable of remaining connected to the network and continuing to operate stably while the **Voltage** remains above retained voltage (0.15 p.u.) during a fault. The **PPM's** internal protection schemes and settings shall not unduly jeopardise fault ride through performance while the **Voltage** remains above retained voltage (0.15 p.u.).

CC. S2.2.3.6 Without prejudice to CC. S2.2.3.4, undervoltage protection (either fault ride through capability or minimum **Voltage** specified at the **Connection Point Voltage**) shall be set by the **Generator** according to the widest possible technical capability of the **PPM**, unless the **TSO** requires narrower settings in accordance with CC6.4.4. The settings shall be justified by the **Generator** in accordance with this principle.

CC. S2.2.3.7 **PPMS** shall be capable of staying connected to the network and operating stably after the **Power System** has been disturbed by secured faults. This capability should be in accordance with CC.S2.2.3.4.

CC. S2.2.3.8 A **PPM** shall be capable of providing fast fault current at the connection point in the

case of symmetrical and asymmetrical faults, under the following conditions:

(a) the **PPM** shall be capable of activating the supply of fast fault current either by:

(i) ensuring the supply of the fast fault current at the connection point, or

(ii) measuring voltage deviations at the terminals of the individual **Generating Units** of the **PPM** and providing fast fault current at the terminals of these units;

(b) the **PPM** shall provide fast fault current at the connection point;

(i) during voltage dips below 0.9 p.u., and

(ii) until voltage has recovered to within normal operating voltage range,

(c) the **PPM** shall prioritise reactive current injection during the duration of the voltage deviation remaining within the rating of **PPM** capability. The **PPM** shall provide fast fault current injection with a rise time no greater than 100 ms and a settling time no greater than 300 ms,

CC. S2.2.3.9 Regarding post-fault **Active Power** recovery the speed of response of the **PPM** control system should be such that following a step change in voltage and recovery to the normal operating range the **PPM** should achieve and maintain on average at least 90% of its steady state active power response, measured by **Output**, at the **Connection Point** within 500ms of the voltage recovery to the normal range for faults cleared within 140ms. For longer duration faults, the **PPM** shall provide at least 90% of its steady state active power response, measured by **Output**, at **the Connection Point** within 1 second of the voltage recovery to the normal range. The **PPM** control system shall ensure that any **Active Power** oscillations following post fault **Active Power** recovery must be adequately damped.

CC.S2.2.3.10 The **TSO** shall specify the pre-fault and post-fault conditions for the fault ride through capability in terms of:

(i) the calculation of the pre-fault minimum short circuit capacity at the connection point,

(ii) pre-fault **MW** and **Mvar** operating point of the Generating Unit at the **Connection Point** and **Voltage** at the **Connection Point**, and

(iii) calculation of the post-fault minimum short circuit capacity at the connection point;

the **TSO** will publish this data in the Transmission Forecast Statement which will be made publicly available via the **TSO's** website.

CC.S2.2.3.11 At the request of a **Generator**, the **TSO** shall provide the pre-fault and post fault conditions to be considered for fault ride through capability as an outcome of the calculations at the **Connection Point** as specified in CC.S2.2.3.4:

(i) pre-fault short circuit capacity at each **Connection Point** expressed in MVA,

(ii) pre-fault **MW** and **Mvar** operating point of the Generating Unit at the **Connection Point** and **Voltage** at the **Connection Point**, and

(iii) post-fault minimum short circuit capacity at each connection point expressed in **MVA.**

alternatively, the **TSO** may provide generic values derived from typical cases.

CC.S2.2.3.12 **Ramp Rates**

For PPMs with the exception of ESPSs:

(a) The **PPM** control system shall be capable of controlling the ramp rate of its **Active Power Output**. There shall be three ramp rate capabilities designated, **Resource Following Ramp Rate, Active Power Control Set-Point Ramp Rate** and **Frequency Response Ramp Rate**. The **PPM** control system shall operate the ramp rates with the following order of priority (high to low): **Frequency Response Ramp Rate; Active Power Control Set-Point Ramp Rate; Resource Following Ramp Rate**. It shall be possible to vary the **Resource Following Ramp Rate** over a range between 1% and 100% of **Registered Capacity** per minute. The ramp rate is the average rate of change in **Output** measured over any 10 minute period. The ramp rate averaged over 1 minute should not exceed 3 times the average ramp rate over 10 minutes.

(b) A **Controllable PPM** or a **Dispatchable PPM** shall have a ramp **Frequency** controller, which on **Start-Up** and during normal operation of any **Controllable PPM** or **Dispatchable PPM** shall only allow an increase in **Active Power Output** when the **System Frequency** is below a set value. This set value in the ramp **Frequency** controller should be capable of being set in the range 50.0 Hz to 52.0 Hz in steps of 0.1 Hz.

(c) During operation the **TSO** may send to the **Generator** a positive ramp blocking signal if the **NI System** would otherwise be at risk from excess **Frequency** movements. This signal is designed to restrain **PPMs** from ramping above the previous 10 minute average level at the time of receiving the signal. The **PPM** may continue to supply **Output** up to this level until the signal is removed. The **TSO** will remove the ramp blocking signal as soon as stable conditions on the **NI System** are restored, as determined by the **TSO**.

(d) Unless the **Controllable PPM** or **Dispatchable PPM** has a continually manned control point the **TSO** shall send SCADA signals indicating that a process of increasing/decreasing maximum **Output** is to be initiated and the time interval over which the increase/decrease of **Output** is to be achieved. A **Controllable PPM** or **Dispatchable PPM** receiving such a signal shall send a SCADA signal in response confirming that it has received the SCADA signal from the **TSO**. The increase/decrease in **Active Power Output** of the **Controllable**

PPM or **Dispatchable PPM** shall be at the **Active Power Control Set-Point Ramp Rate**. For the avoidance of doubt nothing in this CC.S2.2.3.4(d) shall be construed as requiring a **Controllable PPM** or **Dispatchable PPM** to operate beyond its technical limits.

(e) Upon removal of an **Active Power Dispatch Instruction** sent by the **TSO** via SCADA when the **PPM** is operating in an **Active Power** control mode and under normal operational conditions, the **PPM** shall ramp at the **Resource Following Ramp Rate**.

(f) The ramp rate requirements for **PPMs** need not be met in the case of the resource availability falling at a greater rate than that which would be required to control the **Output** to be within the ramp rate.

(g) In the absence of a **TSO Dispatch Instruction**, each **Generating Unit** comprising a **Controllable PPM** or **Dispatchable PPM** must operate as per the power curve submitted to the **TSO** and remain connected to the **NI System** between the upper and lower limit of resource level needed for a **Generating Unit** to generate **Active Power**.

For PPMs consisting of ESPSs:

(h) The **PPM** control system shall be capable of controlling the ramp rate of its **Active Power**. There shall be three ramp rate capabilities designated, **Capacity Limited Ramp Rate, Active Power Control Set-Point Ramp Rate** and **Frequency Response Ramp Rate**. These ramp rates co-exist and the **PPM** control system shall operate the ramp rates with the following order of priority (high to low): **Capacity Limited Ramp Rate**; **Frequency Response Ramp Rate; Active Power Control Set-Point Ramp Rate**. It shall be possible to vary the **Capacity Limited Ramp Rate** between the following values. Minimum value shall be the lower of 10% **Registered Capacity** per minute or 5MW per minute. If 5MW is lower than 1% of **Registered Capacity**, then the minimum value shall be 1% of **Registered Capacity** per minute. Maximum value shall be 100% of **Registered Capacity** per minute. It shall be possible to vary the **Active Power Control Set-Point Ramp Rate** over a range between 1% and 100% of **Registered Capacity** per minute. The ramp rate is the average rate of change in **Active Power** measured over any 10 minute period. The ramp rate averaged over 1 minute should not exceed 3 times the average ramp rate over 10 minutes.

(i) Unless the **Controllable PPM** or **Dispatchable PPM** has a continually manned control point the **TSO** shall send SCADA signals indicating that a process of increasing/decreasing Active Power is to be initiated. A **Controllable PPM** or **Dispatchable PPM** receiving such a signal shall send a SCADA signal in response confirming that it has received the SCADA signal from the **TSO**. The increase/decrease in **Active Power Output** of the **Controllable PPM** or **Dispatchable PPM** shall be at the **Active Power Control Set-Point Ramp Rate**. For the avoidance of doubt nothing in this CC.S2.2.3.4(i) shall be construed as requiring a **Controllable PPM** or **Dispatchable PPM** to operate beyond its technical limits.

(j) The ramp rate requirements for **PPMs** need not be met in the case of the **ESPSs** import/export energy capacity becoming limited. Under these conditions the **ESPS** shall ramp at the **Capacity Limited Ramp Rate**.

CC.S2.2.4 **Black Start Capability**

A **PPM** is not required to provide **Energy** to any part of the **NI System** during the restoration of power process following a **Black Start** and therefore does not require a **Black Start Capability**. For the avoidance of doubt a **PPM** will be disconnected from the **Distribution System** during **Black Start** conditions until the **NI System** is restored to a stable operating mode, as determined by the **TSO**.

CC.S2.2.5 **PPM** Control Arrangements

CC.S2.2.5.1 Each **Controllable PPM** or **Dispatchable PPM** must be capable, in accordance with CC.S2.2.5.2 and CC.S2.5.3, of contributing appropriately, as reasonably specified by the **TSO**, to **Frequency** by continuous modulation of **Active Power** supplied to the **NI System**.

CC.S2.2.5.2

(a) Each **Controllable PPM** or **Dispatchable PPM** must be fitted with a **Fast Acting** proportional power governor to provide **Frequency Control** under normal operational conditions. This **Fast Acting** proportional governor should be equipped with controls which allow the droop or equivalent for **PPMs** consisting of **ESPSs** to be set independently in the range 2% to 20% above and below 50.0 Hz. A deadband within which no control will be exercised must be capable of being set with a lower limit between 49.0 Hz and 50.0 Hz in steps of 0.05 Hz and an upper limit between 50.0 Hz and 51.0 Hz in steps of 0.05 Hz. Whilst responding to **Frequency** excursions on the **System** the change in **Active Power** of the **Controllable PPM** or **Dispatchable PPM** shall be as per the **Frequency Response Ramp Rate**. In addition a high **Frequency** trip facility must be provided capable of being set in the range 51.0 Hz to 52.0 Hz in steps of 0.1 Hz. Where a **Controllable PPM** or **Dispatchable PPM** becomes isolated from the rest of the **Transmission System** the **Controllable PPM** or **Dispatchable PPM** must immediately detect the condition and shut itself down.

(b) Under certain **System** conditions the **TSO** may require a **Controllable PPM** or a **Dispatchable PPM** to operate below its maximum instantaneous **Output** on a droop or equivalent for **PPMs** consisting of **ESPSs** setting to be set in the range 2% to 20%. In this mode of operation the **Controllable PPM** or **Dispatchable PPM** will be providing some of the **System** reserve. The **Controllable PPM** or **Dispatchable PPM** controller must be capable of being set to operate in a constrained manner within the range of at least 50% to 100% of maximum instantaneous **Output**.

CC.S2.2.5.3 In order to deal with **Controllable PPMs** or **Dispatchable PPMs** inducing power fluctuations, an additional control loop must be provided by the **Generator** to ensure that the wind turbine control system, wind turbulence or other factors in the **Controllable PPM** or **Dispatchable PPM** cannot produce power oscillations between 0.25 Hz and 1.75 Hz. It should be designed and operated to ensure that the total peak-

to-peak **MW** oscillation within this **Frequency** range is less than 1% of the **Registered Capacity** of the **Controllable PPM** or **Dispatchable PPM.**

CC.S2.2.6 **Frequency** Capability

CC.S2.2.6.1 **Controllable PPMs** and **Dispatchable PPMs** may be capable of operating outside statutory **Frequency** limits. However, this may mean that they will continue to operate if connected within an **Automatic Load Shedding** zone as detailed in OC4. Consequently, **Users** shall ensure that **Protection** on their **Controllable PPMs** and **Dispatchable PPMs** shall have settings to co-ordinate with the settings on the **Automatic Load Shedding** equipment as detailed by the **TSO** on request by the **User**.

CC.S2.2.6.2

(a) Each **Controllable PPM** and **Dispatchable PPM** shall be capable of satisfactory operation at any **Frequency** within the range of 47.0 Hz to 52.0 Hz for the minimum time periods specified below unless the **TSO** has agreed to the use of any **Frequency** level or rate of change of **Frequency** relays which will trip the **Controllable PPM** and/or **Dispatchable PPM** within this **Frequency** range.

Minimum time periods:

Frequency Range	**Time requirement, minimum**
50.5 Hz – 52.0 Hz	60 minutes
49.5 Hz – 50.5 Hz	Continuous operation
47.5 Hz – 49.5 Hz	60 minutes
47.0 Hz – 47.5 Hz	20 seconds

(b)

– The **TSO** shall, within a reasonable period and in any case no more than 28 days, discuss with the **Generator** whether the proposed settings are satisfactory.

– In relation to any **Generator** which has agreed the settings with the **TSO** under these provisions, the **TSO** shall notify that **Generator** of any change of which it is aware in the expected rate-of-change-of-**Frequency** on the **NI System** which may require new settings to be agreed.

CC.S2.2.6.3 Each **Generator** shall be responsible for protecting the **PPMs** owned or operated by it against the risk of damage which might result from any **Frequency** excursion outside the range 52 Hz to 47 Hz and for deciding whether or not to interrupt the connection between its **Plant** and/or **Apparatus** and the **Distribution System** in the event of such a **Frequency** excursion.

CC.S2.2.7 Additional information

CC.S2.2.7.1 Each **Generator** shall provide the calculated **Output** for the **WFPS** as part of the submission of information under CC11. This will take the form of a diagram showing wind speed and direction against electrical output in **MW**, in "rose" format. Following connection, the **WFPS** shall be monitored for a period to confirm the validity of the calculations, which may be used for future **Output** predictions. This **Monitoring** shall be completed before a Final Operational Notification is issued.

CC.S2.2.7.2 For the avoidance of doubt all requirements in this Schedule 2, Part II, shall be applicable to **Energy Storage Power Stations (ESPS)** under the full range of operation and shall not be interpreted to only apply during times the **ESPS** is providing **Active Power** or **Reactive Power** to the **System**.

TECHNICAL CRITERIA FOR HVDC SYSTEM AND/OR DC CONNECTED CONTROLLABLE PPMS CONNECTED TO THE TRANSMISSION SYSTEM

CC.S3.1.1 Applicability of Technical Design and Operational Criteria

(a) In this Schedule 3, all references to **HVDC Systems** and/or DC Connected **Controllable PPMs** shall be read and construed as references only to **HVDC Systems** and/or DC Connected **PPMs** connected to the **Transmission System**.

In the case of DC Connected **Controllable PPMs** clauses under Grid Code Connection Codes including RfG Unit requirements and **PPM Settings Schedule** shall be applicable unless otherwise specified in this Schedule 3.

(b) In this Schedule 3, unless otherwise specified all references to measurements shall be deemed to be applicable at the **HVDC Interface Point**.

(c) This Schedule 3 contains technical, design and operational requirements for **HVDC System** and/or DC Connected **Controllable PPMs** that are more detailed than those set out in CC6 and is intended to be complementary to CC6. However, in the event of any conflict between the requirements of CC6 and the requirements of this Schedule 3, the provisions of this Schedule 3 shall prevail. Detailed information relating to a particular connection will, where indicated below, be made available by the TSO on request by the **HVDC System** owner and/or DC Connected **Controllable PPM** owner.

(d) An **HVDC System** or DC Connected **PPM** shall, as a minimum requirement, and in addition to the requirements of CC6, comply with all relevant Engineering Recommendations and relevant regulations and the requirements of the **TSO** which will take account of the conditions prevailing on the **Transmission Syste**m at the **HVDC Interface** Point at the relevant time. The **TSO** will notify its requirements to the **HVDC System** owner and/or DC Connected **Controllable PPM** Owner during the course of the **HVDC System** owner's and/or DC Connected **Controllable PPM** Owner's application for connection to the Transmission System.

CC.S3.1.2 **System Frequency Variations**

CC.S3.1.2.1 All **HVDC Systems** shall be capable of staying connected to the **System** and remaining operable within the frequency ranges and time periods specified in the table below

Frequency Range (Hz)	**Time Period for Operation (s)**
47.0 – 47.5 Hz	60 seconds

47.5 – 48.5 Hz	90 minutes
48.5 – 49.0 Hz	90 minutes
49.0 – 51.0 Hz	Unlimited
51.0 – 51.5 Hz	90 minutes
51.5 – 52 Hz	60 minutes

CC.S3.1.2.2 A **HVDC System Owner** shall not unreasonably withhold consent to apply wider frequency ranges or longer minimum times for operation taking account of their economic and technical feasibility.

CC.S3.1.2.3 The **HVDC System Owner** in coordination with the **TSO** may agree on wider frequency ranges, longer minimum operating times for operation or specific requirements for combined frequency and voltage deviations to ensure the best use of the technical capabilities of the **HVDC System** if required to preserve or restore system security.

CC.S3.1.2.4 The **HVDC System** shall be capable of automatic disconnection at frequencies specified by the **TSO** on a site-specific basis.

CC.S3.1.2.5 The **TSO** may specify a maximum admissible **Active Power** output reduction from a **HVDC System** operating point if the **System Frequency** falls below 49 Hz.

CC.S3.1.3 **Frequency Response**

CC.S3.1.3.1 A **HVDC System** shall be capable of staying connected to the **Transmission System** and operate during rate of change of **System Frequency** values between – 2.5 and + 2.5 Hz/s, as measured at any point in time as an average of the rate of change of frequency for the previous 1 second.

CC.S3.1.3.2 A DC connected **Controllable PPM** shall remain connected to the remote-end **HVDC Converter Station** network for a Rate of Change of **Frequency** up to +/- 2 Hz per second (measured at any point in time as an average of the rate of change of frequency for the previous 1 second) at the **HVDC System interface point** of the DC connected **Controllable PPM** at the remote end **HVDC Converter Station.**

CC.S3.1.3.3 A DC-connected **Controllable PPM** shall be capable of receiving a fast signal from a connection point in the **Transmission System** to which **Frequency** response is being provided, and be able to process this signal within 100 ms from sending to completion of processing the signal for activation of the response. **Frequency** shall be measured at the connection point in the **Transmission System** to which **Frequency** response is being provided. If **Frequency** response is provided to more than one synchronous area, then DC-connected **Controllable PPM** shall be capable of delivering coordinated **Frequency** control as specified by the **TSO** in the relevant **Connection Agreement**.

CC.S3.1.3.4 In the case where the **HVDC System** is connecting a DC-connected **Controllable PPM**, the remote end **HVDC Converter Station** Owner and the **Generator** shall agree on the technical requirements of the fast signal communication in accordance with the provision of CC8.8.7. Where the T**SO** requires, the **HVDC System** shall be capable of providing the network **Frequency** at the **Connection Point** as a signal.

CC.S3.1.3.5 In the case where the **HVDC System** is connecting a DC-connected **Controllable PPM**, the remote end **HVDC Converter Station**, shall be subject to the provisions of CC.S3.1.2, CC.S3.1.3 and CC.S3.1.7 even if a nominal **Frequency** other than 50 Hz, or a **Frequency** variable by design is used in the network connecting the DC-connected **Controllable PPM**.

CC.S3.1.4 **Frequency Sensitive Mode – (FSM)**

The following shall apply for **HVDC Systems** for **Frequency Sensitive Mode** operation:

(a) The **HVDC System** shall be capable of responding to **Frequency** deviations on the Transmission System by adjusting its **Active Power** transmission within the minimum and maximum transmission capacity in each direction in accordance with the parameters given below.

(b) A **Frequency Deadband** of no greater than +/- 15 mHz.

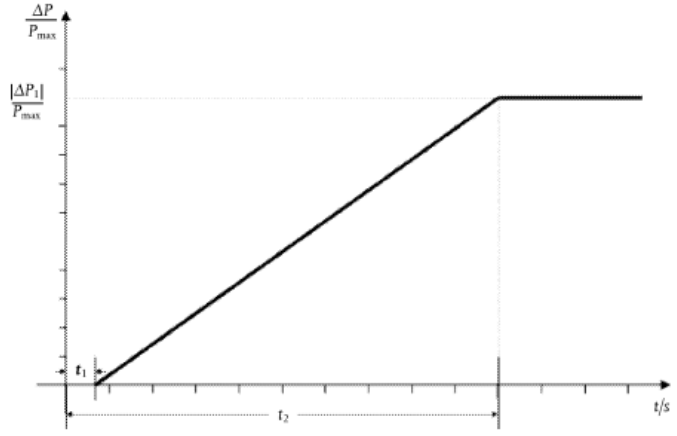
(c) A **Frequency Response Insensitivity** of 15 mHz.

(d) An upward regulation (importing) droop between 0.1% and 12% with a default value set at 4%.

(e) A downward regulation droop (exporting) droop between 0.1% and 12% with a default value set at 4%.

(f) The maximum combined effect of **Frequency Response Insensitivity** and **Frequency Deadband** cannot exceed a value of +/- 15 mHz.

(g) Adjustment of **Active Power** response to a **Frequency** step change shall be delivered as soon as technically feasible and will be in accordance with the performance characteristic shown below



Parameter	Setting
Active Power as percentage of **HVDC System Registered Capacity** ($\Delta P_1/P_{max}$)	X%
Maximum admissible initial delay t_1	0.5 seconds
Maximum admissible time for full activation t_2, unless longer activation times are agreed with the **TSO**	10 seconds

A **HVDC System** linking various synchronous areas shall be capable of adjusting the full **Active Power Frequency** response when operating in **Frequency Sensitive Mode** at any time and for a continuous time period. In addition, the **Active Power** control of the **HVDC System** shall not have any adverse impact on the **Active Power Frequency** response.

CC.S3.1.5 **Limited Frequency Sensitive Mode Over-frequency – (LFSMO)**

The following shall apply for **HVDC Systems** for **Limited Frequency Sensitive Mode Over-frequency** operation:

(a) The **HVDC System** shall be capable of adjusting **Active Power Frequency** response, during both import and export, when the **Transmission System Frequency** rises to or above 50.2 Hz.

(b) The **Active Power** response shall be capable of operating with a droop between 0.1% and 12% with default set at 4%.

(c) The **HVDC System** shall be capable of adjusting its **Active Power** down to its minimum **Active Power** transmission capacity. Stable operation shall be ensured. When **Limited Frequency Sensitive Mode – Over- Frequency** is active, hierarchy of control facilities shall be organised in accordance with CC6.4.7 to CC6.4.10.

(d) The **HVDC System** shall be capable of adjusting **Active Power Frequency** response as fast as inherently technically feasible.

CC.S3.1.6 **Limited Frequency Sensitive Mode Under-frequency – (LFSMU)**

The following shall apply for **HVDC Systems** for **Limited Frequency Sensitive Mode Under-frequency** operation:

(a) The **HVDC System** shall be capable of adjusting **Active Power Frequency** response, during both import and export, when the **Transmission System Frequency** falls to or below 49.5 Hz.

(b) The **Active Power** response shall be capable of operating with a droop between 0.1% and 12% with default set at 4%.

(c) The **HVDC System** shall be capable of adjusting its **Active Power** down to its minimum **Active Power** transmission capacity. Stable operation shall be ensured. When **Limited Frequency Sensitive Mode – Under - Frequency** is active, hierarchy of control facilities shall be organised in accordance with CC6.4.7 to CC6.4.10. (d)

The **HVDC System** shall be capable of adjusting **Active Power Frequency** response as fast as inherently technically feasible.

(d) In the case of DC connected Controllable PPM, operation in Limited Frequency Sensitive Mode – Over-frequency is subject to fast signal response as specified in

CC.S3.1.7 **Active Power Controllability**

CC.S3.1.7.1 A **HVDC System** shall be capable of adjusting the transmitted **Active Power** up to its maximum HVDC **Active Power** transmission capacity in each direction following an instruction from the **TSO**. The minimum **Active Power** transmission capacity shall be not greater than the lesser of 3% of the **HVDC System** maximum capacity or 50 **MW**. When a **HVDC System** receives a **Dispatch Instruction** issued by the **TSO**, this set point shall be reached in a time no greater than 10 seconds plus the ramp rate for the **HVDC System**. The **TSO** may specify a maximum and minimum power step size for adjusting the transmitted **Active Power** of an **HVDC System** on a case-by-case basis in the relevant **Connection Agreement**.

CC.S3.1.7.2 The **TSO** shall specify, on a site-specific basis, how a **HVDC System** shall be capable of modifying the transmitted **Active Power** infeed in case of disturbances into one or more of the AC networks to which it is connected in the relevant **Connection Agreement**. If the initial delay prior to the start of the change is greater than 10 milliseconds from receiving the triggering signal sent by the **TSO**, it shall be reasonably justified by the **HVDC System Owner** to the **TSO**.

CC.S3.1.7.3 The **TSO** shall specify, on a site-specific basis, how a **HVDC System** shall be capable of fast **Active Power** reversal in the relevant **Connection Agreement**. The power reversal shall be possible from the maximum **Active Power** transmission capacity in one direction to the maximum **Active Power** transmission capacity in the other direction as fast as technically feasible and reasonably justified by the **HVDC System Owner** to the relevant **TSOs** if greater than 2 seconds.

CC.S3.1.7.4 The **TSO** shall specify, on a site-specific basis, how a **HVDC System** shall be equipped with an automatic controller which is capable of receiving instructions from the **TSO**. The automatic controller shall have control schemes capable of automatic remedial action which include but not limited to:

- Ramp blocking;
- Blocking **FSM** operation;
- Blocking **LFSM-O** operation;
- Blocking **LFSM-U** operation and;
- Frequency Control

The triggering and blocking criteria shall be specified by **TSO** in the relevant **Connection Agreement**.

CC.S3.1.7.5 A **HVDC System** shall limit its loss of **Active Power** injection in a synchronous area to a value specified by the **TSO** for the respective load frequency control area, based on the **HVDC System's** impact on the Power System. The value will be specified on a site-specific basis in the relevant **Connection Agreement**. Where a **HVDC System** connects two or more control areas, the relevant **TSOs** will consult each other in order to set a coordinated value, on a case-by-case basis, of the maximum loss of **Active Power** injection, taking into account common mode failures.

CC.S3.1.7.6 Each **HVDC System** shall be capable of contributing to the damping of power oscillations in the connected AC networks. The control system of the **HVDC System** shall not reduce the damping of power oscillations. The **TSO** shall specify a frequency range of oscillations that the control scheme shall positively damp along with the network conditions resulting in such a condition taking into account potential stability problems on a site-specific basis. The selection of the control parameter settings shall be agreed between the **TSO** and the **HVDC System**.

CC.S3.1.8 **Voltage Control**

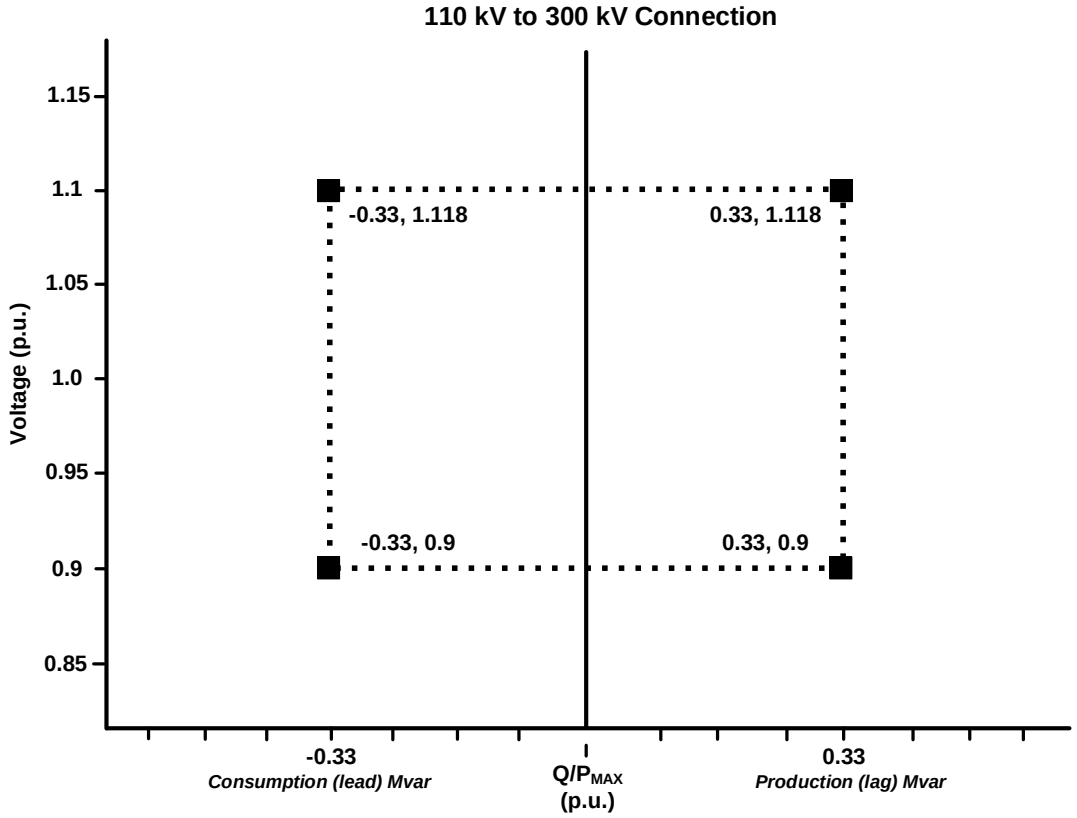
CC.S3.1.8.1 A **HVDC System** shall remain synchronised to the **Transmission System** and operate within the ranges of the **Transmission System Voltage** at the **Connection Point** as specified below:

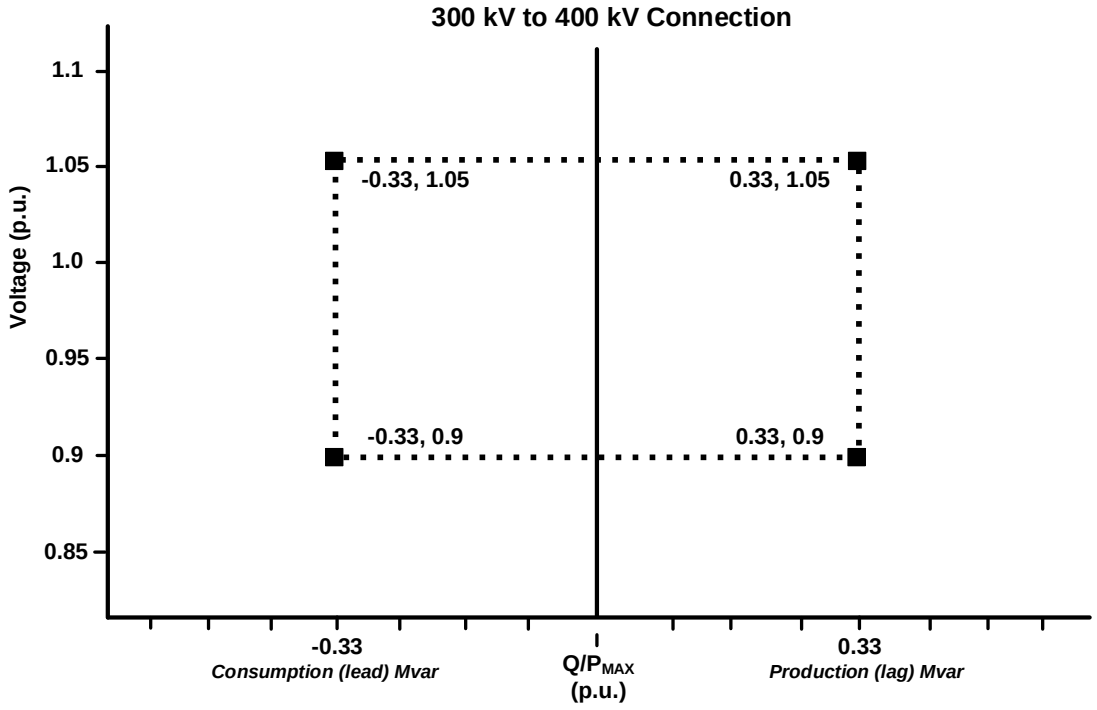
Connection Voltage	Voltage Range	Time period for operation
110 kV	0.9 p.u. – 1.1 p.u.	unlimited
275 kV	0.9 p.u. – 1.09	unlimited
400 kV	0.9 p.u. – 1.05 p.u.	unlimited

it is permissible to relax the 275 kV connection voltage range requirement to 1.1 p.u. if lasting for no longer than 15 minutes.

CC.S3.1.8.2 **HVDC Systems** shall fulfil requirements in relation to voltage stability as defined in the characteristic below;

(a) **For HVDC Systems, the minimum Reactive Power capability is defined in the characteristic below.**


110 kV to 300 kV Connection
1.15
1.1
1.05
1.0
0.95
0.9
0.85
Voltage (p.u.)
-0.33, 1.118
0.33, 1.118
-0.33, 0.9
0.33, 0.9
-0.33
Consumption (lead) Mvar
Q/P MAX
(p.u.)
0.33
Production (lag) Mvar


300 kV to 400 kV Connection
1.1
1.05
1.0
0.95
0.9
0.85
Voltage (p.u.)
-0.33, 1.05
0.33, 1.05
-0.33, 0.9
0.33, 0.9
-0.33
Consumption (lead) Mvar
Q/P MAX
(p.u.)
0.33
Production (lag) Mvar

(b) **The HVDC System shall be capable of moving to any operating point within the characteristic specified in** CC.S3.1.8.2 **without undue delay but at least within 120 seconds.**

(c) **When operating at an Active Power output below Registered Capacity, a HVDC System shall be capable of providing Reactive Power at any operating point inside the characteristic above. The HVDC System shall be capable of contributing to damping of power oscillations. The voltage and reactive power control characteristics of the HVDC System must not adversely affect the damping of power oscillations.**

(d) **The HVDC System shall ensure that its Reactive Power exchanged with the Transmission System at the Connection Point is limited to values specified by the TSO in the characteristics above.**

(e) **The maximum voltage step allowed at the Connection Point due to operation of the Reactive Power control modes is 3%.**

(f) **The HVDC System shall be capable of implementing the following Reactive Power control modes which shall be available to the TSO:**

(i) Voltage Control mode

(ii) Reactive Power control

(iii) power factor control mode

(g) **The HVDC System shall be capable of operating in additional Reactive Power control modes specified by the TSO** in the relevant **Connection Agreement.**

CC.S3.1.8.3 The speed of response of the **Voltage Control** shall be such that, following a step change in **Voltage** at the **Connection Point** the **HVDC System** shall achieve 90 % of its steady-state **Reactive Power** response within 1 second. The **Reactive Power** must settle at the steady-state **Reactive Power** response within 5 seconds, with a steady-state **Reactive Power** tolerance no greater than 5% of the maximum **Reactive Power**. Subject to agreement with **TSO**, the voltage regulation set-point may be operated with or without a deadband selectable in a range from zero to ±5% of reference 1 p.u. **Transmission System** voltage, with continuous setting. **Voltage Control** shall include the capability to change **Reactive Power** output based on a combination of a modified set-point voltage and an additional instructed **Reactive Power** component. The **TSO** will specify a slope with a range and step on a site-specific basis in the relevant **Connection Agreement**.

CC.S3.1.8.4 For **Reactive Power** control set-point to maintain the **Reactive Power** set-point at the **Connection Point**, the **HVDC System** shall be capable of setting the **Reactive Power** set-point at least within the **Reactive Power** range specified in CC.S3.1.8.2, and controlling the **Reactive Power** at the **Connection Point** to an accuracy within ± 5% of the **Reactive Power** set-point. The required **Reactive Power** range shall be agreed and co-ordinated between the **TSO** and the **HVDC System Owner**.

CC.S3.1.8.5 For power factor control set-point to maintain the power factor set-point at the **Connection Point**, and **HVDC System** shall be capable of controlling the **Reactive Power** at least within the **Reactive Power** ranges specified in CC.S3.1.8.2 with maximum setting steps as specified by the **TSO** in the relevant **Connection Agreement** but no greater than 0.01 p.u..

CC.S3.1.8.6 The **TSO** shall specify any equipment needed to enable the remote selection of **Reactive Power** control modes and set-points. Any such additional equipment shall be in accordance with the requirements of the relevant **Connection Agreement**.

CC.S3.1.8.7 The **HVDC System Owner** shall ensure that its **HVDC System** connection to the **Transmission System** does not result in a level of distortion or fluctuation of the supply voltage on the **Transmission System**, at the **Connection Point**, exceeding the level specified in CC5.

CC.S3.1.8.8 Unless otherwise instructed by the **TSO**, during the energisation or synchronisation of an HVDC converter station to the AC network or during the connection of an energised HVDC converter station to an HVDC System, the HVDC converter station shall have the capability to limit any voltage changes to a steady-state level specified by the **TSO**. The maximum magnitude, duration and measurement window of the voltage transient shall be specified on a site specific basis in the relevant **Connection Agreement** and shall not exceed 5% of the pre-synchronisation voltage.

CC.S3.1.8.9 A DC-connected **Controllable PPM** shall remain connected to the remote-end HVDC Converter Station network and operate within the **Voltage** ranges and time periods as specified below**.**

Connection Voltage	Voltage Range	Time period for operation
110 kV	0.85 p.u. – 0.9 p.u.	60 minutes
	0.9 p.u. – 1.1 p.u.	unlimited
	1.1 p.u. – 1.15 p.u.	Not Allowed
275 kV	0.85 p.u. – 0.9 p.u.	60 minutes
	0.9 p.u. – 1.09 p.u.	unlimited
	1.1 p.u. – 1.15 p.u.	Not Allowed
400 kV	0.85 p.u. – 0.9 p.u.	unlimited
	0.9 p.u. – 1.05 p.u.	unlimited
	1.05 p.u. – 1.15 p.u.	Not Allowed

It should be noted that it is permissible to relax the 275 kV connection voltage range requirement to 1.1 p.u. if lasting for no longer than 15 minutes.

Wider Voltage ranges or longer minimum times for operation can be agreed between the **TSO** and the DC-connected **Controllable PPM** if needed to preserve or to restore system security. If wider Voltage ranges or longer minimum times for operation are economically and technically feasible, the DC-connected **Controllable PPM** Owner shall not unreasonably withhold consent.

The DC-connected **Controllable PPM** shall be capable of stable operation within the minimum to maximum range of short circuit power and network characteristics of the **HVDC System interface point** specified by the **TSO** in the relevant **Connection Agreement**.

For HVDC Converter Station interface points at AC Voltages other than those given in the table above, the **TSO** shall specify applicable requirements at the **Connection Point** in the relevant **Connection Agreement**.

In the case of DC-connected **Controllable PPMs**, if a constant nominal Frequency other than 50 Hz is used, the Voltage ranges and time periods specified by the TSO in the relevant **Connection Agreement** shall be proportional to those given in the table above.

CC.S3.1.8.10 DC connected **Controllable PPMs** shall comply with the reactive power capability requirements as given in the diagrams in CC.S2.1.3.3 at maximum **HVDC System Active Power** transmission capacity.

CC.S3.1.8.11 For DC connected **Controllable PPMs**, the **TSO** may specify in the relevant **Connection Agreement** supplementary reactive power to be provided if the **Connection Point** of a DC connected **Controllable PPM** is neither located at the high **Voltage** terminals of the step-up transformer to the **Voltage** level of the **Connection Point** not at the alternator terminals, if no step-up transformer exists. This supplementary **Reactive Power** shall compensate the **Reactive Power** exchange of the high **Voltage** line or cable between the high **Voltage** terminals of the step-up transformer of the DC connected **Controllable PPM** or its alternator terminals, if no step-up transformer exists, and the **Connection Point** and shall be provided by the responsible owner of that line or cable.

CC.S3.1.8.12 During synchronisation of a DC connected **Controllable PPM** to the AC collection network, the DC connected **Controllable PPM** shall have the capability to limit any **Voltage** changes to a steady-state level specified by the **TSO** in the relevant **Connection Agreement**. The maximum magnitude, duration and measurement window of the **Voltage** transient shall be specified on a site-specific basis by the **TSO** in the relevant **Connection Agreement** and shall not exceed 5 % of the pre-synchronisation **Voltage**.

CC.S3.1.8.13 A remote end **HVDC Converter Station** shall remain connected to the remote end **HVDC Converter Station** network and operate within the **Voltage** ranges and time periods specified below based on the reference 1 p.u. Voltage**.**

Connection Voltage	**Voltage Range**	**Time period for operation**
110 kV to (but not including) 300 kV	**0.85 p.u. – 0.9 p.u.**	**60 minutes**
	0.9 p.u. – 1.1p.u.	**unlimited**
	1.1 p.u. – 1.15 p.u.	**Not Allowed**
300 kV to 400 kV	**0.85 p.u. – 0.9 p.u.**	**unlimited**
	0.9 p.u. – 1.05 p.u.	**unlimited**
	1.05 p.u. – 1.15 p.u.	**Not Allowed**

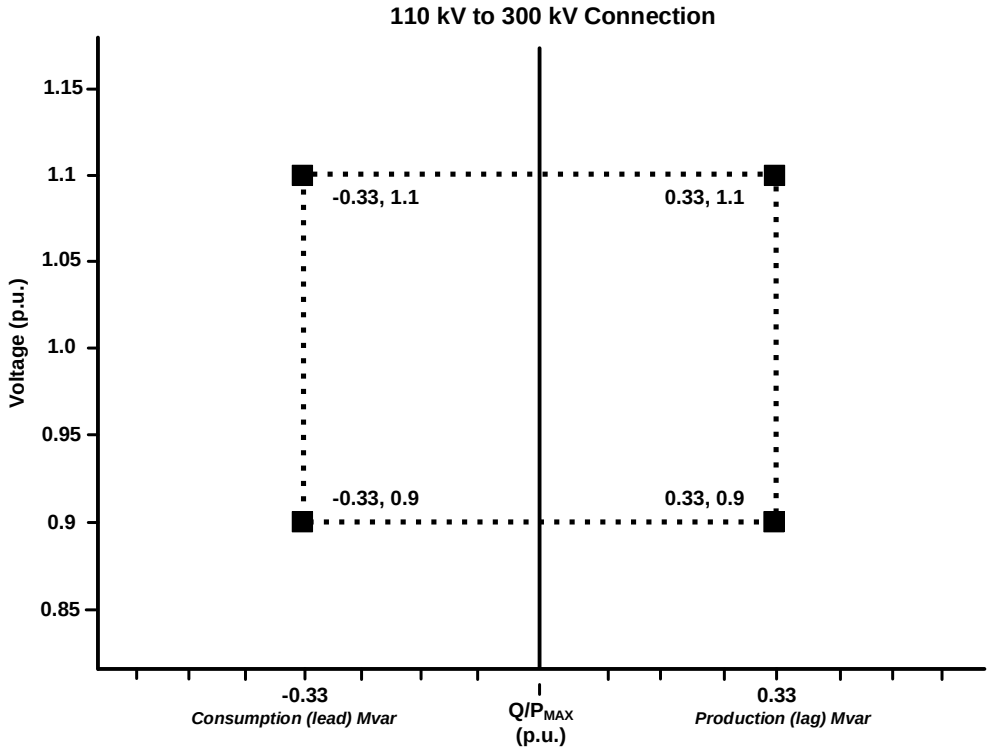
It should be noted that it is permissible to relax the 275 kV connection voltage range requirement to 1.1 p.u. if lasting for no longer than 15 minutes.

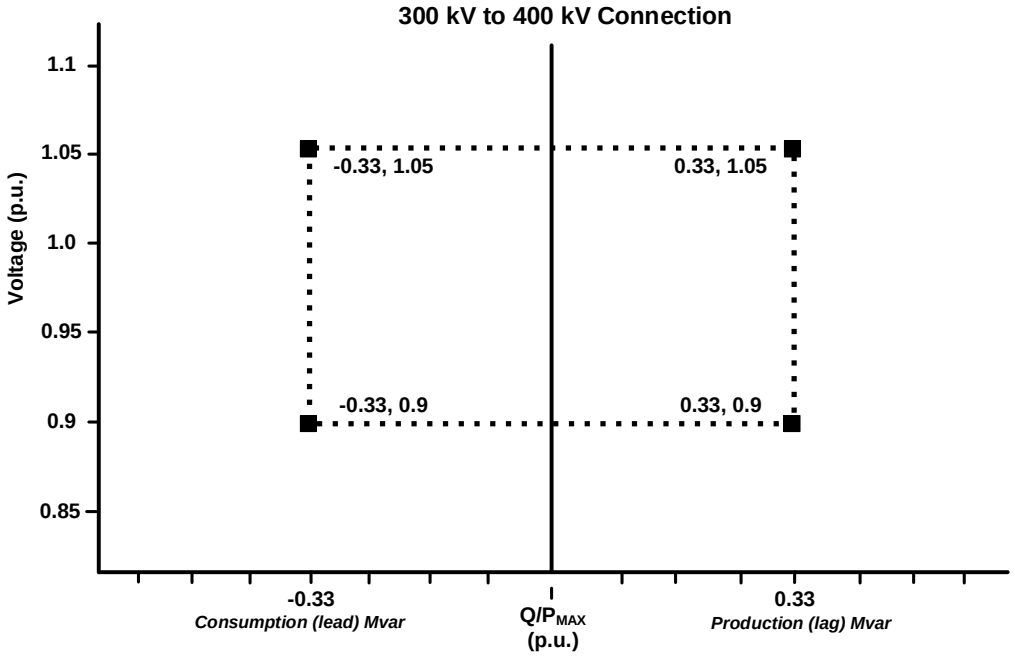
Wider Voltage ranges or longer minimum times of operation may be agreed between the remote end network operator in coordination with the **TSO** and the DC connected **Controllable PPM** owner in accordance with CC.S3.1.8.9

For HVDC interface point at AC Voltages other than the ranges given in the table above, the remote end network operator in coordination with the **TSO** shall specify applicable requirements at the **Connection Points** in the relevant **Connection Agreement**.

Where frequencies other than nominal 50 Hz are used, the **Voltage** ranges and time periods specified in the table above may be adjusted in coordination with the **TSO** and the adjustments shall be proportional to those given above.

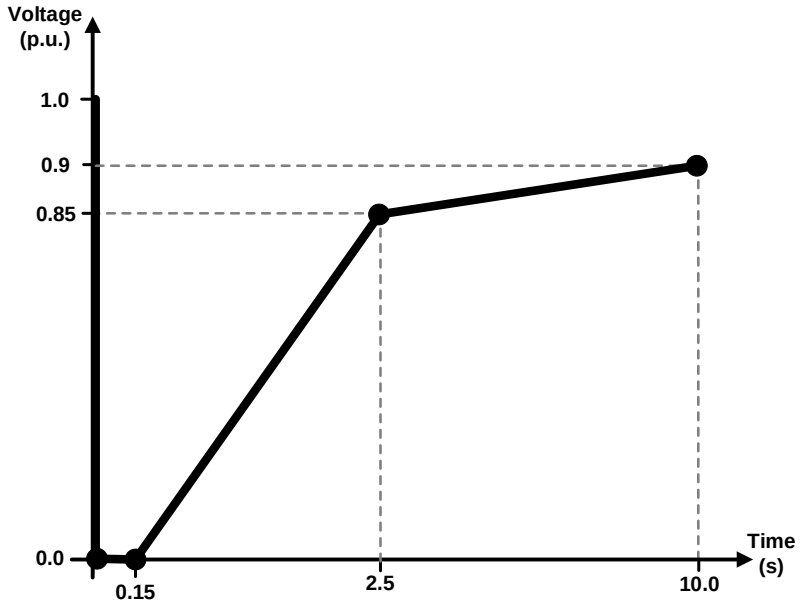
CC.S3.1.8.14 A remote end **HVDC Converter Station** shall be capable of providing **Reactive Power** as per the following requirement at its maximum **Active Power** transmission capacity (Pmax) at the **Connection Point**:


110 kV to 300 kV Connection
1.15
1.1
1.05
1.0
0.95
0.9
0.85
Voltage (p.u.)
-0.33, 1.1
0.33, 1.1
-0.33, 0.9
0.33, 0.9
-0.33
Consumption (lead) Mvar
Q/P MAX
(p.u.)
0.33
Production (lag) Mvar


300 kV to 400 kV Connection
1.1
1.05
1.0
0.95
0.9
0.85
Voltage (p.u.)
-0.33, 1.05
0.33, 1.05
-0.33, 0.9
0.33, 0.9
-0.33
Consumption (lead) Mvar
Q/P MAX
(p.u.)
0.33
Production (lag) Mvar

CC.S3.1.9 **Fault Ride Through**

CC.S3.1.9.1 A **HVDC System** connected to the Transmission System shall be capable of staying connected to the Transmission System and continuing to operate stably during symmetric and asymmetric Voltage Dips. The voltage-against-time profile specifies the required capability for the minimum Voltage and Fault Ride-Through Time at the **Connection Point** before, during and after the Voltage Dip. That capability shall be in accordance with the voltage-against-time profile as specified in the figure below.



CC.S3.1.9.2 A **HVDC System** shall be capable of providing fast fault current at the **Connection Point** in the case of symmetrical and asymmetrical faults;

(a) during voltage dips below 0.9 p.u., and

(b) until voltage has recovered to within normal operating voltage range,

(c) prioritising reactive current, supplied within the rating of **HVDC System**, with a rise time no greater than 100ms and a settling time no greater than 300ms.

CC.S3.1.9.3 After faults, the **HVDC System** shall always give priority to **Active Power**.

CC.S3.1.9.4 The **TSO** shall specify the pre-fault and post-fault conditions for the fault ride through capability in terms of:

(i) the calculation of the pre-fault minimum short circuit capacity at the connection point;

(ii) pre-fault **MW** and **Mvar** operating point of the Generating Unit at the **Connection Point** and **Voltage** at the **Connection Point;** and

(iii) calculation of the post-fault minimum short circuit capacity at the connection point.

the **TSO** will publish this data in the Transmission Forecast Statement which will be made publicly available via the **TSO's** website.

With regards to network characteristics at the remote end, the **HVDC Converter Station** owner at the remote end shall provide the relevant data to a DC connected **Controllable PPM** owner in accordance with the provisions of CC.S2.1.4.

CC.S3.1.9.5 **HVDC Systems** may disconnect from the **Transmission System** if the protection scheme for internal faults requires to do so. The protection scheme for internal faults shall be designed not to jeopardise fault-ride-through performance.

CC.S3.1.9.6 The **TSO** may in the relevant **Connection Agreement** specify voltages at the **Connection Point**, on a site-specific basis, whereby the **HVDC System** is allowed to block, and remain connected to the **Transmission System** with no **Active Power** and **Reactive Power** contribution for a time frame that shall be as short as technically feasible and which shall be agreed between the **TSO** and the **HVDC System Owner**.

CC.S3.1.9.7 A **HVDC System** shall reach its **Active Power** set-point as quickly as the technology allows and in any event within 500 ms of the voltage recovering to 90% of nominal voltage, for fault disturbances cleared within 140 ms. For longer duration fault disturbances, the **HVDC System** shall provide at least 90% of its **Active Power** set-point within 1 second of the voltage recovering to 90% of the nominal voltage.

CC.S3.1.9.8 **HVDC Systems** shall be capable of fast recovery from transient faults within the **HVDC System**.

CC.S3.1.9.9 A **HVDC System** shall be capable of finding stable operation points with a minimum change in **Active Power** flow and voltage level, during and after any planned or unplanned change in the **HVDC System** or **Transmission System** to which it is connected. The **HVDC System** shall be capable of remaining stable for changes in the system conditions within the ranges defined in CC.S3.1.2.1 and CC.S3.1.8.1.

CC.S3.1.9.10 The **HVDC System Owner** shall ensure that the tripping or disconnection of an HVDC converter station, as part of any multi-terminal or embedded **HVDC System**, does not result in transients at the connection point beyond the limit specified by the **TSO** in the relevant **Connection Agreement**.

CC.S3.1.9.11 A **HVDC System** shall withstand transient faults on HVAC lines in the **Transmission System** it is connected to, and shall not cause any of the equipment in the HVDC System to disconnect from the **Transmission System** due to autoreclosure of lines in the network.

CC.S3.1.9.12 A **HVDC System Owner** shall provide information to the **TSO** on the resilience of the **HVDC System** to **Transmission System** disturbances.

CC.S3.1.10 **Protection and Control Schemes Settings**

CC.S3.1.10.1 The **TSO** and the **HVDC System Owner** shall coordinate and agree on the schemes and settings of the different control modes of the HVDC converter station including the settings of the specific parameters on a site-specific basis. Any change to the schemes or settings of parameters of the different control modes and protection of the **HVDC System**, including the procedure, shall be coordinated and agreed between the **TSO** and the **HVDC System Owner**. The parameters of the different control modes and the protection settings of the HVDC converter station shall be able to be changed if required by the **TSO**. The control modes and associated setpoints shall be capable of being changed remotely as instructed by the **TSO**.

CC.S3.1.10.2 The **HVDC System Owner** shall set the protection and control devices of its HVDC converter station in compliance with the following priority ranking, organised in decreasing order of importance unless otherwise specified by the **TSO** in the relevant **Connection Agreement**:

(a) Transmission System and **HVDC System** protection;

(b) **Active Power** control for emergency assistance;

(c) Synthetic inertia, if applicable;

(d) Automatic remedial actions as specified in CC.S3.1.5.4;

(e) **Limited Frequency Sensitive Mode**;

(f) **Frequency Sensitive Mode** and frequency control; and

(g) Power gradient constraint.

APPENDIX 1

FORMAT, PRINCIPLES AND BASIC PROCEDURE TO BE USED IN THE PREPARATION OF SITE RESPONSIBILITY SCHEDULES

This Appendix 1 applies only to **Users** (other than the **DNO**) whose **Plant** and **Equipment** are connected to the **Transmission System**.

CC.A1.1 PRINCIPLES

CC.A1.1.1 The following **Site Responsibility Schedules** shall be drawn up using the proforma attached or with such variations as may be agreed between the **TSO** and the **User**, although in the absence of agreement the proforma attached will be used:

(a) Schedule of **HV Apparatus**;

(b) Schedule of **Plant, LV/MV Apparatus**, services and supplies;

(c) Schedule of telecommunications and measurements **Apparatus**.

Other than at **Generating Unit** and **Power Station** locations (including **PPMs**)**,** the schedules referred to in (b) and (c) may be combined.

CC.A1.1.2 Each **Site Responsibility Schedule** for a **Connection Site** shall be prepared by the **TSO** in consultation with other **Users** at least 2 weeks prior to the date for connection proposed by the **User** pursuant to CC10.1.1(c). Each **User** shall provide information to the **TSO** to enable it to prepare the **Site Responsibility Schedule**.

CC.A1.1.3 Each **Site Responsibility Schedule** shall detail for each item of **Plant** and **Apparatus**:

(a) **Plant/Apparatus** ownership;

(b) **Site** Manager;

(c) Safety (applicable **Safety Rules** and **Control Person** or other responsible person (**Safety Co-ordinator**), or such other person who is responsible for safety);

(d) Operations (applicable **Operational Procedures** and control engineer);

(e) Responsibility to undertake maintenance.

Each **Connection Point** shall be precisely shown.

CC.A1.1.4 In the case of **Site Responsibility Schedules** referred to in CC.A.1.1.1.(b) and (c), with the exception of **Protection** and **Intertrip Apparatus** operation, it will be sufficient to indicate the responsible **User** or the **TSO** as the case may be. In the case of the **Site Responsibility Schedule** referred to in CC.A.1.1.1 (a) for **Protection** and **Intertrip Apparatus**, the responsible management unit must be shown in addition to the **User** or the **TSO** as the case may be.

CC.A1.1.5 The **HV Apparatus Site Responsibility Schedule** for each **Connection Site** must include lines and cables emanating from the **Connection Site**.

CC.A1.1.6 Every page of each **Site Responsibility Schedule** shall bear the date of issue and the issue number.

CC.A1.1.7 When a **Site Responsibility Schedule** is prepared it shall be sent by the **TSO** to the **Users** involved for confirmation of its accuracy.

CC.A1.1.8 The **Site Responsibility Schedule** shall then be signed on behalf of the **TSO** by the Manager responsible and on behalf of each **User** involved by its **Responsible Manager** (see CC.A.1.1.15), by way of written confirmation of its accuracy if they agree on its accuracy. The **TSO** shall also procure that the **TO** will sign the **Site Responsibility Schedule**.

CC.A1.1.9 Once signed, two copies will be distributed by the **TSO**, not less than two weeks prior to its implementation date, to each **User** which is a party on the **Site Responsibility Schedule** and to the **TO**, accompanied by a note indicating the issue number and the date of implementation.

CC.A1.1.10 The **TSO** and **Users** must make the **Site Responsibility Schedules** readily available to their respective operational staff at the **Site** and the **TSO** must make the **Site Responsibility Schedule** available to the **TO**'s operational staff at the **Site**.

Alterations to existing **Site Responsibility Schedules**

CC.A1.1.11 Without prejudice to the provisions of CC.A.1.1.14, when a **User** identified on a **Site Responsibility Schedule** becomes aware that an alteration is necessary, it must inform the **TSO** immediately and in any event 8 weeks prior to any change taking effect (or as soon as possible after becoming aware of it, if less than 8 weeks remain when the **User** becomes aware of the change).

CC.A1.1.12 Where the **TSO** has been informed of a change by a **User**, or itself proposes a change, it will prepare a revised **Site Responsibility Schedule** by not less than six weeks prior to the change taking effect (subject to it having been informed or knowing of the change eight weeks prior to that time) and the procedure set out in CC.A.1.1.7 shall be followed with regard to the revised **Site Responsibility Schedule**.

CC.A1.1.13 The revised **Site Responsibility Schedule** shall then be signed in accordance with the procedure set out in CC.A.1.1.8 and distributed in accordance with the procedure set out in CC.A.1.1.9, accompanied by a note indicating where the alteration(s) has/have been made, the new issue number and the date of implementation.

CC.A1.1.14 When a **User** identified on a **Site Responsibility Schedule**, or the **TSO**, as the case may be, becomes aware that an alteration to the **Site Responsibility Schedule** is necessary urgently to reflect, for example, an emergency situation, the **User** shall notify the **TSO**, or the **TSO** shall notify the **User**, as the case may be, immediately and will discuss:

(a) what change is necessary to the **Site Responsibility Schedule**;

(b) whether the **Site Responsibility Schedule** is to be modified temporarily or permanently; and

(c) the distribution of the revised **Site Responsibility Schedule**.

The **TSO** will prepare a revised **Site Responsibility Schedule** as soon as possible, and in any event within seven days of it being informed of or knowing the necessary

alteration. The **Site Responsibility Schedule** will be confirmed by **Users** and signed on behalf of the **TSO** and **Users** (by the persons referred to in CC.A.1.1.8) as soon as possible after it has been prepared and sent to **Users** for confirmation.

Responsible Managers

CC.A1.1.15 Each **User** and the **TSO** shall, prior to the date for connection proposed by the **User** pursuant to CC10.1.1(c), exchange names and status of managers with authority to sign **Site Responsibility Schedules.**

APPENDIX 2

PROCEDURES RELATING TO OWNERSHIP DIAGRAMS

This Appendix 2 applies only to **Users** (other than the **DNO**) whose **Plant** and **Equipment** are connected to the **Transmission System**.

CC.A2.1. Basic Principles

(a) Where practicable, all the **HV Apparatus** on any **Connection Site** shall be shown on one **Ownership Diagram**. Provided the clarity of the diagram is not impaired, the layout shall represent as closely as possible the geographical arrangement on the **Connection Site**.

(b) Where more than one **Ownership Diagram** is unavoidable, duplication of identical information on more than one **Ownership Diagram** must be avoided.

(c) The **Ownership Diagram** must show accurately the current status of the **Apparatus**, e.g. whether commissioned or decommissioned. Where decommissioned, the associated switchbay will be labelled "spare bay".

(d) Provision will be made on the **Ownership Diagram** for signifying approvals, together with provision for details of revisions and dates.

(e) **Ownership Diagrams** will be prepared in A4 format or such other format as may be agreed with the **TSO**.

CC.A2.2 **Apparatus** to be shown on **Ownership Diagrams**

1. Busbars
2. Circuit Breakers
3. Disconnector (Isolator) and Switch Disconnectors (Switching Isolators)
4. Disconnectors (Isolators) - Automatic Facilities
5. Bypass Facilities
6. **Earthing** Switches
7. Maintenance Earths
8. Overhead Line Entries
9. Overhead Line Traps
10. Cable and Cable Sealing Ends
11. **Generating Unit**
12. **Generator Transformers**
13. **Generating Unit Transformers**, Station Transformers, including the lower voltage circuit-breakers

13A. **PPM** Transformers, including the lower voltage circuit-breakers

14. Synchronous Compensators
15. Static Variable Compensators
16. Capacitors (including Harmonic Filters)
17. Series or Shunt Reactors
18. Supergrid and Grid Transformers
19. Tertiary Windings

20. **Earthing** and Auxiliary Transformers
21. Three Phase VTs
22. Single Phase VT & Phase Identity
23. High Accuracy VT and Phase Identity
24. Surge Arrestors/Diverters
25. Neutral **Earthing** Arrangements on **HV Plant**
26. Fault Throwing Devices
27. Quadrature Boosters
28. Arc Suppression Coils
29. Current Transformers (where separate **Plant** items)
30. Wall Bushings

CC.A2.3 Recommended Graphical Symbols

Where appropriate, the recommended graphical symbols shown in the attachment to this Appendix 2 shall be used in the preparation of an **Ownership Diagram**.

APPENDIX 3

TECHNICAL REQUIREMENTS

LOW FREQUENCY RELAYS FOR THE AUTOMATIC

DISCONNECTION OF SUPPLIES AT LOW **FREQUENCY**

CC.A3.1 **Low Frequency Relays**

CC.A3.1.1 The **Low Frequency Relays** to be used shall be in accordance with the requirements of the **Connection Agreement**. They should have a setting range of 47 Hz to 50 Hz and be suitable for operation from a nominal AC input of 63.5, 110 or 240 V. The following general parameters on the requirements of approved **Low Frequency Relays** for automatic installations is given as an indication, without prejudice to the provisions that may be included in the **Connection Agreement**:

(a)	**Frequency** settings:	47 Hz – 50 Hz in steps of 0.05 Hz or better, preferably 0.01 Hz;
(b)	Measurement period settings:	Within a minimum selectable settings range of 4 to 6 cycles;
(c)	Operating time:	Between 100 and 150 ms dependent on measurement period setting;
(d)	Voltage lock-out:	Selectable within a range of 55 to 90% of nominal voltage;
(e)	Facility stages:	One or two stages of **Frequency** operation;
(f)	**Output** contacts:	Two **Output** contacts per stage to be capable of repetitively making and breaking for 1000 operations.

CC.A3.2 **Low Frequency Relay** Voltage Supplies

CC.A3.2.1 It is essential that the voltage supply to the **Low Frequency Relays** shall be derived from the primary **System** at the supply point concerned so that the **Frequency** of the **Low Frequency Relays** input voltage is the same as that of the primary **System**. This requires either:

(a) the use of a secure supply obtained from voltage transformers directly associated with the grid transformer(s) concerned, the supply being obtained where necessary via a suitable automatic voltage selection scheme; or

(b) the use of the **Substation** 240 V phase-to-neutral selected auxiliary supply, provided that this supply is always derived at the **Connection Point** concerned and for the avoidance of doubt is never derived from a standby supply **Generating Unit** or from another part of the **Distribution System**.

CC.A3.3 Scheme Requirements

CC.A3.3.1 The tripping facility should be engineered in accordance with the following reliability considerations:

(a) Dependability

Failure to trip at any one particular **Demand** shedding point would not harm the overall operation of the scheme. However, many failures would have the effect of reducing the amount of **Demand** under low **Frequency Control**. An overall reasonable minimum requirement for the dependability of the **Demand** shedding scheme is 96%, i.e. the average probability of failure of each **Demand** shedding point should be less than 4%. Thus the **Demand** under low **Frequency Control** will not be reduced by more than 4% due to relay failure.

(b) **Outages**

Low **Frequency Demand** shedding schemes will be engineered such that the amount of **Demand** under control is as specified by the **TSO** and is not reduced unacceptably during equipment **Outage** or maintenance conditions.

OPERATING CODE NO. 1

DEMAND FORECASTING

OC1.1 INTRODUCTION

Operating Code No 1 ("OC1") is concerned with **Demand** forecasting and specifies the procedures to be followed and the data to be supplied to the **Transmission System Operator (TSO)** to enable the **TSO** to forecast **Demand** on the **Northern Ireland (NI) System** through the timescales ranging from 3 years in advance (namely part of the **Operational Planning Phase**) through to the **Control Phase** and into real time operation. As explained in the Glossary and Definitions section, references to the term "**User System**" shall be read as referring to the **Distribution System** with respect to provisions applicable to the **DNO**.

OC1.2 OBJECTIVE

The objectives of OC1 are to set out the requirement for **Users** to provide data to the **TSO** to:

(a) enable the **TSO** insofar as it is able to do so, to maintain a sufficient **Margin** during the **Operational Planning Phase** and the **Programming Phase**; and

(b) enable the **TSO** to know how much **Generating Plant** to **Schedule** and to **Dispatch** (insofar as **Generating Plant** is available) to meet **Demand** on the **NI System** to the **Licence Standards** in the **Control Phase**;

and to specify those factors which the **TSO** will take into account when conducting **Demand** forecasting.

OC1.3 SCOPE

OC1.3.1 OC1 applies to the **TSO** and to **Users**, which in this OC1 means, **Generators** (in respect of all **Generating Units** connected to the **Transmission System** and in respect of **CDGUs** connected to the **Distribution System** and **Controllable PPMs** connected to the **Distribution System**), **Generator Aggregators**, the **DNO** and **Suppliers**.

OC1.4 PROCEDURE

OC1.4.1 **Users**, as specified below, must provide the following data to the **TSO** at the time and in the manner specified in order to enable the **TSO** to have the relevant data for it to carry out **Demand** forecasting over the periods specified in OC1.1.

OC1.4.1.1 **Energy Sales**

(a) Each **Supplier** must, by the end of week 48 each year, provide to the **TSO** in writing details of its anticipated aggregate annual sales of **Energy** in **GWh** (calculated in accordance with paragraph (c) below) in respect of each of the three following **TSO Financial Years**. If between such annual notifications the anticipated sales of **Energy** for any year materially changes, the **Supplier** must notify the **TSO** in writing without delay giving details in **GWh** of the revised anticipated sales of **Energy**.

(b) The details of anticipated sales of **Energy** notified to the **TSO** pursuant to (a) above must contain the **Supplier's** best estimate, acting as a reasonable and prudent **Supplier** in all the circumstances.

(c) Each **Supplier** must (subject as provided below), in order to avoid duplication of anticipated sales of **Energy** which another **Supplier** may be submitting to the **TSO**, only include in its estimate of **Energy** sales provided to the **TSO** pursuant to (a) above those anticipated sales of **Energy** in respect of which it has a contractual arrangement and those sales which would be necessary to meet any anticipated development in **Energy** sales relating to that contractual arrangement. However, where a contractual arrangement exists for only a portion of the period for which the data is to be supplied, the data will include an assumption for the remainder of the period (which must be identified as such in the submission) unless the **Supplier** is aware that the **Energy** sales will be made by another **Supplier**.

OC1.4.1.2 Generation Output

With respect to all **Generating Units** connected to the **Transmission System** and to **CDGUs** and **Controllable PPMs** connected to the **Distribution System**, the output in **MW** and **Mvar** of **Power Stations** will be monitored by the **TSO** at the **TSO Control Centre**. The generator output in **MW** and **Mvar** of **Independent Generating Plant** connected to the **Distribution System** with a **Registered Capacity** of 2**MW** and above shall, when requested by the TSO and where suitable metering is fitted, be recorded by the **DNO** and then provided by the **DNO** to the **TSO** in half hourly metered data. This is to enable the **TSO** to be able to assess the total **Demand** on the **NI System** and it will in due course form part of the historical records which are vital in carrying out **Demand** forecasting.

OC1.4.1.3 **Loading** Profiles

The **DNO** shall, at the request of the **TSO**, in respect of each **Independent Generating Plant** connected to the **Distribution System** with a **Registered Capacity** of 2**MW** and above, submit to the **TSO** in writing by 1000 hours on the day following the day on which the request was made an estimate of the **Generator Load**ing profiles for such **Independent Generating Plant** for the following **Schedule Day**, save that it will be for the following three **Schedule Days** when submitted on a Friday and the next two **Schedule Days** when submitted on a Saturday (no notice being required on a Sunday) and shall be for such longer period as the

TSO may specify, at least one week in advance, to cover holiday periods. Such estimate will identify the **Bulk Supply Point** that the **Independent Generating Plant** is associated with and be in the form of half hourly output in **MW**.

OC1.5 **DEMAND** FORECASTS

OC1.5.1 The following factors will be taken into account by the **TSO** when conducting **Demand** forecasting in the **Operational Planning Phase** and in the **Programming Phase**:

(a) historic generation output information recorded by the **TSO** or submitted by the **DNO** in accordance with OC1.4.1.2;

(b) local factors known to the **TSO** in advance which may affect **Demand** on the **NI System**, for example trade holidays and school holidays;

(c) anticipated **Loading** profiles submitted by the **DNO** in respect of I**ndependent Generating Plant** pursuant to OC1.4.1.3;

(d) prospective new **Demand** for **Energy** exceeding 2**MW** on the **NI System** submitted in accordance with the terms of the Planning Code;

(e) **Customer Demand Management** of which the **TSO**, is aware in accordance with OC4;

(f) estimated **Energy** sales information submitted by **Suppliers** pursuant to OC1.4.1.1;

(g) anticipated transfers across **Interconnectors** and the **Inter-jurisdictional Tie Lines** between Northern Ireland and the Republic of Ireland; and

(h) other information supplied by **Users**.

The peak daily **Demand** forecast in the **Operational Planning Phase** will become the **Average Cold Spell Demand** forecast which is utilised by the **TSO** to determine whether the **Licence Standards** can be met.

OC1.5.2 The following factors will be taken into account by the **TSO** when conducting **Demand** forecasting in the **Control Phase**:

(a) historic load curves which the **TSO** considers to be relevant in the **Control Phase**, for example, in respect of the same or a similar day in the previous year or previous week;

(b) local factors known to the **TSO** in advance which may affect **Demand** on the **NI System**, for example trade holidays and school holidays;

(c) anticipated **Loading** profiles submitted by the **DNO** in respect of **Independent Generating Plant** pursuant to OC1.4.1.3;

(d) weather forecasts and the current and historic weather conditions;

(e) **Demand Control** of which the **TSO** is aware in accordance with OC4;

(f) anticipated transfers across **Interconnectors** and the **Inter-jurisdictional Tie Lines** between Northern Ireland and the Republic of Ireland; and

(g) other information supplied by **Users**.

OPERATING CODE NO. 2

OPERATIONAL PLANNING

OC2.1 INTRODUCTION

OC2.1.1 **Operational Planning** involves planning through various timescales, the matching of generating capacity with forecast **Demand** on the **All Island Networks** together with a reserve of generation to provide the **Margin** taking into account **Outages** of **CDGUs** (and/or in the case of a **CCGT Installation**, **CCGT Modules** as provided in OC2), **Controllable PPMs, Power Station Equipment** and **Outages** of and constraints on parts of the **NI System** and taking into account the output of **Independent Generating Plant** and transfers of electricity across any **Interconnector** and the **Inter-jurisdictional Tie Line** between Northern Ireland and the Republic of Ireland, in order to maintain the security and integrity of the **NI System**.

OC2.1.2 In general terms there is an "envelope of opportunity" for the release of **CDGUs, Controllable PPMs** and **Power Station Equipment** and of parts of the **NI System** for **Outages** in accordance with this OC2. The envelope is determined by reference to the excess of the total generating capacity available (including transfers across any **Interconnector** and taking account of the output of **Independent Generating Plant**) over the sum of **Demand** plus the **Margin** at the relevant time.

OC2.1.3 OC2 sets out the data required by the **TSO** from **Generators** and the data exchanges between the **TSO** and the **DNO** in order for the **TSO** to conduct the co-ordinated **Operational Planning** process in conjunction with the **Other TSO**, and the procedures to be adopted by the **TSO** in the planning and co-ordination of **CDGU Outages**, (and/or in the case of a **CCGT Installation**, **Outages** of **CCGT Modules** as provided in OC2), **Controllable PPM Outages, Power Station Equipment Outages** and **NI System Outages** in accordance with this OC2.

OC2.1.4 In OC2, "Year 0" means the current calendar year at any time, Year 1 means the next calendar year at any time, Year 2 means the calendar year after Year 1, etc.

OC2.2 OBJECTIVE

OC2.2.1 The objective of OC2 is to ensure, as far as possible, that the **TSO**, in conjunction with the **Other TSO**, co-ordinates, optimises and approves **Outages** of **CDGUs** (and/or in the case of **CCGT Installations**, **CCGT Modules** as provided in OC2), **Controllable PPMs** and **Power Station Equipment**, taking into account **System Outages** on the **NI System** and the **Other TSO's Transmission System**, to minimise so far as possible the number and effect of constraints on the **NI System**, the **Other Transmission System** and the **Inter-jurisdictional Tie Line** between Northern Ireland and the Republic of Ireland and in order to ensure that, so far as possible, forecast **Demand** plus the **Margin** (taking account of the output of **Independent Generating Plant** and transfers across any **Interconnector** and the **Inter-**

jurisdictional Tie Line between Northern Ireland and the Republic of Ireland**)** is met.

OC2.3 SCOPE

OC2.3.1 OC2 applies to the **TSO**, **Generators** (in respect of all **Generating Units** connected to the **Transmission System** and in respect of **CDGUs** and **Controllable PPMs** connected to the **Distribution System**), **Interconnector Owners**, **Generator Aggregators, Demand Side Unit Operators,** the **DNO** and **Large Demand Customers**.

OC2.4 INFORMATION EXCHANGE WITH THE **DNO** IN RESPECT OF **INDEPENDENT GENERATING PLANT**

OC2.4.1 Such information as the **TSO** may reasonably require relating to **Independent Generating Plant** connected to the **Distribution System** shall, where required by the **TSO** for the purposes of this OC2, be provided by the **DNO**.

OC2.5 SUMMARY

OC2.5.1 Under OC2 the interaction between the **TSO**, the **DNO, Generators** and **Aggregators** will be as follows:

(a) each **Generator** and the **TSO**: in respect of **Outages** of **CDGUs** (and/or in the case of a **CCGT Installation**, **CCGT Modules**, as provided under OC2), **Controllable PPMs, Dispatchable PPMs, Demand Side Units, Aggregated Generators** and/or **Power Station Equipment**;

(b) the **DNO** and the **TSO**: in respect of **Outages** of **Independent Generating Plant** connected to the **Distribution System** with a **Registered Capacity** of 2 **MW** and greater;

(c) the **TSO** and each **Generator**: in respect of **Transmission System Outages** relevant to the **Generator's CDGUs** (and/or in the case of a **CCGT Installation**, **CCGT Modules**, therein), **Controllable PPMs.**, and **Dispatchable PPMs.**

(d) the **DNO** and the **TSO**: in respect of **Outage**s on the **Distribution System** relevant to distribution connected **CDGUs**, **Controllable PPMs**, **Dispatchable PPMs, Demand Side Units, Aggregated Generators** and **Generators** with distribution connected **Independent Generating Plant** with a **Registered Capacity** of 2 **MW** and greater;

(e) the **TSO** and the **DNO** : in respect of **Outages** of **CDGUs** connected to the **Distribution System** including **Controllable PPMs**, **Dispatchable PPMs, Demand Side Units, Aggregated Generating Units** and/or associated **Power Station Equipment**;

(f) the **DNO** and the **TSO**: in respect of **Outages** of 33kV circuits on the **Distribution System**; and

(g) the **DNO** and the **TSO**: in respect of **Outages** on the **Distribution System** which may affect **Customers** with a **Demand** greater than 10 **MW** and which are connected to the **Distribution System**.

The provisions of this paragraph also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**.

The provisions of this paragraph also apply to **Aggregators** as if **Generators** and to a **Generator**'s units were references to an **Aggregator** in respect of a **Demand Side Unit** or and **Aggregated Generator.**

OC2.5.2 Under OC2 the interaction between the **TSO** and **Large Demand Customers** will be in respect of **Transmission System Outages** relevant to each **Large Demand Customer.**

OC2.5.3 (a) In relation to all matters to be undertaken pursuant to this OC2, including (without limitation) making requests for **Outages** and supplying information to the **TSO** concerning overruns, each **Generator** must act reasonably and in good faith. Without limitation to such obligation, each **Generator** shall act in accordance with **Prudent Operating Practice** in planning its **Outages** and, in particular, so as to avoid a situation arising in which the **Generator** is obliged to request an **Outage** during the **Outage Planning** process by reason of obligations imposed upon the **Generator** by statute as a consequence of the **Generator** not having planned its **Outages** in accordance with **Prudent Operating Practice**, for example, by not having planned its **Outages** sufficiently far in advance of any statutory time limit. The provisions of this paragraph also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph also apply to **Aggregator**s as if **Generator**s and to a **Generator**'s units were references to an **Aggregator** in respect of a **Demand Side Unit** or an **Aggregated Generator.**

(b) In relation to all matters to be undertaken pursuant to this OC2:

(i) the **DNO** must act reasonably and in good faith; and

(ii) the **DNO** shall procure that

each **Customer** with a **Demand** greater than 10 **MW** and which is connected to the **Distribution System**, and

each **Generator** with **Independent Generating Plant** with a **Registered Capacity** of 2 **MW** and greater

each **Aggregator**

must act reasonably and in good faith.

(c) The **TSO** must, in relation to all matters to be undertaken pursuant to this OC2, including (without limitation) the co-ordination of **Generators', Aggregators'** or **Interconnector Owners' Outages**, act reasonably and in good faith in the discharge of its obligations.

OC2.5.4 Where in this OC2 there are references to outages of **CCGT Modules**, such provisions only apply where the **Power Station Agreement** and/or **Generating Unit Agreement** relating to the **CCGT Installation** of which the **CCGT Module** forms part so provides.

OC2.6 **OUTAGE** PLANNING PROCEDURES FOR **CDGUs, Controllable PPMs,** AND/OR **POWER STATION EQUIPMENT**

OC2.6.1 Indicative Term **Operational Planning** - Planning for Years 4 to 7

The provisions of this section OC2.6 shall only apply if reasonably required and requested by the **TSO**. In each calendar year:

(a) By the End of March

Each **Generator** will provide the **TSO** in writing with a suggested **Indicative Outage Programme** for Years 4 to 7 which will contain the following information in relation to each proposed **Planned Outage** in the suggested **Provisional Outage Programme**:

(i) identity of the **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs**(or **Generating Unit(s)** therein) and/or the **Power Station Equipment** concerned;

(ii) **MW** concerned (i.e. **MW** which will not be **Available** as a result of the **Outage** and that which will, notwithstanding the **Outage**, still be **Available**, if any);

(iii) required duration of **Outage**;

(iv) preferred **Start Date** or range of **Start Dates**;

(v) whether the **Outage** is a **Flexible Planned Outage** or an **Inflexible Planned Outage**, provided that the **Generator** must not declare an **Outage** to be an **Inflexible Planned Outage** unless **Prudent Operating Practice** would not permit the **Outage** to be declared as a **Flexible Planned Outage**;

(vi) if it is a **Flexible Planned Outage**,

(a) the period for which the **Outage** could be deferred at the request of the **TSO**, which period shall be not less than 30 days in length;

(b) the period for which the **Outage** could be advanced at the request of the **TSO**, which period shall be not less than 10 days in length; and

(vii) where relevant, that the **Generator** wishes to take the **Outage** in order to enable it to comply with obligations relating to the operation and maintenance of **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment** imposed upon the **Generator** by statute and, if so, the latest date by which the **Outage** must be taken.

In relation to sub-paragraph (v), the **Generator** must provide the **TSO** with such evidence as it may reasonably require in order to substantiate the declaration as an **Inflexible Planned Outage** and, if the **Generator** fails to establish to the **TSO 's** reasonable satisfaction that the **Outage** is required to be an **Inflexible Planned Outage**, the **Outage** shall be deemed to have been submitted as a **Flexible Planned Outage** with an attendant **Flexible Planned Outage Period** of 10 days for advancement and 30 days for deferment.

Details of proposed **Outages** for years 4 to 7 are required to signal adequately in advance major **Outages** which could impact on capacity adequacy or on the **TSO's** or the **Other TSO's Transmission Outage Maintenance and Development Programmes** and are indicative only. In rolling over the **Provisional Outage Programme** from one year to the next each **Generator** shall not be constrained in making any submission to any previous **Indicative Outage Programme.**

The provisions of this paragraph OC2.6.1(a) also apply to **Interconnector Owners** as if references to "**Generator**" and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**.
The provisions of this paragraph OC2.6.1(a) also apply to **Aggregators** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

(b) Between the End of March and the End of September

(i) The **TSO** will be calculating the weekly capacity required from **Generating Plant** in Years 4 and 7 taking into account insofar as the **TSO** may consider to be appropriate:

(a) **Demand Forecasts**;

(b) The **TSO's** estimate of **Customer Demand Management**;

(c) forecast **Availability** of **CDGUs**;

(d) forecast output available from any **Interconnectors**;

(e) the **Margin** as set by the **TSO**;

(f) **NI System** constraints and constraints on the **Inter-jurisdictional Tie Line** between Northern Ireland and the Republic of Ireland; and

(g) **NI System Outages** to ensure that, in general, these have the least restraint on **CDGU**, **Controllable PPM** and **Power Station Equipment Outages**.

(ii) The calculation under (i) will, with anticipated **Outages** other than **Planned Outages** then taken into account, effectively define the envelope of opportunity for **Planned Outages** of **CDGUs,** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment**.

During this period the **TSO** may, as appropriate, contact each **Generator** which has supplied information to seek clarification on information received or such additional relevant information as is reasonable. The provisions of this paragraph OC2.6.1(b) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.1(b) also apply to **Aggregators** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.6.2 Long Term **Operational Planning** - Planning for Years 2 and 3

In each calendar year:

(a) By the End of March
Each **Generator** will provide the **TSO** in writing with a suggested **Provisional Outage Programme** for Years 2 and 3 (that part of the programme relating to Year 2 showing any updates to the programme for Year 3 which, by effluxion of time, has become that for Year 2) which will contain the following information in relation to each proposed **Planned Outage** in the suggested **Provisional Outage Programme**:

(i) identity of the **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs,** (or **Generating Unit(s)** therein) and/or the **Power Station Equipment** concerned;

(ii) **MW** concerned (i.e. **MW** which will not be **Available** as a result of the **Outage** and that which will, notwithstanding the **Outage**, still be **Available**, if any);

(iii) required duration of **Outage**;

(iv) preferred **Start Date** and **Start Time** or range of **Start Dates** and **Start Times**;

(v) whether the **Outage** is a **Flexible Planned Outage** or an **Inflexible Planned Outage**, provided that the **Generator** must not declare an **Outage** to be an **Inflexible Planned Outage** unless **Prudent Operating Practice** would not permit the **Outage** to be declared as a **Flexible Planned Outage**;

(vi) if it is a **Flexible Planned Outage**,

(a) the period for which the **Outage** could be deferred at the request of the **TSO**, which period shall be not less than 30 days in length;

(b) the period for which the **Outage** could be advanced at the request of the **TSO**, which period shall be not less than 10 days in length; and

(vii) where relevant, that the **Generator** wishes to take the **Outage** in order to enable it to comply with obligations relating to the operation and maintenance of **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment** imposed upon the **Generator** by statute and, if so, the latest date by which the **Outage** must be taken.

In relation to sub-paragraph (v), the **Generator** must provide the **TSO** with such evidence as it may reasonably require in order to substantiate the declaration as an **Inflexible Planned Outage** and, if the **Generator** fails to establish to the **TSO 's** reasonable satisfaction that the **Outage** is required to be an **Inflexible Planned Outage**, the **Outage** shall be deemed to have been submitted as a **Flexible Planned Outage** with an attendant **Flexible Planned Outage Period** of 10 days for advancement and 30 days for deferment.

The updates to the programme for Year 3 when, by effluxion of time, Year 3 has become Year 2, may only reflect the **Generator**'s reasonable response to changed circumstances and changes which, in the context of the **Provisional Outage Programme** as a whole, are minimal in their effect on the operation of the **NI System**; otherwise it must reflect the **Provisional Outage Programme** for Year 3 issued the previous September.

The provisions of this paragraph OC2.6.2(a) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.2(a) also apply to **Aggregators** as if references to **Generator** and to a **Generator**'s units were references to an

Aggregator in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

(b) Between the End of March and the End of September

(i) The **TSO** will be calculating the weekly capacity required from **Generating Plant** in Years 2 and 3 taking into account insofar as the **TSO** may consider to be appropriate:

(a) **Demand Forecasts**;

(b) The **TSO's** estimate of **Customer Demand Management**;

(c) forecast **Availability** of **CDGUs**;

(d) forecast output available from any **Interconnectors**;

(e) the **Margin** as set by the **TSO**;

(f) **NI System** constraints and constraints on the **Inter-jurisdictional Tie Line** between Northern Ireland and the Republic of Ireland; and

(g) **NI System Outages** to ensure that, in general, these have the least restraint on **CDGU**, **Controllable PPM** and **Power Station Equipment Outages**.

(ii) The calculation under (i) will, with anticipated **Outages** other than **Planned Outages** then taken into account, effectively define the envelope of opportunity for **Planned Outages** of **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment**.

During this period the **TSO** may, as appropriate, contact each **Generator** which has supplied information to seek clarification on information received or such additional relevant information as is reasonable. The provisions of this paragraph OC2.6.2 (b) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.2(b) also apply to **Aggregators** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

(c) By the End of September

(i) The **TSO** will, in conjunction with the **Other TSO** and having taken into account the information notified to it pursuant to (a), the factors specified in (b) and, having discussed it with the **Generator**

if appropriate, provide each **Generator** in writing with a **Provisional Outage Programme** showing the **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment** it may potentially withdraw from service during each week of Years 2 and 3 for a **Planned Outage** (including, for the avoidance of doubt, both **Flexible Planned Outages** and **Inflexible Planned Outages**) and showing the **Flexible Planned Outage Periods**, by way of amendment to, or confirmation of, the suggested **Provisional Outage Programme** submitted by the **Generator**. When preparing the **Provisional Outage Programme** with respect to an **Interconnector**, the **TSO** shall take into account the arrangements it has in place under its Operating procedures with National Grid Electricity Transmission.

(ii) The **Provisional Outage Programme** may differ from the suggested **Provisional Outage Programme** as follows:

(a) **Flexible Planned Outages** (and associated **Flexible Planned Outage Periods**) and **Inflexible Planned Outages** may have been moved to co-ordinate all **Outage** proposals received by the **TSO** or generally for reasons relating to the proper operation of the **NI System** and the **Other TSO's Transmission System**. When dealing with Year 2, the **TSO** will give priority to including proposed **Inflexible Planned Outages** for the dates proposed by the **Generator** in the case of newly proposed **Inflexible Planned Outages** and for the dates included in the **Provisional Outage Programme** prepared the previous September in the case of **Inflexible Planned Outages** which were included in that **Provisional Outage Programme**;

(b) a **Flexible Planned Outage** may have been re-designated as an **Inflexible Planned Outage**;

(c) in addition, when preparing the **Provisional Outage Programmes** for Year 3 and for Year 2, where in the opinion of the **TSO** the **Licence Standards** could not otherwise be met, the **TSO** may request that a **Flexible Planned Outage** proposed by the **Generator** be deferred to a specific date (with an attendant **Flexible Planned Outage Period**) in the following year (then Year 4 or Year 3, as the case may be) and given priority over all other **Outages** in subsequent planning for that year. The **Generator** must accept such request unless this would not be in accordance with **Prudent Operating Practice**, in which case (subject to (iii) below) the **Outage** shall be included in the **Provisional Outage Programme** for Year 3 or Year 2, as the case may be;

provided that in Year 2 only (but not in Year 3) the **TSO** may not move a **Planned Outage** relating to which the **Generator** has informed the **TSO** under OC2.6.2(a)(vii) that it needs it to comply with statutory obligations, if to do so would result in the **Generator** being in breach of those statutory obligations. However, the **TSO** may discuss the **Planned Outage** with the **Generator** and may request the **Generator** to approach the relevant authorities for an extension of time in order to avoid the breach of those statutory obligations. The **Generator** must accede to that request and use reasonable endeavours to obtain such an extension. In the case of a **Generator** with **PPA CDGUs**, the provisions of GC13.2 shall be imported into (and for the purposes of the **TSO Licence**, regarded as forming part of) this OC2.6.2(c)(ii). The **Generator** must, in all cases, inform the **TSO** of the position. In the event that an extension is obtained, the **TSO** may (subject to the other provisions of this paragraph (c)(ii)) move the **Planned Outage** accordingly.

(iii) In addition, where in the opinion of the **TSO** the **Licence Standards** could not otherwise be met, the **TSO** may (by giving the **Generator** a written notice designated as being under this OC2.6.2(c)(iii)) request:

(a) that a **Flexible Planned Outage** or an **Inflexible Planned Outage** which:

(1) (where planning for Year 3) was requested by the **Generator** (and in the case of a **Flexible Planned Outage** was not deferred to Year 4 under (ii)(c) above); or

(2) (where planning for Year 2) was shown in the **Provisional Outage Programme** for such year (prepared the previous September as the Year 3 programme) or is newly requested by the **Generator** (such request not reflecting a change in any **Outage** included in the **Provisional Outage Programme** prepared the previous September as the Year 3 programme);

be excluded from the **Provisional Outage Programme**; or

(b) that an **Inflexible Planned Outage** which was proposed by the **Generator** be re-designated as a **Flexible Planned Outage** (with an attendant **Flexible Planned Outage Period** not exceeding 10 days for advancement and 30 days for deferment).

In the case of a **Generator** with **PPA CDGUs**, the provisions of GC13.1 shall be imported into (and for the purposes of the **TSO Licence**, regarded as forming part of) this OC2.6.2(c)(iii).

(iv) Subject to (iii) above, the amendments may be made by the **TSO** in relation to Year 2, even if the offered **Planned Outages** in the suggested **Provisional Outage Programme** reflect the **Provisional Outage Programme** for Year 3 issued the previous September, to the extent necessary for the **TSO** to carry out its obligations in relation to **Operational Planning**.

The provisions of this paragraph OC2.6.2(c) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.2.2(c) also apply to **Aggregators** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

(d) By the End of October

(i) Where a **Generator** objects to the **Provisional Outage Programme** showing the **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment** it can withdraw from service during each week of Years 2 and 3 for **Planned Outage** it may contact the **TSO** to explain its concerns and the **TSO** and that **Generator** will then discuss the problem and seek to resolve it.

(ii) The resolution of the problem may require the **TSO** to contact other **Generators** and joint meetings of parties may be convened by the **TSO**. A **Generator** which notifies the **TSO** of its objections in accordance with (i) above may request that such a meeting be convened and the **TSO** will give due and reasonable consideration to such request. The need for further discussions, be they on the telephone or at meetings, can only be determined at the time.

(iii) In the event of the above discussions not producing an agreed result, the **TSO** will determine the **Provisional Outage Programme**. With respect to an **Interconnector**, when determining the **Provisional Outage Programme**, the **TSO** shall take into account the arrangements it has in place under its Operating procedures with National Grid Electricity Transmission.

(iv) This paragraph (d) does not override paragraph (c) above.

The provisions of this paragraph OC2.6.2(d) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**.

The provisions of this paragraph OC2.6.2(d) also apply to **Aggregators** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.6.3 Medium Term **Operational Planning** - Planning for Year 1

The **Outage** programme for Year 2 forming part of the **Provisional Outage Programme** established under OC2.6.2 will become the Outage programme for Year 1 (until updated in accordance with this OC2.6.3) when, by effluxion of time, Year 2 becomes Year 1.

In each calendar year:

(a) By the End of March

Each **Generator** will provide the **TSO** in writing with its suggested **Final Outage Programme** for Year 1 (showing any updates to the outage programme for Year 2 which, by effluxion of time, has become that for Year 1), which will then, in accordance with this OC2, become the **Final Outage Programme**. For the avoidance of doubt, the suggested **Final Outage Programme** will contain the following information in relation to each proposed **Planned Outage** in the suggested **Final Outage Programme**:

(i) identity of the **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** (or **Generating Unit(s)** therein) and/or the **Power Station Equipment** concerned;

(ii) **MW** concerned (i.e. **MW** which will not be **Available** as a result of the **Outage** and that which will, notwithstanding the **Outage**, still be **Available** (if any));

(iii) required duration of **Outage**;

(iv) preferred **Start Date** and **Start Time** or range of **Start Dates** and **Start Times**;

(v) whether the **Outage** is a **Flexible Planned Outage** or an **Inflexible Planned Outage**, provided that the **Generator** must not declare an **Outage** to be an **Inflexible Planned Outage** unless **Prudent Operating Practice** would not permit the **Outage** to be declared as a **Flexible Planned Outage**;

(vi) if it is a **Flexible Planned Outage**,

(a) the period for which the **Outage** could be deferred at the request of the **TSO**, which period shall be not less than 30 days in length;

(b) the period for which the **Outage** could be advanced at the request of the **TSO**, which period shall be not less than 10 days in length; and

(vii) where relevant, that the **Generator** wishes to take the **Outage** in order to enable it to comply with obligations relating to the operation and maintenance of **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment** imposed upon the **Generator** by statute and, if so, the latest date by which the **Outage** must be taken.

In relation to sub-paragraph (v), the **Generator** must provide the **TSO** with such evidence as it may reasonably require in order to substantiate the declaration as an **Inflexible Planned Outage** and, if the **Generator** fails to establish to the **TSO 's** reasonable satisfaction that the **Outage** is required to be an **Inflexible Planned Outage**, the **Outage** shall be deemed to have been submitted as a **Flexible Planned Outage** with an attendant **Flexible Planned Outage Period** of 10 days for advancement and 30 days for deferment.

The updates to the programme for Year 2 when, by effluxion of time, Year 2 has become Year 1, may only reflect the **Generator's** reasonable response to changed circumstances and changes which, in the context of the **Provisional Outage Programme** as a whole, are minimal in their effect on the operation of the **NI System** and the **Other TSO's Transmission System**; otherwise it must reflect the **Provisional Outage Programme** for Year 2 issued the previous September.

The provisions of this paragraph OC2.6.3(a) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.3(a) also apply to **Aggregators** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

(b) Between the End of March and the End of June

The **TSO** will be considering the suggested **Final Outage Programme** in the light of the factors set out in OC2.6.2(b) and the requirement for **Minimum Demand Regulation** and will be analysing whether the **Margin** for the period can be met. With respect to an **Interconnector**, when considering the **Final Outage Programme**, the **TSO** shall take into account the arrangements it has in place under its Operating procedures with National Grid Electricity Transmission.

(c) By the End of June

(i) The **TSO** will provide each **Generator** in writing with a draft **Final Outage Programme** showing the **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment** it may potentially withdraw from service during each week of Year 1 for a **Planned Outage** (including, for the avoidance of doubt, both **Flexible Planned Outages** and **Inflexible Planned Outages**) and showing the **Flexible Planned Outage Periods**, by way of amendment to, or confirmation of, the suggested **Final Outage Programme** submitted by the **Generator**. With respect to an **Interconnector**, when preparing the draft **Final Outage Programme**, the **TSO** shall take into account the arrangements it has in place under its Operating procedures with National Grid Electricity Transmission.

(ii) The draft **Final Outage Programme** may differ from the suggested **Final Outage Programme** as follows:

(a) **Flexible Planned Outages** (and associated **Flexible Planned Outage Periods**) may have been moved to co-ordinate all **Outage** proposals received by the **TSO** or generally for reasons relating to the proper operation of the **NI System** and the **Other TSO's Transmission System**;

(b) a **Flexible Planned Outage** may have been re-designated as an **Inflexible Planned Outage**;

provided that the **TSO** may not move a **Planned Outage** relating to which the **Generator** has informed the **TSO** under OC2.6.3(a)(vii) that it needs it to comply with statutory obligations, if to do so would result in the **Generator** being in breach of those statutory obligations. However, the **TSO** may discuss the **Planned Outage** with the **Generator** and may request the **Generator** to approach the relevant authorities for an extension of time in order to avoid the breach of those statutory obligations. The **Generator** must accede to that request and use reasonable endeavours to obtain such an extension. In the case of a **Generator** with **PPA CDGUs**, the provisions of GC13.2 shall be imported into (and, for the purposes of the **TSO Licence**, regarded as forming part of) this OC2.6.3(c)(ii). The **Generator** must, in all cases, inform the **TSO** of the position. In the event that an extension is obtained the **TSO** may (subject to the other provisions of this paragraph (c)(ii) move the **Planned Outage** accordingly.

(iii) In addition, where in the opinion of the **TSO** the **Licence Standards** could not otherwise be met, the **TSO** may (by giving to the **Generator** a written notice designated as being under this OC2.6.3(c)(iii) request:

(a) that a **Flexible Planned Outage** or an **Inflexible Planned Outage** which was shown in the **Provisional Outage Programme** (prepared the previous September as the Year 2 programme) or is newly requested by the **Generator** (such request not reflecting a change in any **Outage** included in the **Provisional Outage Programme** prepared the previous September as the Year 2 programme) be excluded from the **Provisional Outage Programme**; or

(b) that an **Inflexible Planned Outage** which was shown in the **Provisional Outage Programme** prepared the previous September as the Year 2 programme, be re-designated as a **Flexible Planned Outage** (with an attendant **Flexible Planned Outage Period** not exceeding 10 days for advancement and 30 days for deferment), or that the **Start Date** thereof (shown in the **Provisional Outage Programme** prepared the previous September) be moved.

In the case of a **Generator** with **PPA CDGUs**, the provisions of GC13.1 should be imported into (and, for the purposes of the **TSO Licence**, regarded as forming part of) this OC2.6.3(c)(iii).

(iv) Subject to sub-paragraph (iii) above, the amendments may be made by the **TSO** in relation to Year 1 even if the offered **Planned Outages** in the suggested **Provisional Outage Programme** reflect the **Provisional Outage Programme** for Year 2 issued the previous September to the extent necessary for the **TSO** to carry out its obligations in relation to **Operational Planning**.

The provisions of this paragraph OC2.6.3(c) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.3(c) also apply to **Aggregators** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

(d) By the End of July

Where a **Generator,** an **Aggregator** or an **Interconnector Owner** objects to any changes to the suggested **Final Outage Programme**, equivalent provisions to those set out in OC2.6.2(d) will apply.

(e) By the end of August

The **DNO** will provide the **TSO** in writing with details of **Outages** of **Independent Generating Plant** connected to the **Distribution System** with a **Registered Capacity** of 2 **MW** and greater.

(f) Between the End of June and the End of September

The **TSO** will be considering the draft **Final Outage Programme** in the light of the factors set out in OC2.6.2(b), any changes as a result of (d) above and the requirement for **Minimum Demand Regulation** and will be analysing whether the **Margin** for the period can be met. With respect to an **Interconnector**, when considering the draft **Final Outage Programme**, the **TSO** shall take into account the arrangements it has in place under its Operating procedures with National Grid Electricity Transmission.

(g) By the End of September

(i) The **TSO** will notify each **Generator** in writing of any further changes (if any) to the draft **Final Outage Programme** by the issue of a **Final Outage Programme** showing the **CDGUs** (or, in the case of a **CCGT Installation**, **CCGT Module(s)**), **Controllable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment** it may potentially withdraw from service during each week of Year 1 for a **Planned Outage** and showing the **Flexible Planned Outage Periods**.

(ii) The **TSO** will provide the **DNO** in writing with an extract from the latest copy of the **Final Outage Programme** showing:

(a) the identity of **CDGUs**, **Controllable PPMs** (or **Generating Unit(s)** therein) and/or the **Power Station Equipment** connected to the **Distribution System** concerned;

(b) **MW** concerned (i.e. **MW** which will not be available as a result of the **Outage**); and

(c) the start date and duration of the **Outage**.

(iii) The **Final Outage Programme** may differ from the draft **Final Outage Programme** as follows:

(a) **Flexible Planned Outages** (and associated **Flexible Planned Outage Periods**) may have been moved to co-

ordinate all **Outage** proposals received by the **TSO** or generally for reasons relating to the proper operation of the **NI System** and the **Other TSO's Transmission System**;

(b) a **Flexible Planned Outage** may have been re-designated as an **Inflexible Planned Outage**;

provided that the **TSO** may not move a **Planned Outage** relating to which the **Generator** has informed the **TSO** under OC2.6.3(a)(vii) that it needs it to comply with statutory obligations, if to do so would result in the **Generator** being in breach of those statutory obligations. However, the **TSO** may discuss the **Planned Outage** with the **Generator** and may request the **Generator** to approach the relevant authorities for an extension of time in order to avoid the breach of those statutory obligations. The **Generator** must accede to that request and use reasonable endeavours to obtain such an extension. In the case of a **Generator** with **PPA CDGUs**, the provisions of GC13.2 shall be imported into (and for the purposes of the **TSO Licence**, regarded as forming part of) this OC2.6.3(g)(iii). The **Generator** must, in all cases, inform the **TSO** of the position. In the event that an extension is obtained, the **TSO** may (subject to the other provisions of this paragraph (g)(iii)) move the **Planned Outage** accordingly.

(iv) In addition, where in the opinion of the **TSO** the **Licence Standards** could not otherwise be met, the **TSO** may (by giving the **Generator** a written notice designated as being under this OC2.6.3(g)(iv)) request:

(a) that a **Flexible Planned Outage** or an **Inflexible Planned Outage** which was shown in the draft **Final Outage Programme** be excluded from the **Final Outage Programme**; or

(b) that an **Inflexible Planned Outage** which was shown in the draft **Final Outage Programme** be re-designated as a **Flexible Planned Outage** (with an attendant **Flexible Planned Outage Period** not exceeding 10 days for advancement and 30 days for deferment) or that the **Start Date** thereof (shown in the draft **Final Outage Programme**) be moved;

In the case of a **Generator** with **PPA CDGUs**, the provisions of GC13.1 shall be imported into (and, for the purposes of the **TSO Licence**, regarded as forming part of) this OC2.6.3(g)(iv).

The provisions of this paragraph OC2.6.3(g) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.3(g) also apply to an **Aggregator** as

if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.6.4 Short Term **Operational Planning** - Planning for Year 0

Throughout each calendar year and from 1st October of the preceding year:

(a) The **TSO** will monitor the **Margin** continuously in the light of any movement of **Planned Outages**, the factors specified in OC2.6.2(b)(i), the incidence of **Outages** other than **Planned Outages** and the requirement for **Minimum Demand Regulation**.

(b) The **DNO** will provide the **TSO** in writing with such information as the **TSO** may reasonably require relating to distribution connected **Independent Generating Plant** with a **Registered Capacity** of 2 **MW** and greater including information updates on planned **Outages**.

(c) The **TSO** shall ensure the **DNO** is provided with any updated information regarding **Outages** of distribution connected **CDGUs**, **Controllable PPMs** and in particular:

(i) the identity of distribution connected **CDGUs**, **Controllable PPMs**(or **Generating Unit(s)** therein) and/or the **Power Station Equipment** concerned;

(ii) **MW** concerned (i.e. **MW** which will not be **Available** as a result of the **Outage**); and

(iii) the start date and duration of the **Outage**.

The provisions of this paragraph OC2.6.4(c) also apply to an **Aggregator** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of **An Aggregated Generating Unit** or a **Demand Side Unit.**

(d) **Flexible Planned Outage** Movements

In the case of a **Flexible Planned Outage**, the **TSO** may, upon giving a **Generator** written notice of not less than 7 days (in the case of advancement, before the advanced **Start Date** and in the case of deferral, before the original **Start Date**) require the **Start Date** or **Start Time** of the **Flexible Planned Outage** to be advanced or deferred within the **Flexible Planned Outage Period**, and the **Generator** will take that **Outage** in accordance with the revised timing set out in that notice. Such written notice may be given in the preceding year where the **TSO** could not otherwise give the **Generator** a sufficient period of notice. The provisions of this paragraph OC2.6.4(d) also apply to **Interconnector Owners** as if references to **Generator** were references to an **Interconnector Owner**. The provisions of this paragraph OC2.6.4(d) also apply to an **Aggregator** as if references to

Generator were references to an **Aggregator.**

(e) Amendments to **Planned Outages**

In the case of:

(i) a **Flexible Planned Outage** which the **TSO** would like to move outside the **Flexible Planned Outage Period**; or

(ii) a **Flexible Planned Outage** which the **TSO** would like to move within the **Flexible Planned Outage Period** on less than seven days' notice (in the case of advancement, before the advanced **Start Date** and, in the case of deferral, before the original **Start Date**);

(iii) an **Inflexible Planned Outage** which the **TSO** would like to move;

the **TSO** may, upon giving a **Generator** written notice, request that the **Start Date** or **Start Time** of a **Planned Outage** be advanced or deferred. If the **Generator** agrees to such advancement or deferral, or the **TSO** and the **Generator** agree to some other advancement or deferral, the **Generator** will take the **Outage** in accordance with that agreement. The provisions of this paragraph OC2.6.4(e) also apply to **Interconnector Owners** as if references to **Generator** were references to an **Interconnector Owner**. The provisions of this paragraph OC2.6.4(e) also apply to an **Aggregator** as if references to **Generator** were references to an **Aggregator.**

(f) A **Generator** may, on reasonable grounds, by notice in writing submitted to the **TSO** at any time during Year 0, request that a **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein) and/or **Generating Unit(s)** within a **Dispatchable PPM** or a **Controllable PPM**, for which there is a **Flexible Planned Outage** or an **Inflexible Planned Outage**, as specified in the **Final Outage Programme**, remain in service and that one or more of the other **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein) and/or **Generating Unit(s)** within a **Dispatchable PPM** or a **Controllable PPM**, as the case may be, at the same **Power Station** (having substantially the same **Contracted Capacity** / **Registered Capacity** (**PPA** plant / non-**PPA** plant respectively) and **Contracted Technical Parameters,** or equivalent parameters in the case of **CCGT Modules**, **CDGUs** other than PPA **CDGUs**, and/or **Generating Unit(s)** within a **Dispatchable PPM** or a **Controllable PPM** be permitted to be taken out of service during the period for which such **Flexible Planned Outage** or **Inflexible Planned Outage** has been planned. The **TSO** shall not unreasonably withhold its consent to such substitution and, if the **TSO** does consent, the **Final Outage Programme** shall be amended and the **Generator** shall be entitled to take the **Outage** accordingly. The provisions of this paragraph OC2.6.4(f) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.4(f) also apply to an **Aggregator** as if references to **Generator** and to a **Generator**'s units

were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

(g) **Short Term Planned Maintenance Outage**

(i) A **Generator** may at any time in Year 0 request the **TSO**, by giving not less than 7 days' notice before the earliest **Start Date**, for a **Short Term Planned Maintenance Outage**. The request notice must contain the following information:

(a) identity of the **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** (or **Generating Unit(s)** therein) and/or the **Power Station Equipment** concerned;

(b) **MW** concerned (i.e.**MW** which would not be **Available** as a result of the **Outage** and that which would, notwithstanding the **Outage**, still be **Available** (if any));

(c) required duration of **Outage** (which must not exceed 72 hours); and

(d) preferred **Start Date** and **Start Time** or range of **Start Dates** and **Start Times**.

The **Generator** may (if it is the case), in addition, state that the **Outage** is required for the purposes of maintaining the brush gear of a **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or a **Controllable PPM (or Generating Unit(s)** therein), in accordance with (v) below.

(ii) On receipt of a request notice under (i) above, the **TSO** shall consider the request and shall, having discussed the position with the **Generator**, reply within one **Business Day** in writing indicating:

(a) acceptance of the request, confirming the requested **Start Time** and duration of the **STPM Outage**;

(b) proposals for the advancement or deferment of the **STPM Outage** if taken, indicating alternative **Start Time** and duration; or

(c) rejection of the request.

(iii) If the **TSO** has accepted the request, the **STPM Outage**, if taken, must be taken by the **Generator** in accordance with the request. If the **TSO** has indicated an alternative **Start Time** and/or duration, the **TSO** and the **Generator** must discuss the alternative and any

other options which may arise during the discussions. If agreement is reached, then the **Outage**, if taken, must be taken by the **Generator** in accordance with the agreement. If the request is refused by the **TSO** or if agreement is not reached then, subject to (iv) below, the **Outage** may not be taken by the **Generator**.

(iv) If, in respect of a particular **CDGU, Controllable PPM** or item of **Power Station Equipment**, the **TSO** has rejected requests made under (i) above on two successive occasions which were not less than 7 days apart, the **TSO** may not reject a third request. However, the **TSO** may require that such **Outage**, if it is to be during the three months of maximum winter **Demand**, be deferred if in the **TSO**'s reasonable opinion (were the **Outage** not to be deferred):

(a) the **Licence Standards** could not be met; or

(b) there would otherwise be insufficient generating capacity to meet forecast **Demand** and the **Margin**;

such deferral to be for so long as those circumstances exist, but in any event not be beyond the end of the month following the end of the three months of maximum winter **Demand**. For the avoidance of doubt, such provision is without prejudice to the **TSO 's** rights under OC2.6.7.

(v) Where a **Generator** has requested an **STPM Outage** in respect of a **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPMs** (or **Generating Unit(s)** therein), which the **Generator** identified in the notice served under (i) above as requiring such **Outage** for the purposes of routine brush gear maintenance, the **TSO** shall permit the **Generator** to take the **Outage** within 14 days after the date of service of the request at such time as the **TSO** shall, in its absolute discretion, determine.

(vi) In the event that an **STPM Outage** is scheduled pursuant to this OC2.6.4(g), the **TSO** shall by notice in writing confirm the details thereof within one **Business Day** after the details of the **STPM Outage** have been settled. Such notice shall contain the following information:

(a) the identity of the **CDGU(s)** (or in the case of a **CCGT Installation(s)**, **CCGT Module(s)** therein), and/or **Controllable PPMs** (or **Generating Unit(s)** therein) and/or the **Power Station Equipment** concerned;

(b) **MW** concerned (i.e. **MW** which will not be **Available** as a result of the **Outage** and that which will, notwithstanding the **Outage**, still be **Available** (if any));

(c) duration of the **Outage**; and

(d) the **Start Date** and **Start Time**.

The provisions of this paragraph OC2.6.4(g) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.4(g) also apply to an **Aggregator** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.6.5 **Notified Unplanned Outages**

(a) A **Generator** must, if it considers that a **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or a **Controllable PPM** (or **Generating Unit(s)** therein) and/or an item of **Power Station Equipment** will require an **Outage** which cannot reasonably be deferred to become a **Planned Outage** or a **Short Term Planned Maintenance Outage** but of which it has some warning, give the **TSO** as much notice as is reasonably possible. Such **Outage** is known as a **Notified Unplanned Outage** and the **Generator's** notice as an **Outage Notice**. Such notice must include an identification of the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) or item of **Power Station Equipment**, as the case may be, the expected **Start Date** and **Start Time** and duration of the **Notified Unplanned Outage** and the nature of the **Outage** together with the **MW** concerned (i.e. **MW** which will not be **Available** as a result of the **Outage** and that which will still be **Available** (if any)). The **TSO** must acknowledge such notification as soon as reasonably possible after the notification was received by the **TSO**. The provisions of this paragraph OC2.6.5(a) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.5(a) also apply to an **Aggregator** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

(b) The **TSO** may request the **Generator** to advance or defer the **Outage** and if the **Generator** agrees to such a request, he shall send the **TSO** a written notice confirming this agreement, which the **TSO** will acknowledge, and the **Generator** must then (subject to any intervening **Outage**) take the **Outage** in accordance with that agreement. The provisions of this paragraph OC2.6.5(b) also apply to **Interconnector Owners** as if references to **Generator** were references to an **Interconnector Owner**. The provisions of this paragraph OC2.6.5(b) also apply to an **Aggregator** as if references to **Generator** were references to **Aggregators.**

(c) **24 Hour Recall**

In relation to an **Notified Unplanned Outage** notified to it pursuant to (a) above, the **TSO** may request the **Generator** to retain the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) or item of **Power Station Equipment** on **24 Hour Recall**, the period of which shall be the whole or part of the period identified by the **Generator** as the expected period of the **Outage**. If the **Generator** agrees to such a request to retain the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) or item of **Power Station Equipment** on **24 Hour Recall**, the **Generator** shall send to the **TSO** a notice confirming the period within which the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) or item of **Power Station Equipment** will be on **24 Hour Recall**. The **TSO** and the **Generator** may discuss amendments to the period suggested by the **TSO**, and any agreed amendment shall be reflected in the above notice. The **TSO** shall acknowledge the notice within 2 hours, such acknowledgement confirming that the **Outage** will be a **24 Hour Recall Outage**. The provisions of this paragraph OC2.6.5(c) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.5(c) also apply to an **Aggregator** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.6.6 **Forced Outages**

OC2.6.6.1 In the event that a **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) or item of **Power Station Equipment** suffers a **Forced Outage**, the relevant **Generator** shall, as soon as possible after the commencement of the **Outage** and in any event within 48 hours thereof, inform the **TSO** by written notice (in addition to the notifications required to be given by the **Generator** in such circumstances under SDC1.4.5, SDC2.4.2.10(b) and SDC2.4.2.15) of the **Generator's** best estimate of the date and time by which the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) or item of **Power Station Equipment** is likely to have been repaired and restored to its full level of **Availability**. (It should be noted that a **Forced Outage** of an item of **Power Station Equipment** may result in a reduced level of **Availability** of the associated **CDGU Controllable PPM.)** If the **Generator** is unable for any reason to comply with this requirement, it shall not later than 48 hours after the commencement of the **Forced Outage**, provide to the **TSO** such information as is then known to the **Generator** regarding the date and time of return from such **Outage** and shall provide such updates thereafter as the **TSO** may reasonably require. The **Generator** shall then inform the **TSO** by written notice of the **Generator's** best estimate of the date and time by which the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) or item of **Power**

Station Equipment is likely to have been repaired and restored to its full level of **Availability** as soon as the **Generator** is able. The provisions of this paragraph OC2.6.6.1 also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.6.1 also apply to an **Aggregator** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.6.6.2 Pursuant to and subject to SDC1.4.3, a **Generator** shall use all reasonable endeavours to ensure that, following a **Forced Outage**, the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) or item of **Power Station Equipment** (as the case may be) is repaired and restored to its full level of **Availability** as soon as possible and in accordance with **Prudent Operating Practice**. The provisions of this paragraph OC2.6.6.2 also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.6.2 also apply to an **Aggregator** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of and **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.6.7 Release of **CDGUs, Controllable PPMs** and **Power Station Equipment**

OC2.6.7.1 **Generators** may only undertake **Planned Outages** with the **TSO's** agreement in accordance with **Outage** programmes produced pursuant to this OC2.

OC2.6.7.2 In real time operation **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** (or **Generating Unit(s)** therein) and **Power Station Equipment** must not actually be withdrawn for a **Planned Outage** or a **Short Term Planned Maintenance Outage** without the **TSO's** express formal permission for such release according to the procedures set out in OC2.6.7.3, which permission shall be given except as described in OC2.6.7.4.

OC2.6.7.3 The **TSO's** express formal permission shall specify (consistent with the details resulting from the application of the foregoing procedures of this OC2):

(a) the identity of the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment** and **MW** concerned (**i.e. MW** which will not be **Available** as a result of the **Outage** and that which will, notwithstanding the **Outage**, still be **Available** (if any));

(b) the duration of the **Outage**; and

(c) the **Start Date** and **Start Time**.

OC2.6.7.4 (a) Notwithstanding anything else contained in this OC2, the **TSO** shall be entitled, on the basis set out in (b) below, to determine whether to release a **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or a **Controllable PPM** (or **Generating Unit(s)** therein) or an item of

Power Station Equipment for a **Planned Outage** or a **Short Term Planned Maintenance Outage**.

(b) Subject to (c) below the **TSO** may withhold its permission for the release of a **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or a **Controllable PPM** (or **Generating Unit(s)** therein) or any item of **Power Station Equipment** for a **Planned Outage** or a **Short Term Planned Maintenance Outage** where such **Outage** has previously been planned in accordance with this OC2 where, in the **TSO 's** reasonable opinion (were such **Outage** not to be deferred):

(i) the **Licence Standards** could not be met; or

(ii) there would be insufficient generating capacity to meet forecast **Demand** and the **Margin**;

and may require the **Generator** to continue to defer such **Outage** for so long as those circumstances exist.

(c) In the case of a **Generator** with **PPA CDGUs**, the provisions of GC13.3 shall be imported into (and, for the purposes of the **TSO Licence**, shall be regarded as forming part of) this OC2.6.7.4. Nothing in this OC2.6.7.4 shall limit any other power which the **TSO** has in this OC2 to grant or withhold absolutely its permission for an **Outage** under this OC2.

OC2.6.7.5 The provisions of this OC2.6.7 also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.7 also apply to an **Aggregator** as if reference to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.6.8 Return to service and overruns

OC2.6.8.1 (a) In relation to a **Planned Outage**, not later than 7 days before the expiry of the **Flexible Planned Outage Period** or the **Inflexible Planned Outage Period** (as the case may be), the **Generator** must inform the **TSO** by notice in writing, in such form as the **TSO** may reasonably require, (a "**RTS Notice**") either that its **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) or **Power Station Equipment** is returning to service earlier than expected, or at the time and date expected, or later than expected and if, upon return, it is expected to be **Fully Available**, the **Generator** shall so state. Where a **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) is not expected to be **Fully Available** upon its return to service, the **Generator** shall state the **MW** level at which the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) is expected to be **Available**. In the case of a

CDGU which is capable of firing both on coal and on oil, the **Availability** must be stated for each **Designated Fuel**.

(b) In the case of a return from a **Planned Outage** earlier than expected, the **RTS Notice** must be given as far as possible in advance of return but in any event not later than required under (a) above.

(c) In the case of a return from a **Planned Outage** later than expected, the **RTS Notice** must be given not later than required under (a) above and shall state the reason for the delay in the return of the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), the **TSO** and/or **Controllable PPM** (or **Generating Unit(s)** therein) or **Power Station Equipment** to service and the **Generator's** best estimate of the date and time at which the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) or **Power Station Equipment** will return to service.

(d) If, after giving a **RTS Notice**, the **Generator** becomes aware that any details notified to the **TSO** in such notice are or have become inaccurate, the **Generator** shall give a revised **RTS Notice**.

OC2.6.8.2 Without prejudice to the provisions of SDC1.4.3 (which, for the avoidance of doubt, are not applicable in respect of **Controllable PPMs),** a **Generator** must use all reasonable endeavours to ensure that, in respect of each **Planned Outage** of the **Generator's CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPMs** (or **Generating Unit(s)** therein) and **Power Station Equipment**, the **Outage** as included in the **Final Outage Programme** (or as moved in accordance with this OC2) is followed.

OC2.6.8.3 Before returning from any **Outage** other than a **Planned Outage**, a **Generator** must inform the **TSO**, as far in advance as reasonably possible, by notice in writing in such form as the **TSO** may reasonably require, that its **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), and/or **Controllable PPM** (or **Generating Unit(s)** therein) or **Power Station Equipment** is returning to service. The **Generator** must, in addition, give an **Availability Notice** in accordance with SDC1 on the day prior to the **Schedule Day** on which the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), or **Power Station Equipment** (other than **Power Station Equipment** used in the operation of a **Controllable PPM)** is to return to service. The **Generator** must also give an updated **Availability Notice** amending or confirming the **Availability Notice** for the **Controllable PPM** on the day prior to the day in the **Schedule Week** on which the **Controllable PPM** (or **Generating Unit(s)** therein) or **Power Station Equipment** used in the operation of the **Controllable PPM** is to return to service.

OC2.6.8.4 If at any time during an **Outage** (in the case of a **Planned Outage**, prior to giving a **RTS Notice**) the **Generator** becomes aware that its **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), or item of **Power Station Equipment** (other than **Power Station Equipment** used in the operation of a **Controllable PPM)** will not (or is unlikely to) have been maintained, repaired or restored to be **Available** in accordance with SDC1.4.3 by the expiry of the period

specified for the duration of the **Outage** in the **Final Outage Programme** or as otherwise notified in the case of **Outages** other than **Planned Outages,** the **Generator** shall notify the **TSO** immediately in writing stating the reason for the delay and the **Generator's** best estimate of the date and time by which the **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein), or item of **Power Station Equipment** (other than **Power Station Equipment** used in the operation of a **Controllable PPM)** will actually have been maintained, repaired or restored to be **Available** in accordance with SDC1.4.3. If at any time during an **Outage** (in the case of a **Planned Outage,** prior to giving a **RTS Notice)** the **Generator** becomes aware that its **Dispatchable PPM** or **Controllable PPM** (or **Generating Unit(s)** therein) or item of **Power Station Equipment** used in the operation of the **Dispatchable PPM** or the **Controllable PPM** will not (or is unlikely to) have been maintained, repaired or restored to be **Available** by the expiry of the period specified for the duration of the **Outage** in the **Final Outage Programme** or as otherwise notified in the case of **Outages** other than **Planned Outages**, the **Generator** shall notify the **TSO** immediately in writing stating the reason for the delay and the **Generator's** best estimate of the date and time by which the **Dispatchable PPM** or the **Controllable PPM** (or **Generating Unit(s)** therein) or item of **Power Station Equipment** used in the operation of the **Dispatchable PPM** or the **Controllable PPM** will actually have been maintained, repaired or restored to be **Available.**

OC2.6.8.5 The provisions of this OC2.6.8 also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.6.8.5 also apply to an **Aggregator** as if reference to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.7 ASSESSMENT OF CAPACITY ADEQUACY

In assessing capacity Adequacy the **TSO** shall, in conjunction with the **Other TSO**, estimate **Demand** growth, formulate **Demand Forecasts** and consider **Outages** of **CDGUs** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein as provided in OC2), **Dispatchable PPMs, Controllable PPMs** , **Power Station Equipment Interconnectors, Aggregated Generating Units** and **Demand Side Units..**

OC2.7.1 Capacity Margin for Year 1

If there is a deficit indicated in any week, the **TSO** and the **Other TSO** shall jointly issue a **System Capacity Shortfall Warning**.

OC2.7.2 Capacity Margin for Year 0

If there is a deficit indicated in any day, the **TSO** and the **Other TSO** shall jointly issue a **System Capacity Shortfall Warning**.

OC2.8 **OUTAGE** PLANNING PROCEDURES FOR **SYSTEM OUTAGES**

OC2.8.1 This Section 8 sets out the data exchanges and planning procedures required to enable the **TSO** to prepare a plan of:

(a) **Outages** on the **Transmission System**;

(b) **Outages** of circuits on the **Distribution System** which operate at 33kV;

(c) **Outages** on the **Distribution System** which may affect **CDGUs** (and/or in the case of a **CCGT Installation**, **CCGT Modules** as provided in OC2), **Dispatchable PPMs** and **Controllable PPMs, Aggregated Generating Units** and **Demand Side Units** connected to the **Distribution System**;

(d) **Outages** on the **Distribution System** which may affect **Independent Generating Plant** with a **Registered Capacity** of 2 **MW** and greater; and

(e) **Outages** on the **Distribution System** which may affect **Customers** with a **Demand** greater than 10 **MW** and which are connected to the **Distribution System**;

which shall be known as the "**System Outage Plan**".

OC2.8.2 Long Term **Operational Planning** - Planning for Years 2 and 3 ahead

The **TSO** shall develop the **System Outage Plan** for Years 2 and 3 taking due account of known requirements for construction and refurbishment works. This contrasts with the **System Outage Plan** in respect of Years 0 and 1 ahead when the **TSO** will, in addition, take into account **Outages** required as a result of maintenance. **Transmission System Outages** and **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein) and/or **Controllable PPM** (or **Generating Unit(s)** therein) and/or **Power Station Equipment Outages** shall, during Years 2 and 3 but not in Year 1 or later, be co-ordinated so that, in general, **CDGU** (or in the case of a **CCGT Installation**, **CCGT Module(s)** therein) and/or **Controllable PPM** (or **Generating Unit(s)** therein) and/or **Power Station Equipment Outages** shall take precedence over **Transmission System Outages** but subject always, in any particular case, to the **TSO's** discretion to determine otherwise on the basis of reasons relating to the proper operation of the **Transmission System** and the **Other TSO's Transmission System**. The provisions of this paragraph OC2.8.2 also apply to **Interconnectors** as if references to a **Generator**'s units were references to **Interconnectors**. The provisions of this paragraph OC2.8.2 also apply to an **Aggregator** as if references to a **Generator** or a **Generator**'s units were references to **Aggregated Generating Units** or **Demand Side Units.**

OC2.8.3 In each calendar year:

(a) By the End of August

The **DNO** will provide the **TSO** in writing with known requirements for **Outages** on the **Distribution System** of the type set out in OC2.8.1 (b), (c), (d) and (e) which are related to construction or refurbishment works in Years 2 and 3 ahead, if any.

(b) By the End of September

The **TSO** will draw up a draft **System Outage Plan** covering the period Years 2 and 3 for the **TSO's** internal use. The **TSO** will notify each **Generator** in writing where **Transmission System Outages** may operationally affect such **Generator**'s **CDGUs** (and/or in the case of a **CCGT Installation**, **CCGT Modules**, as provided under OC2), **Controllable PPMs**, **Dispatchable PPMs** including, in particular, proposed start dates and end dates of relevant **Transmission System Outages**. The **TSO** will indicate to a **Generator** where a need may exist to use **Intertripping** or other measures including restrictions on the **Dispatch** of **CDGUs** and/or **Controllable PPMs** to allow the security of the **NI System** to be maintained within the **Licence Standards**. The **TSO** will also inform each **Large Demand Customer** of the aspects of the plan which may affect it. The provisions of this paragraph OC2.8.3(b) also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.8.3(b) also apply to an **Aggregator** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.8.4 Medium Term **Operational Planning** - Planning for Year 1

OC2.8.4.1 The plan produced pursuant to OC2.8.2 will become the draft **System Outage Plan** for Year 1 when, by effluxion of time, Year 2 becomes Year 1. Each calendar year the **TSO** shall update the draft **System Outage Plan** and shall, in addition, take into account **Outages** required as a result of maintenance work.

OC2.8.4.2 In each calendar year:

(a) By the End of May

The **DNO** will provide the **TSO** in writing with known requirements for **Outages** on the **Distribution System** of the type set out in OC2.8.1 (b), (c), (d) and (e) which are related to construction, refurbishment or maintenance works in Year 1.

(b) By the End of June

The **TSO** will draw up the **System Outage Plan** and will inform each **Generator** in writing where **Transmission System Outages** may operationally affect in Year 1 such **Generator's CDGUs** (and/or in the case of a **CCGT Installation**, **CCGT Modules**, as provided under OC2), **Controllable PPMs** including, in particular, proposed start dates and end dates of relevant **Transmission System Outages.**

(c) By the end of July

Where a **Generator** objects to the proposed restrictions or impact notified to it under (b) above, equivalent provisions to those set out in OC2.6.2(d) will apply.

(d) Between the End of June and the end of September

The **TSO** will draw up a final **System Outage Plan** covering Year 1.

(e) By the End of September

(i) The **TSO** will publish the final **System Outage Plan** for Year 1.

(ii) The **TSO** will notify each **Generator** in writing where **Transmission System Outages** may operationally affect such **Generator's CDGUs** (and/or in the case of a **CCGT Installation**, **CCGT Modules**, as provided under OC2), **Controllable PPMs**, including, in particular, proposed start dates and end dates of relevant **Transmission System Outages** including, in particular, proposed start dates and end dates of relevant **Transmission System Outages**. The **TSO** will also indicate where a need exists to use **Intertripping**, emergency switching, emergency load management or other measures including restrictions on the **Dispatch** of **CDGUs** and/or **Controllable PPMs** to allow the security of the **NI System** to be maintained within the **Licence Standards**. The **TSO** will also inform the **DNO** and each **Large Demand Customers** of the aspects of the plan which may affect it.

The provisions of this paragraph OC2.8.4 also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.8.4 also apply to and **Aggregator** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.8.5 Short Term **Operational Planning** - Planning in Year 0 Down to the **Programming Phase**

The **System Outage Plan** for Year 1 issued under OC2.8.4.2(e) shall become the final plan for Year 0 when by effluxion of time Year 1 becomes Year 0.

Programming Phase

(a) By 10.00 hours on Wednesday of each week

The **DNO** shall provide the **TSO** in writing with known requirements for **Outages** on the **Distribution System** of the type set out in OC2.8.1 (b), (c), (d) and (e) which are related to construction, refurbishment or maintenance

works in the following one week period beginning on the Friday.

(b) By 11.00 hours Each Thursday

(i) The **TSO** shall update the **System Outage Plan** for the following one week period beginning on the Friday.

(ii) The **TSO** will notify each **Generator** in writing where **Transmission System Outages** may operationally affect such **Generator's CDGUs** (and/or in the case of a **CCGT Installation**, **CCGT Modules**, as provided under OC2), **Controllable PPMs**, including, in particular, proposed start dates and end dates of relevant **Transmission System Outages.** The **TSO** will also indicate where a need exists to use **Intertripping**, emergency switching, emergency load management or other measures including restrictions on the **Dispatch** of **CDGUs** and/or **Controllable PPMs** to allow the security of the **NI System** to be maintained within the **Licence Standards**. The **TSO** will also inform the **DNO** and each **Large Demand Customers** of the aspects of the plan which may affect it.

(c) During the **Programming Phase**

Each **Generator** and the **TSO** will inform each other immediately if there is any unavoidable requirement to depart from the **Outages** and actions determined and notified under paragraph OC2.8.5(b) above. In addition, the **TSO** shall notify each **Large Demand Customers** to whom it notified details of the updated **Transmission System Outage** plan pursuant to OC2.8.5(b) of any changes to such details.

The provisions of this paragraph OC2.8.5 also apply to **Interconnector Owners** as if references to **Generator** and to a **Generator**'s units were references to an **Interconnector Owner** in respect of an **Interconnector**. The provisions of this paragraph OC2.8.5 also apply to an **Aggregator** as if references to **Generator** and to a **Generator**'s units were references to an **Aggregator** in respect of an **Aggregated Generating Unit** or a **Demand Side Unit.**

OC2.9 DATA REQUIREMENTS

OC2.9.1 (a) When requested initially under the **Connection Agreement**, and thereafter in calendar week 24 in each calendar year, each **Generator** shall in respect of each of its:

(i) **CDGUs** other than **CCGT Installation**s, in relation to the **Generation Planning Parameters** and the **Generator Performance Chart**; and/or
(ii) **CCGT Installations** in relation to the **Generation Planning Parameters**; and
(iii) **CCGT Modules** within a **CCGT Installation** in relation to the **Generator Performance Chart**; and/or

(iv) **Dispatchable PPMs** and **Controllable PPMs** in relation to the **Generation Planning Parameters** and the **Generator Performance Chart**,

submit to the **TSO** in writing the **Generation Planning Parameters** and the **Generator Performance Chart** (which shall be within the parameters set out in CC.S1.3.2 or, in the case of **Controllable PPMs,** CC.S2.3.2 and which shall reasonably reflect the true operating characteristics of the **CDGU** and/or **CCGT Module** within a **CCGT Installation** and/or **Controllable PPM**, as the case may be) to be applied (unless revised under this OC2, in the case of the **Generator Performance Chart**) from the beginning of week 25 onwards, in the **formats** indicated in Appendix 1 for the **Generator Performance Charts** and as set out in Appendix 2 for the **Generation Planning Parameters**.

(b) In the case of a **CDGU** which is capable of firing on two different **Designated Fuels** (or fuels in the case of a **CDGU** other than a **PPA CDGU**), the **Generator** must submit to the **TSO**, by separate written notifications, the **Generation Planning Parameters** in accordance with OC2.9.1(a) in respect of each **Designated Fuel** (or fuels in the case of a **CDGU** other than a **PPA CDGU**), each clearly marked to indicate for which fuel it applies.

(c) In the case of a **CCGT Module** within a **CCGT Installation**, the **Generator** must submit to the **TSO** details of the availability of any **Back-Up Fuel**.

(d) Any changes to the **Generator Performance Chart** or **Generation Planning Parameters** must be notified to the **TSO** promptly.

(e) **Generators** should note that the amendments to the composition of **CCGT Installations** may only be made in accordance with the principles set out in PC.A2.3.5. If in accordance with PC.A2.3.5 an amendment is made, any consequential changes to the **Generation Planning Parameters** must be notified to the **TSO** promptly.

OC2.9.2 **The Generator Performance Chart** must be on a **Generating Unit** specific basis at the **Generator Terminals** except in the case of **Dispatchable PPMs** or **Controllable PPMs,** where it must be on a **Power Park Module** basis at the **Connection Point** to the **NI System** and must include details of the **Generator Transformer** parameters (or, in the case of **Dispatchable PPMs** or **Controllable PPMs**, to the extent present, the main step-up transformer(s) or, otherwise, the step-up transformers that relate exclusively to the operation of each wind turbine generator therein) and demonstrate the limitation on reactive capability of the **NI System** voltage at 3% above nominal.

OC2.9.3 For each **CCGT Module**, and any other **Generating Unit** whose performance varies significantly with ambient temperature, the **Generator Performance Chart** shall show curves for at least two values of ambient temperature so that the **TSO** can assess the variation in performance over all likely ambient temperatures by a process of linear interpolation or extrapolation. One of these curves shall be for the ambient

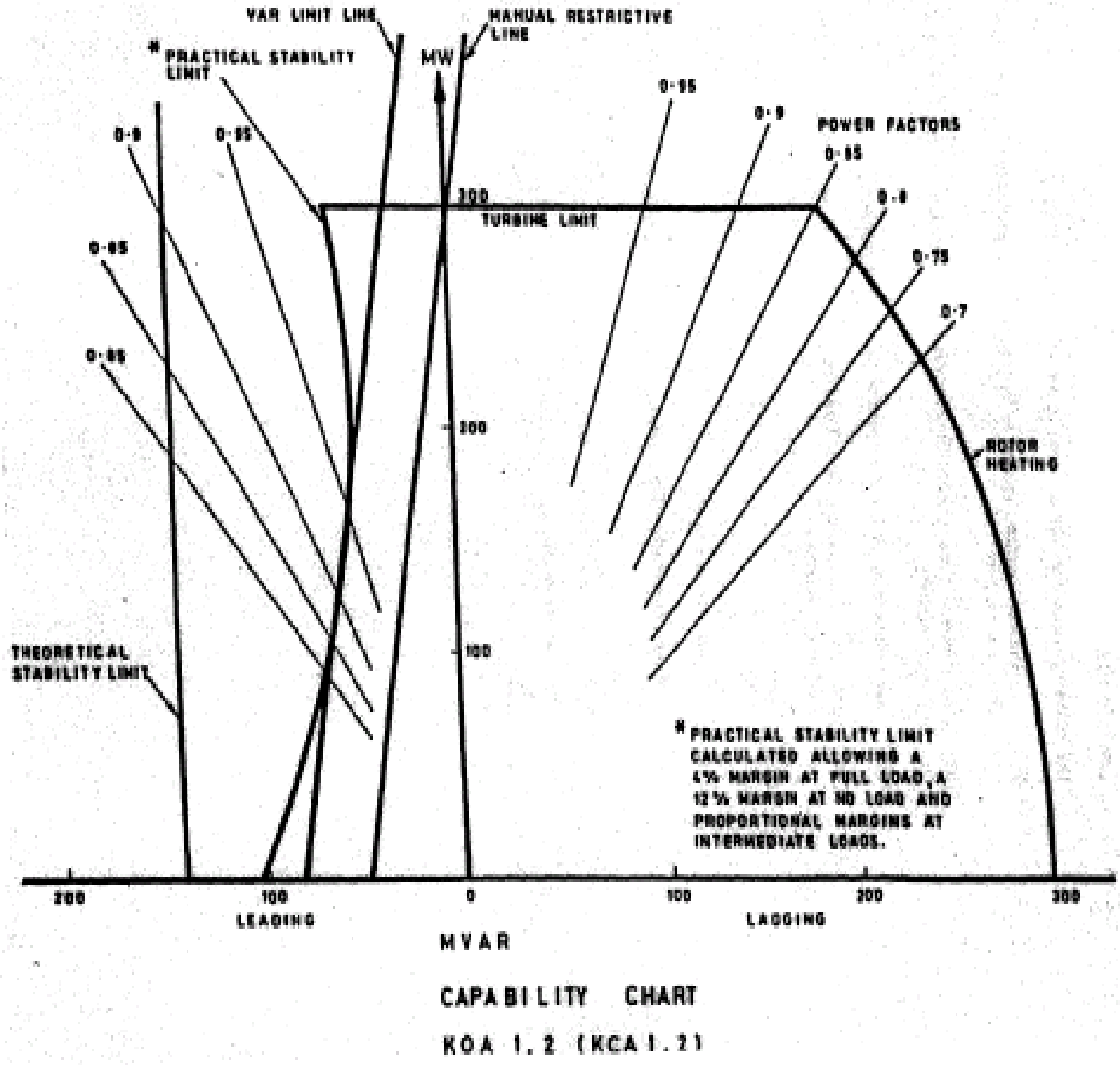
temperature at which the **Generating Unit's Output**, or **CCGT Installation's Output**, as appropriate, equals its **Registered Capacity**.

OC2.9.4 The **Generation Planning Parameters** supplied under OC2.9.1 shall be used by the **TSO** for **Operational Planning** purposes only and not in **Scheduling** and **Dispatch** (subject as otherwise permitted in the SDCs).

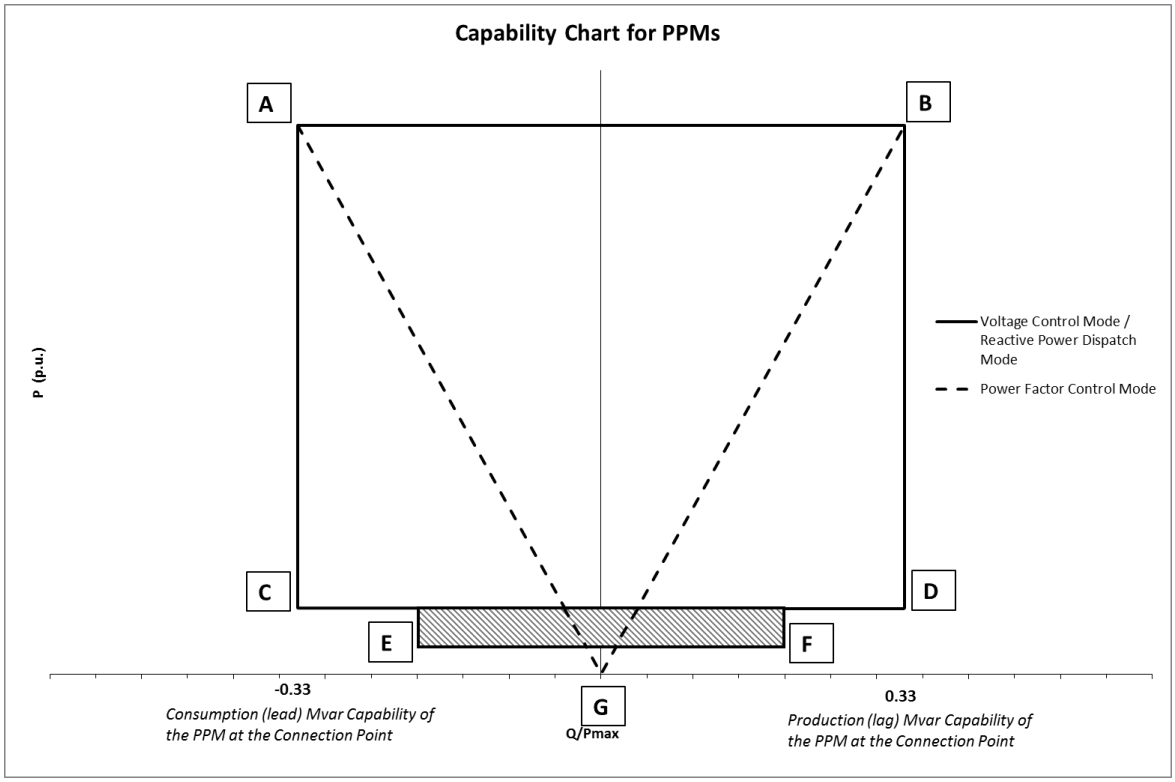
OC2.9.5 When determining **Operational Planning** timescales, the **TSO** shall use the information contained in the **CCGT Installation Matrix** submitted by the **Generator** under PCA2.3.4.

OC2 APPENDIX 1

OC2.A1.1 CAPABILITY CHART FOR CDGUS AND CCGT MODULES WITHIN A CCGT INSTALLATION



OC2.A1.2 Capability Chart for Dispatchable PPMs and Controllable PPMs



OC2 APPENDIX 2

OC2.A.2.1 **Generation Planning Parameters for CDGUs**

The following parameters are required in respect of each **CDGU**:

(i) the minimum notice required to **Synchronise** a **Generating Unit** from **De-Synchronisation**;

(ii) the minimum time between **Synchronising** different **Generating Units** in a **Power Station**;

(iii) the minimum block **Load** requirements on **Synchronising**;

(iv) maximum **Generating Unit Loading** rates from **Synchronising** for the following conditions:
hot;
warm;
cold;

(v) minimum time off **Load**;

(vi) maximum **Generating Unit** de**Loading** rates for the following conditions:
hot;
warm;
cold;

(vii) maximum allowable starts per year:
hot;
warm;
cold.

OC2.A.2.2 **Generation Planning Parameters for Dispatchable PPMs** and **Controllable PPMs**

The following parameters are required in respect of each **Dispatchable PPM** and **Controllable PPM:**

(i) the minimum time to connect/reconnect the **Dispatchable PPM** or **Controllable PPM** (or part thereof) to the **NI System** following a **Dispatch** instruction;

(ii) the minimum time to connect/reconnect the **Dispatchable PPM** or **Controllable PPM** (or part thereof) to the **NI System** automatically following a trip of the **Controllable PPM** (or part thereof) that does not cause damage to the **Controllable PPM** (or part thereof);

(iii) the maximum rate at which Load can be increased following connection of the **Dispatchable PPM** and **Controllable PPM** (or part thereof) to the **NI System**;

(iv) the minimum fault level or voltage at the **Connection Point** below which the **Dispatchable PPM** or **Controllable PPM** cannot be connected.

OPERATING CODE NO.3

OPERATING MARGIN

OC3.1 INTRODUCTION

Operating Code No. 3 ("OC3") sets out the different types of reserve which make up the **Operating Margin** that the **TSO** may use in the **Control Phase**.

OC3.2 OBJECTIVE

The objective of OC3 is to set out and describe the types of reserve which may be utilised by the **TSO** acting in conjunction with the **Other TSO** pursuant to the **Scheduling and Dispatch Code**s (SDCs).

OC3.3 SCOPE

OC3 applies to the **TSO**, **Generators** with **Generating Plant** (in respect of all **Generating Units** connected to the **Transmission System** and in respect of **CDGUs** and **Controllable PPMs** connected to the **Distribution System**) and **Interconnector Owners**.

OC3.4 CONSTITUENTS OF OPERATING MARGIN

The **Operating Margin** comprises **Contingency Reserve** and **Operating Reserve**.

OC3.4.1 **Contingency Reserve**

Contingency Reserve is the margin of generation over forecast **Demand** which is required to be held in Northern Ireland in the period from 24 hours ahead down to real time to cover against uncertainties in generating plant **Availability** and **Interconnector Availability** and against both weather forecast and **Demand** forecast errors. It is provided by **Generating Plant** in Northern Ireland which is not required to be **Synchronised** but which must be held available to **Synchronise** within a defined timescale as provided in OC3.4.6.1.

OC3.4.2 **Operating Reserve**

OC3.4.2.1 **Operating Reserve** is additional output from **Generating Plant** in Northern Ireland, additional **Interconnector** transfer and/or reduction in **Demand** which must be realisable in real time operation to respond in order to contribute to containing and correcting any **System Frequency** deviation to an acceptable level, within the limits specified in the Electricity Supply Regulations (N.I.) 1991, in the event of a loss of generation or a loss of import from any **Interconnector** or mismatch between generation output and **Demand**.

OC3.4.2.2 The **Operating Reserve** from **Generating Plant** must be capable of providing response in four distinct time scales:

OC3.4.2.2.1 **Primary Operating Reserve**

The automatic response to **NI System Frequency** changes which is released increasingly from the time of **Frequency** change and fully available by 5 seconds, and, subject to the **Unit Load Controller** adjustment determined pursuant to the CC where applicable, must be sustainable, for at least 15 seconds.

OC3.4.2.2.2 **Secondary Operating Reserve**

The additional **MW** output compared to the pre-incident output, which is fully available and sustainable over the period from 15 to 90 seconds following an **Event**.

OC3.4.2.2.3 **Tertiary Operating Reserve band 1**

The additional **MW** output required compared to the pre-**Event** output which is fully available and sustainable from 90 seconds to 5 minutes following an **Event**.

OC3.4.2.2.4 **Tertiary Operating Reserve band 2**

The additional **MW** output required compared to the pre-**Event** output which is fully available and sustainable from 5 minutes to 20 minutes following an **Event**.

OC3.4.3 **Replacement Reserve**

The additional **MW** output required compared to the pre-**Event** output which is fully available and sustainable from 20 minutes to 4 hours following an **Event**.

OC3.4.4 **Substitute Reserve**

The additional **MW** output required compared to the pre-**Event** output which is fully available and sustainable from 4 hours to 24 hours following an **Event**.

OC3.4.5 **Demand Control**

Operating Reserve can also be provided by a reduction in **Demand** which is realisable by operation of **Low Frequency Relays** or **Special Protection Schemes.**

The **TSO**, in accordance with its **Licence** and statutory obligations, and acting in conjunction with the **Other TSO** which shall be looking at similar factors in respect of the **Other Transmission System** shall determine the amount of **Operating Reserve** to be carried at any time. This will not be constrained by the **Trading and Settlement Code**.

OC3.4.6 Provision of **Operating Margin**

OC3.4.6.1 **Contingency Reserve**

This is the reserve held in Northern Ireland over, and above**, Operating Reserve,** which is required in the period from 24 hours ahead (SDC1 **Scheduling**) down to real time to cover against uncertainties of generation output, weather conditions and **Demand** forecast. The amount of **Contingency Reserve** required at the day ahead

Scheduling stage under SDC1 and in subsequent timescales will be decided by the **TSO** acting in conjunction with the **Other TSO** on the basis of historical trends in the reduction in **Availability** of **CDGUs** and increases in forecast **Demand** up to real time operation.

OC3.4.6.2 **Operating Reserve**

The amount of **Operating Reserve** required at any time will be determined by the **TSO** acting in conjunction with the **Other TSO** having regard to the demand levels, generating plant availability shortfalls and the greater of the largest secured loss of generation on the Island of Ireland or loss of import from or sudden export across any **Interconnectors**. The **TSO** will allocate the **Operating Reserve** to the various classes of **Generating Plant**, to an **Interconnector** and/or to a reduction in the **Demand** initiated by the operation of **Low Frequency Relays** or **Special Protection Schemes** so as to fulfil the required levels of **Primary Operating Reserve**, **Secondary Operating Reserve, Tertiary Operating Reserve band 1** and **Tertiary Operating Reserve band 2**.

OC3.4.7 Instruction of **Operating Margin**

The **TSO** will instruct (as part of the **Dispatch Instructions**), sufficient individual **CDGUs** and **Interconnectors** and/or arrange for sufficient **Low Frequency** disconnection of **Demand** by means of **Special Protection Schemes** so as to fulfil in total the required levels of **Contingency Reserve, Replacement Reserve, Substitute Reserve** and **Operating Reserve** with the required levels of response. Such instructions of **CDGUs** and/or **Interconnectors** will be issued (as part of the **Dispatch Instructions**) pursuant to SDC2.

OC3.5 DATA REQUIREMENTS

The response capability data required for each **CDGU** (and in the case of a **CCGT Installation**, **CCGT Module(s)** therein), in connection with **Operating Reserve** and relating to circumstances when **NI System Frequency** falls to a level which fully opens the **CDGU's** governor valve, is listed in the **Appendix** to OC3 (in the case of an **Open Cycle Gas Turbine Unit**, only the data applicable to an **Open Cycle Gas Turbine Units** should be supplied). This data for all such units should be provided when required initially under the **Connection Agreement** and thereafter in Week 24 in each calendar year and shall be within the parameters set out in Schedule 1 to the CC**.** The provisions of SDC1.4.4.1(b) will apply, with necessary changes of terminology, to any changes to these parameters.

OC3.6 **UNIT LOAD CONTROLLERS**

CC.S1.5 requires certain **CDGUs** specified by the **TSO** (other than **Gas Turbine Units**) to be fitted with **Unit Load Controllers**. Each **Generator** must ensure that each of its **CDGUs** which is subject to this requirement operates with its **Unit Load Controller** in operation unless relieved of this obligation in respect of a particular **CDGU** by the **TSO**. A **Generator** at its **Generating Plant** may request the **TSO 's** agreement for one of its **CDGUs** at that **Generating Plant** to be operated without the **Unit Load Controller** in service. The **TSO 's** agreement will be dependent on the risk that would be imposed on the **NI System**, provided that in any event a **Generator** may

take such action as is reasonably necessary to avoid, in the **Generator's** reasonable opinion, an imminent risk of injury to persons or material damage to property (including the **CDGU**).

OC3 APPENDIX

OC3.A.1 **Operating Reserve** to **Frequency** Change

To be given in a tabular form, describing **Primary Operating Reserve, Secondary Operating Reserve, Tertiary Operating Reserve band 1** and **Tertiary Operating Reserve band 2** at different levels of **Load**, ranging from **Minimum Generation** to **Registered Capacity**.

OC3.A.2 **Governor Droop** Characteristics

Governor Droop %

OC3.A.3 Unit Control Options

Maximum droop %
Normal droop %
Minimum droop %

OPERATING CODE NO. 4

DEMAND CONTROL

OC4.1 INTRODUCTION

OC4.1.1 Operating Code No 4 ("OC4") is concerned with the provisions made by the **TSO** and procedures to be followed by the **TSO** and **Users** to permit a reduction in **Demand** in the event that there are insufficient **Generating Plant**, **PPMs, Independent Generating Plant**, **Demand Side Units** or transfers across any **Interconnectors** and the **Inter-jurisdictional Tie Lines** between Northern Ireland and the Republic of Ireland available to meet **Demand** in all or any part of the **NI System** and/or in the event of problems on the **NI System**, including, without limitation, in the event of both a steady state shortfall of generation and a transient shortfall of generation following a sudden loss of generation. OC4 also covers operating problems such as unacceptable voltage levels and thermal overloads and also the provision of information on any **Demand Control** arrangements by **Suppliers**, including **Demand Control** arrangements providing for the utilisation of controllable **Load** blocks on the **NI System** (for example, by radio teleswitching). OC4 does not override and must be read in conjunction with the **Operating Security Standard**. The **Demand Control** arrangements may also apply where there are insufficient **Generating Plant, Demand Side Units** or transfers to meet **Demand** in all or any part of the **Other Transmission System** and/or in the event of problems on the **Other Transmission System** in circumstances where the **TSO** is able to assist the **Other TSO** and where doing so would not have a detrimental effect on the security of the **NI System**.

OC4.1.2 (a) OC4 deals with the following:

(i) **Customer Demand Management** initiated by **Suppliers**;

(ii) **Customer Demand Management** initiated by the **TSO** (such as that achieved by directing the timing of supply to a **Customer** in a manner and to the extent agreed for commercial purposes between the **Supplier** and its **Customer** and offered by a **Supplier** to the **TSO** including that resulting from **Load Management Arrangements**);

(iii) **Customer Voltage Reduction** initiated by the **TSO** and implemented by the **DNO**;

(iv) **Planned Manual Disconnection** (such as **Rota Load Shedding)** initiated by the **TSO** and implemented by the **DNO**;

(v) **Emergency Manual Disconnection** initiated and implemented by the **TSO**;

(vi) protection of supply to any part of the **NI System** where system security is weak; and

(vii) **Disconnection** of **Load** blocks by operation of **Automatic Load Shedding Devices** to preserve overall **NI System** security.

The term "**Demand Control**" is used to describe any or all of those methods of controlling **Demand**.

(b) The type of **Demand Control** utilised by the **TSO** in any particular case will depend upon the amount of time between the **TSO** becoming aware of the need for implementing **Demand Control** and the time at which it needs to be implemented. In the event of a sudden and unexpected loss of generation and/or **NI System** problems and, subject to the circumstances set out in OC4.1.1, in the event of a sudden and unexpected loss of generation on the **Other Transmission System** and/or **Other Transmission System** problems, the requisite **Demand Control** will normally be achieved by means of **Automatic Load Shedding** but, occasionally, **Emergency Manual Disconnection** may additionally be required. The amount of time which the **TSO** has in which to implement **Demand Control** will also determine whether **Customer Demand Management** will be implemented before voltage reduction. In all cases when **Demand Control** is necessary, the **TSO** will generally use **Demand Disconnection** as the last option.

OC4.1.3 **Load Shedding** shall not, so far as possible, be exercised in respect of **Protected Customers** and **Contract Customers**. OC4, therefore, applies subject to this exclusion.

OC4.1.4 As explained in the Glossary and Definitions section, references to the term "**User System**" shall be read as referring to the **Distribution System** with respect to provisions applicable to the **DNO**.

OC4.2 OBJECTIVE

OC4.2.1 The objective of OC4 is to detail the provisions required to enable the **TSO** to achieve a reduction in **Demand** to avoid or relieve operating problems on all or any part of the **NI System** and, subject to the circumstances set out at OC4.1.1, the **Other Transmission System**. Subject to OC4.1.3, the **TSO** will utilise **Demand Control** in a manner which does not unduly discriminate against, or unduly prefer, any one or any group of **Customers**. OC4 requires that the **TSO** be notified of any **Demand Control** arrangements entered into or utilised by **Users**.

OC4.3 SCOPE

OC4.3.1 OC4 applies to the **TSO** and to **Users**, which in OC4 means the **DNO**, **Suppliers** and **Generators**.

OC4.4 PROCEDURES

OC4.4.1 Risk of **Demand Reduction**

OC4.4.1.1 The **TSO** shall issue to the **DNO** notification of a risk of **Demand Reduction** when the **TSO** anticipates that there may be insufficient **Generating Plant**, **PPMs**,

Independent Generating Plant, **Demand Side Units** or transfers across any **Interconnectors** and the **Inter-jurisdictional Tie Lines** between Northern Ireland and the Republic of Ireland available to meet **Demand** in all or any part of the **NI System**.

OC4.4.1.2 Any such notification issued pursuant to OC4.4.1.1 shall be provided as soon as reasonably possible after the **TSO** has grounds to believe that there is a risk of **Demand Reduction**. The notice shall include the **TSO's** best estimate of:

(a) the required level of **Demand Control** in **MW**;

(b) the expected start time and duration of **Demand Control**.

OC4.4.2 **Customer Demand Management**

Customer Demand Management means reducing the level of supply of **Energy** to a **Customer**, **Disconnecting** a **Customer** or directing the timing of supply to a **Customer** in all cases in a manner agreed for commercial purposes between a **Supplier** and its **Customer**.

OC4.4.3 **Customer Demand Management** Initiated by a **Supplier**

OC4.4.3.1 Each **Supplier** which enters into (or amends) an agreement or other arrangement with a **Customer** allowing **Customer Demand Management** must notify the **TSO** in writing in accordance with OC4.4.3.2 of the following when the aggregate of its possible **Customer Demand Management** pursuant to all such agreements or arrangements it has effected can equal or exceed 2 **MW** at any point in time:

(a) the level of expected and possible **Demand Control** in **MW**;

(b) the circumstances in which the **Customer Demand Management** is expected to be and may be utilised;

(c) the expected duration of **Demand Control** and the maximum permitted;

(d) the expected and possible frequency of initiation; and

(e) the locations at which it is expected that **Demand Control** will be exercised.

The **Supplier** must supply its best estimate to the **TSO** for each item specified above although the **Supplier** will not then become bound to act in accordance with its estimate. The information may be supplied to the **TSO** on an aggregated basis, thus avoiding the ability to identify individual **Customers**, insofar as that is possible without destroying its meaning.

OC4.4.3.2 The notification must be given when the total of such **Customer Demand Management** can equal or exceed 2 **MW** at any point in time and thereafter must be updated by the end of March each year in respect of the year commencing on 1st May following such notification in order to permit the **TSO** to reflect the effects of such **Customer Demand Management**. If following the end of March, or initial

notification, as the case may be, any of the details change, the **TSO** must be notified in writing by the **Supplier** promptly.

OC4.4.3.3 Each **Supplier** must notify the **TSO** in writing on each occasion that any **Customer Demand Management**, of which it has notified the **TSO** under OC4.4.3.1 and OC4.4.3.2, is planned to be instructed (or has been instructed) by that **Supplier** and which will in aggregate equal or exceed (or has equalled or exceeded) 2 **MW** at any point in time other than following an instruction by the **TSO**.

OC4.4.3.4

(a) The notification will, where the **Customer Demand Management** is planned sufficiently in advance, be given by 1400 hours on the day prior to the **Trading Day** on which the **Customer Demand Management** is to be implemented.

(b) Where the **Customer Demand Management** is planned after that time, the **TSO** will be notified as soon as possible after the decision to implement has been made.

(c) If it is not possible to notify in advance, the **Supplier** must notify the **TSO** within 10 minutes of implementation.

(d) Any material change in the details contained in such notice must be notified to the **TSO** in writing as soon as possible and in any event not later than 10 minutes after the implementation of such change. Such notification shall be confirmed to the **TSO** in writing as soon as possible after the notification has been given.

OC4.4.3.5 The notification will contain the following:

(a) the amount of **Customer Demand Management** planned to be instructed, or which has already been instructed;

(b) the length of time that the **Customer Demand Management** is anticipated to be in force and the time at which it is to commence, or commenced; and

(c) the locations on the **Total System** at which the **Customer Demand Management** is to be, or has been, implemented.

OC4.4.3.6 A **Supplier** which has initiated **Customer Demand Management**, otherwise than pursuant to an instruction from the **TSO**, which has equalled or exceeded 2 **MW** in aggregate at any point in time must, in addition, notify the **TSO** of details as to the **Customer Demand Management** which was actually achieved. The notification must be made within 2 weeks of the initiation of such **Customer Demand Management** and (to the extent it differs from the **Customer Demand Management** details supplied already) must contain the **TSO** profiles on a half hourly basis and the amount of **Demand** reduction achieved from such use of **Demand Control**. Such information is required by the **TSO** in order to establish the effect that the level of **Customer Demand Management** actually achieved had on the **NI System**.

OC4.4.3.7 Where a **Supplier** wishes to utilise voltage reduction as **Customer Demand Management** on the **User System** of any of its **Customers**, the **Supplier** must notify

the **TSO** of such details of the proposed voltage reduction as the **TSO** reasonably requires in writing as far in advance of the implementation of such voltage reduction as is reasonably practicable. The **Supplier** will need to make adequate arrangements with its **Customers** to prevent any problems arising on such **Customers User Systems** in the event that the **TSO** implements voltage reduction on such **User Systems** at any time whilst voltage reduction utilised by the **Supplier** is in effect. In particular, the **Supplier** must take steps to ensure that the **Customer** is aware that the voltage at the point of supply from the **NI** may be reduced within the limit set out in the Electricity Supply Regulations (NI) 1991.

OC4.4.4 **Customer Demand Management** Initiated by the **TSO**

OC4.4.4.1 If a **Supplier** would like to make arrangements with the **TSO** whereby the **TSO** would be given the ability to use **Customer Demand Management** which the **Supplier** has arranged for the purposes of **Demand Control**, it shall notify the **TSO** in accordance with OC4.4.4.3 and OC4.4.4.4**.** Each **Supplier** must ensure that it does not, by initiating **Customer Demand Management** itself, limit the **Customer Demand Management** which it has made available to the **TSO** under this OC4.4.4.

OC4.4.4.2 The notification must be given by the **Supplier** to the **TSO** in writing by the end of March each year. If, following the end of March, any of the details change, the **TSO** must be notified in writing by the **Supplier** promptly. By so notifying, the **Supplier** will be agreeing that, throughout the year commencing on 1 May following the notification (or such other date as may be agreed between the **TSO** and the **Supplier**), it will comply with the **TSO's** instructions relating to the **Customer Demand Management** provided these instructions are within the parameters set out in the notification. Any commercial arrangements relating to this are outside the **Grid Code**. For the avoidance of doubt, commercial arrangements cannot override the provisions of the **Grid Code**.

OC4.4.4.3 The notification must contain the following information:

(a) the amount of the **Demand Control** reduction available;
(b) how often it can be used;
(c) the length of time that **Demand Control** can be used;
(d) the notice required to be given to the **Supplier** by the **TSO**;
(e) any situations under which the available **Customer Demand Management** may be varied or cannot be instructed by the **TSO**;
(f) the duration of the arrangement with the **Customer**; and
(g) any other information which the **Supplier** reasonably considers would be relevant to the **TSO.**

OC4.4.4.4 The **TSO** will, when it considers it necessary, implement the **Customer Demand Management** arranged and made available to it by a **Supplier** within the parameters notified to it.

OC4.4.5 **Customer Voltage Reduction**

OC4.4.5.1 The **TSO** will, insofar as it is able, organise the **Transmission System** and make such other arrangements as are necessary so that a 6 per cent reduction of voltage

supplied to all or any group of **Customers** on a particular part of the **NI System** can be implemented.

OC4.4.5.2 The **DNO** shall arrange to have available within the **Distribution System** an arrangement which will provide for two 3 per cent stages of voltage reduction, which can be applied to all or selected groups of **Customers**.

OC4.4.5.3 The **TSO** will, when it considers it necessary, instruct the **DNO** to implement either a 3 per cent or 6 per cent **Customer Demand Reduction** which the **DNO** shall complete without delay.

OC4.4.5.4 The **TSO** will, when it considers it necessary, instruct the **DNO** to remove the 3 per cent or the 6 per cent voltage reduction implemented pursuant to OC4.4.5.3 which the **DNO** shall complete without delay.

OC.4.4.6 **Planned** and/or **Emergency Manual Disconnection**

OC4.4.6.1 **Planned Manual Disconnection** is the procedure adopted when the TSO has reasonable notice that a generation shortfall and/or **Transmission System** problems require **Demand Control.** Where **Demand Control** is required to continue for a protracted period rotation of **Disconnection** under a **Rota Load Shedding** procedure may be required to ensure equitable treatment, insofar as practicable, for all **Customers** as further detailed in OC4.4.6.2 and OC4.4.6.3.

OC4.4.6.2 The **TSO**, in conjunction with the **DNO**, will arrange for the purposes of **Rota Load Shedding**, insofar as it is able, that the total **Demand** on the **NI System** is arranged in groups of approximately 5 per cent. of total **Demand** (as a percentage at time of winter peak) so that any or all such groups can be **Disconnected** when the **TSO** considers it necessary.

OC4.4.6.3 Where **Disconnection** is envisaged by the **TSO** to be prolonged, the **DNO** will, where possible, utilise **Disconnection** rotas where approximately 5 per cent. groups are interchanged to ensure (so far as possible) equitable treatment of **Customers**.

OC4.4.6.4 **Emergency Manual Disconnection** is utilised by the **TSO** when a loss of generation or a mismatch of generation output and **Demand** is such that there is an operational requirement to shed **Load** at short notice (or no notice) to maintain a **Regulating Margin** between generation output and **Demand** and in certain circumstances to deal with operating problems such as unacceptable voltage levels and thermal overloads.

OC4.4.6.5 To avoid affecting the operational integrity of the **Automatic Load Shedding** scheme, the **DNO** shall ensure that the **Load** blocks shed under **Planned Manual Disconnection** and/or **Emergency Manual Disconnection** will, as far as practicable, not be those within the **Automatic Load Shedding** scheme which could be shed under a single operational contingency. To ensure no undue discrimination against any **Customers**, manual **Load Shedding** will be dealt with in conjunction with the provisions for rotating **Load Shedding** in OC4.4.8 and the **TSO** will monitor **Load Shedding** to ensure no undue discrimination.

OC4.4.6.6 The **TSO** will, when it considers it necessary, implement **Emergency Manual Disconnection** and/or instruct the **DNO** to implement **Planned Manual Disconnection**, which the **DNO** shall complete without delay.

OC4.4.6.7 The **TSO** will, when it considers it necessary, restore the connections removed by **Emergency Manual Disconnection** and/or instruct the **DNO** to restore the connections removed by **Planned Manual Disconnection**, which the **DNO** shall complete without delay.

OC4.4.7 **Demand Control** with Weak or Reduced **System** Capabilities

OC4.4.7.1 This section covers the situation where the **TSO** may wish to initiate **Demand Control** to maintain partial supplies to a part of the **NI System** which cannot support the full area **Demand** of that part of the **NI System**. It applies to circumstances where the **TSO** wishes to allow for fault contingencies more severe than envisaged in the **Licence Standards** because the impact of these contingencies on the **NI System** would be unacceptable. It can also apply to circumstances where **Planned Outages** or unplanned **Outages** would, in the opinion of the **TSO**, result in a single contingency having an unacceptable impact on the **NI System**.

OC4.4.7.2 Where the **TSO** considers that it should put in place arrangements to enable **Demand Control** to be effected in the circumstances outlined in OC4.4.7.1, it may effect such arrangements and **Demand Control** under such arrangements may be initiated by the **TSO** and implemented by the **TSO** and/or the **DNO** at the **TSO's** request.

OC4.4.7.3 **Load** shedding caused by these schemes will be assimilated into **Load** shedding caused by the **Automatic Load Shedding** scheme detailed in OC4.4.8 to ensure no **Customer** or group of **Customers** is unfairly discriminated against.

OC4.4.8 **Automatic Load Shedding**

OC4.4.8.1 Under generation shortfall conditions a **Frequency** graded **Automatic Load Shedding** scheme is utilised to prevent **Frequency** collapse on the **NI System** and to restore the balance between generation output and **Demand**.

OC4.4.8.2 The **Demand** on the **NI System** subject to **Automatic Load Shedding** will be split into discrete blocks. The number, location, size and the associated low **Frequency** settings of these blocks will be as determined by the **TSO** on a rota basis insofar as possible.

OC4.4.8.3 Where conditions are such that, following **Automatic Load Shedding**, and the subsequent recovery of **Frequency** on the **NI System**, it is not possible to restore a large proportion of the total **Demand** so **Disconnected** within a reasonable period of time, the **TSO** may require the **DNO** to implement additional **Disconnection** manually to restore an equivalent amount of the **Demand** which has been **Disconnected** automatically.

OC4.4.8.4 For the avoidance of doubt, no **Demand** shed by operation of **Automatic Load Shedding Devices** will be restored without the specific direction of the **TSO**.

OC4.4.9 **General**

OC4.4.9.1 In most instances of **Demand Control**, other than with **Customer Demand Management** initiated by **Suppliers, Demand Control** is initiated by the **TSO and implemented by the TSO and/** or the **DNO** upon the **TSO's** request**. Suppliers** should note, however, that although implementation of **Demand Control** in respect of their **Customers** is not, in general, exercisable by them, their **Customers** may be affected by **Demand Control**. The contractual arrangements of **Suppliers** with their **Customers** may, accordingly, need to reflect this.

OC4.4.9.2 During the implementation of **Demand Control, Scheduling** and **Dispatch** in accordance with the principles in the SDCs for determining which **CDGUs** will be **Scheduled** and **Dispatched** may cease and will not be re-implemented until the **TSO** decides that normal operation can be resumed. The **TSO** will inform **Generators** when normal **Scheduling** and **Dispatch** in accordance with the SDCs is to be re-implemented as soon as reasonably practicable.

OC4.4.9.3 Where time permits, the **TSO** will, insofar as it is reasonably able, inform all affected **Users** that **Demand Control** is planned to be exercised.

OC4.5 **FUEL SECURITY CODE**

OC4.5.1 Each **Supplier** agrees to comply with the **Fuel Security Code** to the extent it is expressed to apply to it and with any instructions issued by the **TSO** pursuant to the **Fuel Security Code**

OPERATING CODE NO. 5
OPERATIONAL LIAISON

OC5.1 INTRODUCTION

OC5.1.1 OC5 sets out the requirements for the exchange of information in relation to **Operations** and/or **Events** on the **Total System** which have had (or may have had) or will have (or may have) an **Operational Effect**:

(i) on the **Transmission System** in the case of an **Operation** and/or **Event** occurring on a **User System**; and

(ii) on a **User System**, in the case of an **Operation** and/or **Event** occurring on the **Transmission System** or the **Other Transmission System**;

where no requirement for liaison is specified in any other section of the **Grid Code**. OC5 also sets out the procedure for issue of warnings in the event of a risk of serious and widespread disturbance of the whole, or part of, the **NI System**.

OC5.1.2 Where an **Operation** and/or **Event** on the **Transmission System** falls to be reported by the **TSO** to the **Other TSO** under the **System Operator Agreement**, the **TSO** may include in that report the information which it has been given by the **User** in relation to the **Operation** and/or **Event** on the **User System** which has itself then caused or exacerbated the **Operation** or **Event** on the **Transmission System**.

OC5.1.3 As explained in the Glossary and Definitions section, references to the term "**User System**" shall be read as referring to the **Distribution System** with respect to provisions applicable to the **DNO** .

OC5.2 OBJECTIVE

The exchange of information is needed in order that the implications of the **Operation** and/or **Event** can be considered and the possible risks arising from it can be assessed and appropriate action taken by the relevant party in order to maintain the integrity of the **Total System**. OC5 does not seek to deal with any actions arising from the exchange of information, but merely with that exchange.

OC5.3 SCOPE

OC5 applies to the **TSO** and to **Users**, which in this OC5 means the **DNO**, **Generators** (in respect of all **Generating Units** connected to the **Transmission System**), **Interconnector Owners** and **Large Demand Customers**.

OC5.4. PROCEDURE

OC5.4.1 The term **"Operation"** means a scheduled or planned action relating to the operation of a **System** or on the **Other Transmission System** but, for the avoidance of doubt, does not include fault locating operations undertaken by the **TSO** or the **Other TSO**.

OC5.4.2 The term **"Event"** means an unscheduled or unplanned (although it may have been anticipated) occurrence on a **System** or on the **Other Transmission System** including, without limiting that general description, faults, incidents and breakdowns.

OC5.4.3 The term **"Operational Effect"** in the whole of this OC5 shall mean any effect on the operation of the relevant **System** or on the **Other Transmission System** which will or may cause the **Systems** of the **TSO** or the other **User** or **Users**, as the case may be, to operate differently from the way in which they would or may have operated in the absence of that effect.

OC5.4.4 Requirement to notify **Operations**

OC5.4.4.1 The **TSO**

In the case of an **Operation** on the **Transmission System** which will have, or may have, an **Operational Effect** on a **User System**, the **TSO** will (unless this requirement arises under any other part of the **Grid Code**) notify the **User** or **Users**, whose **System(s)** will, or may in the opinion of the **TSO**, be so affected in accordance with this OC5. Following notification by the **TSO**, the **DNO** may notify any user connected to the **Distribution System** on whose system the **Operation** will have an **Operational Effect**. The provisions of this OC5.4.4.1 shall also apply to circumstances where an **Operational Effect** on the **User System** was caused or may have been caused by an **Operation** on the **Other Transmission System**, provided that the **TSO**'s duty to notify a **User** shall be solely a duty to pass on the information that the **TSO** has received from the **Other TSO**.

OC5.4.4.2 **User**

In the case of an **Operation** on a **User System**, which will have or may have an **Operational Effect** on the **Transmission System**, the **User** will (unless this requirement arises under any other part of the **Grid Code**) notify the **TSO** in accordance with this OC5. Following notification by the relevant **User**, the **TSO** will notify any other **User** or **Users** on whose **System(s)** the **Operation** will (or, in the **TSO**'s reasonable opinion, may) have an **Operational Effect**, and may also notify the **Other TSO** if the **Operation** will (or, in the **TSO'**s reasonable opinion, may) have an equivalent effect on the **Other Transmission System**, in accordance with this OC5.

OC5.4.4.3 Whilst in no way limiting the general requirement to notify in advance as set out in OC5.4.4.1 and OC5.4.4.2, the following are examples of scheduled or planned actions for which notification will be required under this OC5 if they will, or may, have an **Operational Effect**:

(i) the planned operation (other than, in the case of a **User**, at the instruction of the **TSO**) of any circuit breaker or isolator or any sequence or combination of the two; and

(ii) voltage control.

OC5.4.4.4 Nature of Notification

(a) A notification under OC5.4.4.1 or OC5.4.4.2 (save where the notification is to be given to a **Large Demand Customer**, in which event the provisions of (b) below shall apply) must be of sufficient detail to describe the **Operation** (although it need not state the cause) and to enable the recipient of the notification reasonably to consider and assess the implications and risks arising and will include the name of the individual reporting the **Operation** on behalf of the **TSO** or the **User**, as the case may be. The recipient may ask questions to clarify the notification and the notifying party shall use its reasonable endeavours to provide the necessary information.

(b) A notification which is to be given under OC5.4.4.1 or OC5.4.4.2 to a **Large Demand Customer** will not contain the information specified in (a) above but may indicate that there will be, or is likely to be, an incident on the **Total System**, the general nature of the incident (but not the cause of the incident) and, if known, in circumstances where power supplies are thought likely to be affected, the estimated time of cessation and return to service.

OC5.4.4.5 Timing

A notification under OC5.4.4.1 or OC5.4.4.2 must be given as far in advance as practicable and in any event shall be given in sufficient time as will reasonably allow the recipient to consider and assess the implications and risks arising.

OC5.4.4.6 Recording

The notification shall be given in writing whenever possible. If there is insufficient time before the **Operation** is scheduled to take place for notification to be given in writing, then notification shall be given orally and, if either party requests, it shall be written down by the sender and dictated to the recipient who shall write it down and repeat each phrase as received and, on completion, shall repeat the notification in full to the sender and check that it has been accurately recorded.

OC5.4.5 Requirement to notify **Events**

OC5.4.5.1 The **TSO**

In the case of an **Event** on the **Transmission System** which has had (or may have had) an **Operational Effect** on a **User System**, the **TSO** will (unless this requirement arises under any other part of the **Grid Code**) notify the **User** or **Users** whose **System(s)** have been (or in the reasonable opinion of the **TSO** may have been) so affected, in accordance with this OC5. Following notification by the **TSO**, the **DNO** may notify any user connected to the **Distribution System** on whose system the **Event** has had (or may have had) an **Operational Effect**. The provisions of this OC5.4.5.1 shall also apply to circumstances where an **Operational Effect** on a **User System** was caused by an **Event** on the **Other Transmission System**, provided that the **TSO's** duty to notify a **User** shall be solely a duty to pass on the information that the **TSO** has received from the **Other TSO**.

OC5.4.5.2 **User**

In the case of an **Event** on a **User System** which has had (or may have had) an **Operational Effect** on the **Transmission System**, the **User** will (unless this requirement arises under any other part of the **Grid Code**) notify the **TSO** in accordance with this OC5. Following notification by the relevant **User**, the **TSO** will notify any other **User** or **Users** on whose **System** the **Event** has had or may have had in the **TSO's** reasonable opinion an **Operational Effect**, and may also notify the **Other TSO** if the **Event** has had or may have had in the **TSO's** reasonable opinion an equivalent effect on the **Other Transmission System**, in accordance with this OC5.

OC5.4.5.3 Whilst in no way limiting the general requirement to notify set out in OC5.4.5.1 and OC5.4.5.2, the following are examples of situations where notification will be required under this OC5 if they have had, or may have had, an **Operational Effect**:

(i) where **Plant** and/or **Apparatus** is being operated in excess of its capability or may present a hazard to personnel;

(ii) the activation of any alarm or indication of any abnormal operating condition;

(iii) adverse weather conditions being experienced;

(iv) breakdown of, or faults on, or temporary changes in the capabilities of, **Plant** and/or **Apparatus**;

(v) breakdown of, or faults on, control, communications or metering equipment;

(vi) increased risks of **Protection** operation.

OC5.4.5.4 Nature of Notification

(a) A notification under OC5.4.5.1 or OC5.4.5.2 (save where the notification is to be given to a **Large Demand Customer**, in which event the provisions of (b) below shall apply) will be of sufficient detail to describe the **Event** (although it need not state the cause) and so enable the recipient of the notification reasonably to consider and assess the implications and risks arising. The recipient may ask questions to clarify the notification and the notifying party shall use its reasonable endeavours to provide the necessary information.

(b) A notification which is to be given under OC5.4.4.1 or OC5.4.4.2 to a **Large Demand Customer** will not contain the information specified in (a) above but may indicate that there has been an incident on the **Total System**, the general nature of the incident (but not the cause of the incident) and, if known, in circumstances where power supplies have been affected, an estimated time of return to service.

OC5.4.5.5 Recording

Notification shall be given orally and, except in the case of emergency, if either party requests, shall be written down by the sender and dictated to the recipient who shall write it down and repeat each phrase as received and, on completion, shall repeat the notification in full to the sender and check that it has been accurately recorded.

OC5.4.5.6 Timing

A notification under OC5.4.5.1 or OC5.4.5.2 shall be given as soon as possible after the occurrence of the **Event**, or the time that the **Event** is known of or anticipated by the giver of the notification under this OC5, and in any event within 15 minutes of such time.

OC5.4.6 **Significant Incidents**

OC5.4.6.1 Where a **User** notifies the **TSO** under OC5.4.5.2 of an **Event** which the **TSO** considers has had or may have had a significant effect on the **Transmission System,** the **TSO** may require the **User** to report that **Event** in writing in accordance with the provisions of OC8 in which event it will, within one **Business Day**, notify that **User** accordingly.

OC5.4.6.2 Where the **TSO** notifies a **Generator** or an **Interconnector Owner** of an **Event** under this OC5 which the **Generator** or the **Interconnector Owner** considers has had or may have had a significant effect on that **Generator's** or **Interconnector Owner's System**, that **Generator** or **Interconnector Owner** may require the **TSO** to report that **Event** in writing in accordance with the provisions of OC8 in which event it will, within one **Business Day**, notify the **TSO** accordingly.

OC5.4.6.3 **Events** which the **TSO** requires a **User** to report in writing pursuant to OC5.4.6.1 and **Events** which a **Generator** requires the **TSO** to report in writing pursuant to OC5.4.6.2 are known as **"Significant Incidents"**.

OC5.4.6.4 Without limiting the general description set out in OC5.4.6.1 and OC5.4.6.2, a **Significant Incident** will include an **Event** having an **Operational Effect** which results in, or is likely to result in, the following:

(i) tripping of **Plant** and/or **Apparatus** either manually or automatically;

(ii) voltage outside statutory limits;

(iii) **System Frequency** outside statutory limits;

(iv) **System** instability; or

(v) **System** overloads.

OC5.4.7 Warnings

(i) A warning will be issued by the **TSO** (usually by telephone or other electronic means) to **Users** who may be affected when the **TSO** knows there is a risk of widespread and serious disturbance to the whole, or part of, the **NI System**. Where the warning is given by telephone or other electronic means, the **TSO** will issue a written confirmation as soon as reasonably practicable thereafter.

(ii) The warning will contain such information as the **TSO** reasonably considers to be necessary in order to explain the nature and extent of the anticipated disturbance to the **User** provided that sufficient time is available to the **TSO** prior to the issue of the warning and that such information is available to the **TSO**;

(iii) For the duration of a warning each **User** in receipt of the warning shall take the necessary steps to warn its operational staff and maintain its **Plant** and/or **Apparatus** in the condition in which it is best able to withstand the anticipated disturbance ;

(iv) **Scheduling** and **Dispatch** in accordance with the **Scheduling and Dispatch Codes** may be affected during the period covered by a warning. Further provisions on this are contained in the **Scheduling and Dispatch Codes**.

OPERATING CODE NO. 6

SAFETY CO-ORDINATION

OC6.1 INTRODUCTION

OC6.1.1 Operating Code No. 6 ("OC6") specifies the standard procedures which are to be followed by the **TSO**, the **TO,** and **Users** for the co-ordination, establishment and maintenance of necessary **Safety Precautions** when work and/or testing (other than **System Tests**, which are covered by OC10 and the type of tests covered in OC11) is to be carried out on or near either the **Transmission System** or a **User's System** and when, for this to be done safely, **Safety Precautions** are required on the **Transmission System** and on a **User's System**.

OC6.1.2 Where, by reason of the design of any **HV Apparatus** on which **Safety Precautions** are to be applied, it is not practicable to apply **Safety Precautions** on such **HV Apparatus**, the **Safety Precautions** shall be applied at the most appropriate point(s) on the **User's Plant** and **Apparatus** (for example, at steam valves) to achieve **Safety From The System** on the **HV Apparatus** on which **Safety From The System** is to be achieved.

OC6.1.3 OC6 does not apply to a situation in which **Safety Precautions** need to be agreed solely between **Users**.

OC6.1.4 OC6 does not seek to impose a particular set of **Safety Rules** on the **TO** or **Users**; the **Safety Rules** to be adopted and used by the **TO** and each **User** shall be those chosen by each.

OC6.1.5 The procedures set out in this OC6 do not refer expressly to a situation in which both the **TO** and a **User** require the other to implement **Safety Precautions** at the same time. In such circumstances the relevant procedures of this OC6 should be applied twice, once with the **TO** acting as **Implementing Safety Co-ordinator** and once with the **User** acting in that role.

OC6.1.6 In this OC6 the following terms shall have the following meanings:

(a) "**HV Apparatus**" means **High Voltage** electrical circuits forming part of a **System** on which **Safety From The System** may be required or on which **Safety Precautions** may be applied to allow work and/or testing to be carried out on a **System**;

(b) "**Isolation**" means the disconnection of **HV Apparatus** from the remainder of the **System** in which that **HV Apparatus** is situated by means either of an **Isolating Device(s)** in the isolating position or adequate physical separation or sufficient gap or the disablement (by means of switching or dismantling) of **Plant** and/or **Apparatus** so that electrical energy cannot pass from the

Apparatus (or in the case of **Plant**, from the associated **Apparatus**) to the **HV Apparatus** other than by an **Isolating Device**;

(c) "**Earthing**" means a way of providing a connection between conductors and earth by means of an **Earthing Device**.

OC6.1.7 It should be noted that the term "**User System**" includes the **Distribution System** and therefore references to a **User System** should be construed accordingly.

OC6.2 OBJECTIVE

The objective of this OC6 is to achieve **Safety From The System** when work and/or testing on or near either a **User System** or the **Transmission System** necessitates the provision of **Safety Precautions** on both **Systems**.

OC6.3 SCOPE

OC6.3.1 OC6 applies to the **TO**, to the **TSO**, and to **Users** which term in this OC6 means the **DNO**, **Generators** with respect to **Generating Units** connected to the **Transmission System**, **Large Demand Customers** and **Interconnector Owners**.

OC6.3.2 The **TSO** shall procure that the **TO** complies with its obligations under OC6.

OC6.4 PROCEDURE

OC6.4.1 Approval of **Local Safety Instructions**

OC6.4.1.1 (a) In accordance with the timing requirements of its **Connection Agreement**, or as otherwise agreed, each **User** shall supply to the **TO** a copy of its **Local Safety Instructions** relating to the **User's** side of the **Connection Point** at each **Connection Site**.

(b) In accordance with the timing requirements of each **Connection Agreement**, or as otherwise agreed, the **TO** shall supply to each **User** a copy of the **TO's Local Safety Instructions** relating to the **TO** side of the **Connection Point** at each **Connection Site**.

(c) Prior to connection and in accordance with the timing requirements of the relevant **Connection Agreement**, or as otherwise agreed, the **TO** and the **User** must have approved each other's **Local Safety Instructions** dealing with **Isolation** and **Earthing.** Where an employee of the **TSO** has been appointed to act on behalf of the **TO** as a **Safety Co-ordinator** the **TO** and each **User** shall, at the same time as confirming approval of the other's **Local Safety Instructions,** provide to the **TSO** a copy of that other's **Local Safety Instructions** which they have approved, with a copy also being sent to the **User** or the **TO**, as the case may be.

OC6.4.1.2 If the party required to give approval requires, for that approval to be given, more stringent provisions relating to **Isolation** and/or **Earthing** (including relating to **Earthing Devices**) (and to the extent that these are not unreasonable), the other party will make such changes as soon as reasonably practicable to the provisions in its **Local Safety Instructions** relating to **Isolation** and/or **Earthing** (including relating to **Earthing Devices**) affecting the **Connection Site** (which may of course need to

cover the application of **Isolation** and/or **Earthing** at a place remote from such **Connection Site**, depending upon the **System** layout). There is no right to withhold approval on the grounds that the party required to approve reasonably believes the provisions relating to **Isolation** and/or **Earthing** (including **Earthing Devices**) are too stringent.

OC6.4.1.3 If, following approval, a party wishes to change the provisions in its **Local Safety Instructions** relating to **Isolation** and/or **Earthing** (including **Earthing Devices**), it must inform the other party. If the change is to make the provisions more stringent, then the other party merely has to note the changes. If the change is to make the provisions less stringent, then the other party needs to approve the new provisions and the procedures referred to in OC6.4.1.2 will apply.

OC6.4.2 **Safety Co-ordinators**

OC6.4.2.1 The **TO** and each **User** will at all times have nominated a person or persons to be responsible for the co-ordination of **Safety Precautions** at each **Connection Point**, when work and/or testing is to be carried out on or near a **System** which necessitates the provision of **Safety Precautions** on (or relating to) **HV Apparatus**, pursuant to this OC6 ("**Safety Co-ordinator(s)**"). A **Safety Co-ordinator** may be responsible for the co-ordination of safety on (or relating to) **HV Apparatus** at more than one **Connection Point.** It should be noted that, for the purposes of this OC6, the **Safety Co-ordinator's** role is limited to the co-ordination of **Safety Precautions**. The **Safety Co-ordinator** will not necessarily but may undertake the physical implementation of **Safety Precautions**. In the case of the **TO**, the **Safety Co-ordinator** may be an employee of the **TSO** acting on behalf of the **TO**.

OC6.4.2.2 Each **User** shall, prior to its **Plant** and **Apparatus** being connected to the **Transmission System**, in accordance with any timing and other provisions of the **Connection Conditions**, give notice in writing to the **TO** of the identity of the **User's Safety Co-ordinator(s)** and shall update the written notice (i) whenever there is a change to the identity of its **Safety Co-ordinator(s)**, and (ii) annually on 1 April each year.

OC6.4.2.3 The **TO** shall, prior to the **Plant** and **Apparatus** of a **User** being connected to the **Transmission System**, in accordance with any timing and other provisions of the **Connection Conditions**, give notice in writing to that **User** of the identity of the **TO's Safety Co-ordinator(s)** and shall update the written notice (i) whenever there is a change to the identity of its **Safety Co-ordinator(s)**, and (ii) annually on 1 April each year.

OC6.4.2.4 Where an employee of the **TSO** has been appointed to act on behalf of the **TO** as a **Safety Co-ordinator,** the **TO** shall, prior to the **Plant** and **Apparatus** of a **User** being connected to the **Transmission System**, in accordance with any timing and other provisions of the **Connection Conditions**, give notice in writing to the **TSO** of the identity of the **User's Safety Co-ordinator(s)** and shall update the written notice (i) whenever there is a change to the identity of the **User's Safety Co-ordinator(s)**, and (ii) annually on 1 April each year..

OC6.4.2.5 Contact will be made between **Safety Co-ordinators** via normal operational channels and, accordingly, separate telephone numbers for **Safety Co-ordinators** need not be provided.

OC6.4.2.6 If work and/or testing is to be carried out on or near a **System** which necessitates the provision of **Safety Precautions** on (or relating to) **HV Apparatus** in accordance with the provisions of this OC6, the **Safety Co-ordinator** who is nominated as responsible for the **HV Apparatus** on which or in relation to which **Safety From The System** is to be achieved (the "**Requesting Safety Co-ordinator**") shall contact the **Safety Co-ordinator** who is nominated as responsible for the **HV Apparatus** which is connected at the **Connection Point** to the **HV Apparatus** on which **Safety From The System** is required (the "**Implementing Safety Co-ordinator**"), to co-ordinate the **Safety Precautions**.

OC6.4.3 **RISSP**

OC6.4.3.1 OC6 sets out the procedures for utilising the **Record of Inter-System Safety Precautions** ("**RISSP**").

OC6.4.3.2 The **TO** and the **DNO** will use the format of the **RISSP** forms set out in Appendix A and Appendix B to this OC6. That set out in Appendix A and designated as "**RISSP-A**", shall be used when the **TO** and the **DNO** is the **Requesting Safety Co-ordinator**, and that in Appendix B and designated as "**RISSP-B**", shall be used when the **TO** or the **DNO** is the **Implementing Safety Co-ordinator**.

OC6.4.3.3 **Users** other than the **DNO** may either adopt the format referred to in OC6.4.3.2, or use a form or other tangible written record in an equivalent format provided that the form, or other tangible written record, includes sections for containing the same information and has the same numbering of sections as **RISSP-A** and **RISSP-B** as set out in Appendix A and Appendix B, respectively. Whichever method a **User** chooses, it shall provide proformas or other means of recording in writing for use by its staff.

OC6.4.3.4 All references to **RISSP-A** and **RISSP-B** shall be taken as referring to the corresponding parts of the alternative forms or other tangible written records used by each **User** other than the **DNO**.

OC6.4.3.5 **RISSP-A** shall have written or printed on it an identifying number, comprising a unique prefix which identifies the location at which it is issued, and a unique serial number for the **TO** and each **User** consisting of four digits and the suffix "**R**".

OC6.4.3.6 At the time that a **User** first gives notice to the **TO** of its **Safety Co-ordinators**, that **User** shall apply in writing to the **TO** for the **TO's** approval of its proposed prefix. The **TO** shall consider the proposed prefix to see if it is the same as (or confusingly similar to) a prefix used by the **TO** or another **User** and shall, as soon as possible (and in any event within ten days), respond in writing to the **User** with its approval or disapproval. If the **TO** disapproves, it shall explain in its response why it has disapproved and will suggest an alternative prefix and the **User** shall either notify the **TO** in writing of its acceptance of the suggested alternative prefix or it shall apply in writing to the **TO** with revised proposals and the above procedure shall apply to that application.

OC6.5 **SAFETY PRECAUTIONS** ON OR RELATING TO **HV APPARATUS**

OC6.5.1 **Safety Precautions**

For the purpose of the co-ordination of safety under OC6 relating to **HV Apparatus,** the term "**Safety Precautions**" means **Isolation** and/or **Earthing**.

OC6.5.2 Agreement of **Safety Precautions**

OC6.5.2.1 When the **TO** or a **User** wishes to carry out work and/or testing on or near its **System** and it is of the opinion that, for this to be done safely, **Safety Precautions** are required on the **TO's HV Apparatus** (in the case of a **User**), or on or relating to the **HV Apparatus** of a **User** (in the case of the **TO**), the **Requesting Safety Co-ordinator** will contact the **Implementing Safety Co-ordinator** for the part of the **System** on which (or relating to which) the **Safety Precautions** are, in his reasonable opinion, required, in order to agree in accordance with the procedure contained in this OC6.5, the **Location** at which the **Safety Precautions** will be implemented or applied.

OC6.5.2.2 When the **TO** wishes to carry out work and/or testing on or near the **Transmission System** and it is of the opinion that, for this to be done safely, **Safety Precautions** are required on (or relating to) more than one **User System** the provisions of this OC6.5 shall be followed with regard to each **User** separately.

OC6.5.3 Agreement of **Isolation**

OC6.5.3.1 The **Requesting Safety Co-ordinator** shall inform the **Implementing Safety Co-ordinator** of the **HV Apparatus** on which **Safety From The System** is to be achieved and they will need to reach agreement on the **Location(s)** at which **Isolation** is to be established on (or relating to) the **Implementing Safety Co-ordinator's System**.

OC6.5.3.2 The **Implementing Safety Co-ordinator** shall then promptly inform the **Requesting Safety Co-ordinator** of the following:

(a) for each **Location**, the identity (by means of name and numbering or position, as applicable) of each point of **Isolation**; and

(b) whether **Isolation** is to be achieved by an **Isolating Device** in the isolating position or by an adequate physical separation or sufficient gap or by disablement (by means of switching or dismantling) of **Plant** and/or **Apparatus** so that electrical energy cannot pass from the **Apparatus** (or, in the case of **Plant**, from the associated **Apparatus**) to the **HV Apparatus**, other than by an **Isolating Device**.

OC6.5.3.3 The **Implementing Safety Coordinator** shall maintain each point of **Isolation** in accordance with the relevant **Local Safety Instructions**.

OC6.5.4 Agreement of **Earthing**

OC6.5.4.1 If, in addition to the **Isolation** requested under OC6.5.3, the **Requesting Safety Co-ordinator** requires **Earthing**, he shall notify this requirement to the **Implementing Safety Co-ordinator** and they will need to reach agreement on the **Location(s)** at which **Earthing** is to be established on the **Implementing Safety Co-ordinator's System**.

OC6.5.4.2 The **Implementing Safety Co-ordinator** shall then promptly inform the **Requesting Safety Co-ordinator** for each **Location**, the identity (by means of **HV Apparatus** name and numbering or position, as is applicable) of each point of **Earthing**.

OC6.5.4.3 The **Implementing Safety Coordinator** shall maintain each point of **Earthing** in accordance with the relevant **Local Safety Instructions**.

OC6.5.5 In the event of disagreement

In any case where the **Requesting Safety Co-ordinator** and the **Implementing Safety Co-ordinator** are unable to agree the **Location** of the **Isolation** and (if requested) **Earthing**, it shall be at the closest available points on the infeeds to the **HV Apparatus** on which **Safety From The System** is to be achieved as indicated on the **Ownership Diagram** or, in the case where, by reason of the design of any **HV Apparatus** on which **Safety Precautions** are to be applied, it is not practicable to apply **Safety Precautions** on such **HV Apparatus**, it shall be at the most appropriate point(s) on the **User's Plant** and/or **Apparatus** to achieve **Safety From The System** on the **HV Apparatus** on which **Safety From The System** is to be achieved, as determined by the **TO**.

OC6.5.6 Implementation of **Isolation** and **Earthing**

Once the **Location** of **Isolation** and (if requested) **Earthing** are agreed in accordance with OC6.5.3 and OC6.5.4 above, the following procedure will apply:

(a) the **Implementing Safety Co-ordinator** will ensure the implementation of the **Isolation**;

(b) the **Implementing Safety Co-ordinator** will confirm to the **Requesting Safety Co-ordinator** that the **Isolation** has been established on his **System**;

(c) when the **Implementing Safety Co-ordinator** has confirmed the establishment of **Isolation** in accordance with (b) above, the **Requesting Safety Co-ordinator** shall confirm to the **Implementing Safety Co-ordinator** the establishment of relevant **Isolation** on his **System** and request, if it has been required, the implementation of the **Earthing**;

(d) the **Implementing Safety Co-ordinator** will ensure the implementation of the **Earthing** on his **System**; and

(e) the **Implementing Safety Co-ordinator** will confirm to the **Requesting Safety Co-ordinator** that **Earthing** has been established on his **System**.

OC6.5.7 Recording of **Safety Precautions**

OC6.5.7.1 Following confirmation by the **Implementing Safety Co-ordinator** to the **Requesting Safety Co-ordinator** that all of the agreed **Safety Precautions** have been established on or relating to the **System** of the **Implementing Safety Co-ordinator**, the **Implementing Safety Co-ordinator** will record the details of the **HV Apparatus** on which he has been told that **Safety From The System** is required and the **Safety Precautions** established on or relating to the **System** of the **Implementing Safety Co-ordinator** onto parts 1.1 and 1.2 of his **RISSP-B**. Where **Earthing** was not requested (either because **Earthing** was possible but was not required or because **Earthing** was not possible), part 1.2(b) of the **RISSP-B** will be completed with the words "not earthed".

OC6.5.7.2 The **Implementing Safety Co-ordinator** shall then contact the **Requesting Safety Co-ordinator** and confirm, by reading out the details entered on parts 1.1 and 1.2 of **RISSP-B**, to the **Requesting Safety Co-ordinator**, that the **Safety Precautions** have been established.

OC6.5.7.3 The **Requesting Safety Co-ordinator** will then complete parts 1.1 and 1.2 of **RISSP-A** with the precise details received from the **Implementing Safety Co-ordinator** and then read back all those details to the **Implementing Safety Co-ordinator**. If both confirm that the details entered are the same, the **Requesting Safety Co-ordinator** shall issue the **RISSP** identifying number, as stated on the **RISSP-A**, to the **Implementing Safety Co-ordinator** who shall ensure that the number, including its prefix and suffix, is correctly entered on the **RISSP-B**.

OC6.5.7.4 The **Requesting Safety Co-ordinator** and the **Implementing Safety Co-ordinator** shall then respectively complete part 1.3 of **RISSP-A** and **RISSP-B** (which relates to the identity and location of the **Implementing Safety Co-ordinator** and the **Requesting Safety Co-ordinator** respectively). Each **Safety Co-ordinator** shall then complete the issue of the **RISSP** by signing part 1.3 of their respective **RISSPs** and then enter the time and date. Once signed, no alteration to the **RISSP** is permitted; the **RISSP** may only be cancelled.

OC6.5.7.5 The **Requesting Safety Co-ordinator** is then free to authorise work, but not testing. Where testing is to be carried out, the procedure set out below in OC6.5.8 shall be implemented. The procedure to carry out the work is entirely an internal matter for the party which the **Requesting Safety Co-ordinator** is representing.

OC6.5.8 Testing

OC6.5.8.1 Where the **Requesting Safety Co-ordinator** wishes to authorise the carrying out of a test to which the procedures in this OC6.5 apply he may not do so and the test will not take place unless and until the following procedures have been followed:

(a) confirmation is obtained from the **Implementing Safety Co-ordinator** that no person is working on, or testing, or has been authorised to work on, or test, any parts of the **Systems** within the points of **Isolation** identified on the **RISSP** form relating to the test which is proposed to be undertaken (the "original **RISSP**"), and the points of **Isolation** on the **Requesting Safety Co-ordinator's System**, and will not be so authorised until the proposed test has been completed (or cancelled) and the **Requesting Safety Co-ordinator** has notified the **Implementing Safety Co-ordinator** of its completion (or cancellation) and thereby the cancellation of the requirements;

(b) all current **RISSPs** (except for the original **RISSP**) between the **Requesting Safety Co-ordinator** and the **Implementing Safety Co-ordinator** which relate to those parts of the **Systems** between the points of **Isolation** identified on the original **RISSP** and the points of **Isolation** on the **Requesting Safety Co-ordinator's System**, have been cancelled in accordance with the procedures set out in OC6.5.9; and

(c) the **Implementing Safety Co-ordinator** agrees with the **Requesting Safety Co-ordinator** to permit the testing on those parts of the **Systems** between the points of **Isolation** identified in the original **RISSP** and the points of **Isolation** on the **Requesting Safety Co-ordinator's System**.

OC6.5.8.2 The **Requesting Safety Co-ordinator** will inform the **Implementing Safety Co-ordinator** as soon as the test has been completed or cancelled. Where **Earthing** has been removed during a test and has not been restored at the original position upon completion or cancellation of the test, the original **RISSP** shall be cancelled immediately in accordance with the procedure set out in OC6.5.9.

OC6.5.9 Cancellation

OC6.5.9.1 When the **Requesting Safety Co-ordinator** decides (having followed all relevant internal procedures) that **Safety Precautions** are no longer required, he will contact the **Implementing Safety Co-ordinator** and inform him of the **RISSP** identifying number (including the prefix and suffix). The **Requesting Safety Co-ordinator** shall read out to the **Implementing Safety Co-ordinator** the details entered on parts 1.1 and 1.2 of his **RISSP-A**, and the **Implementing Safety Co-ordinator** shall confirm that the details entered on parts 1.1 and 1.2 of the **RISSP-B** are the same. The **Requesting Safety Co-ordinator** shall then confirm to the **Implementing Safety Co-ordinator** that the **Safety Precautions** are no longer required.

OC6.5.9.2 The **Requesting Safety Co-ordinator** and the **Implementing Safety Co-ordinator** shall then respectively complete part 2.1 of **RISSP-A** and **RISSP-B** (which relates to the identity and location of the **Implementing Safety Co-ordinator** and the **Requesting Safety Co-ordinator** respectively). Each **Safety Co-ordinator** shall then complete the cancellation of the **RISSP** procedure by signing part 2.1 of their respective **RISSPs** and then entering the time and date.

OC6.5.9.3 Subject as provided in OC6.5.9.4, the **Implementing Safety Co-ordinator** is then free to arrange the removal of the **Safety Precautions**, the procedure to achieve that being entirely an internal matter for the party which the **Implementing Safety Co-ordinator** is representing. The only situation in which any **Safety Precautions** may be removed without first cancelling the **RISSP** in accordance with OC6.5.9 is when **Earthing** is removed in the situation envisaged in OC6.5.8.2.

OC6.5.9.4 Where **Earthing** has been requested neither **Safety Co-ordinator** shall instruct the removal of any **Isolation** forming part of the **Safety Precautions** until it is confirmed to each by the other that all **Earthing** has been removed.

OC6.5.10 Loss of Integrity of **Safety Precautions**

In any instance when any **Safety Precautions** may be ineffective for any reason the relevant **Safety Co-ordinator** shall without delay inform the other **Safety Co-ordinator(s)** of that being the case and, if requested, of the reasons why.

OC6.6 SAFETY LOG

OC6.6.1 The **TO** and each **User** shall maintain a safety log which shall be a chronological record of all messages relating to safety co-ordination under this OC6 sent and received by the **Safety Co-ordinator(s)**. The safety log must be retained for a period of not less than 3 years.

OC6 - APPENDIX A

[Northern Ireland Electricity] [CONTROL CENTRE/SITE]

RECORD OF INTER-SYSTEM SAFETY PRECAUTIONS (RISSP-A)

(Requesting Safety Co-ordinator's Record)

RISSP NUMBER

PART 1

1.1 HV APPARATUS IDENTIFICATION

Safety Precautions have been established by the **Implementing Safety Co-ordinator** to achieve (in so far as it is possible from that side of the **Connection Point**) **Safety From The System** on the following **HV Apparatus** on the **Requesting Safety Co-ordinator's System**: [State identity - name(s) and, where applicable, identification of the HV circuit(s) up to the **Connection Point**]:

_____

_____

_____

1.2 SAFETY PRECAUTIONS ESTABLISHED

(a) **ISOLATION**

[State the **Location(s)** at which **Isolation** has been established. For each **Location**, identify each point of **Isolation**. For each point of **Isolation**, state the means by which the **Isolation** has been achieved and whether immobilised and Locked, Caution Notice affixed or other safety procedures applied, as appropriate.]

_____

_____

_____

(b) **EARTHING**

[State the **Location(s)** at which **Earthing** has been established. For each **Location**, identify each point of **Earthing**. For each point of **Earthing**, state the means by which the **Earthing** has been achieved and whether immobilised and Locked or other safety procedures applied, as appropriate].

_____

_____

_____

1.3 ISSUE

I have received confirmation from _____ (name of **Implementing Safety Co-ordinator**) at _____ (location) that the **Safety Precautions** identified in paragraph 1.2 have been established and that instructions will not be issued at his location for their removal until this **RISSP** is cancelled.

Signed .....(**Requesting Safety Co-ordinator**)

at ..... (time) on .....(date)

PART 2

2.1 CANCELLATION

I have confirmed to _____ (name of the **Implementing Safety Co-ordinator**) at _____ (location) that the **Safety Precautions** set out in paragraph 1.2 are no longer required and accordingly the **RISSP** is cancelled.

Signed .....(**Requesting Safety Co-ordinator**)

at .....(time) on .....(Date)

OC6 - APPENDIX B

[Northern Ireland Electricity] [CONTROL CENTRE/SITE]

RECORD OF INTER-SYSTEM SAFETY PRECAUTIONS (RISSP-B)

(Implementing Safety Co-ordinator's Record)

RISSP NUMBER

PART 1

1.1 HV APPARATUS IDENTIFICATION

Safety Precautions have been established by the **Implementing Safety Co-ordinator** to achieve (in so far as it is possible from that side of the **Connection Point**) **Safety From The System** on the following **HV Apparatus** on the **Requesting Safety Co-ordinator's System**: [State identity - name(s) and, where applicable, identification of the HV circuit(s) up to the **Connection Point**]:

_____

_____

_____

1.2 SAFETY PRECAUTIONS ESTABLISHED

(a) **ISOLATION**

[State the **Location(s)** at which **Isolation** has been established. For each **Location**, identify each point of **Isolation**. For each point of **Isolation**, state the means by which the **Isolation** has been achieved and whether immobilised and Locked, Caution Notice affixed or other safety procedures applied, as appropriate.]

_____

_____

_____

(b) **EARTHING**

[State the **Location(s)** at which **Earthing** has been established. For each **Location**, identify each point of **Earthing**. For each point of **Earthing**, state the means by which the **Earthing** has been achieved and whether immobilised and Locked or other safety procedures applied, as appropriate].

_____

_____

_____

1.3 ISSUE

I have confirmed to _____ (name of **Requesting Safety Co-ordinator**) at _____ (location) that the **Safety Precautions** identified in paragraph 1.2 have been established and that instructions will not be issued at my location for their removal until this **RISSP** is cancelled.

Signed .....(**Implementing Safety Co-ordinator**)

at ..... (time) on .....(date)

PART 2

2.1 CANCELLATION

I have received confirmation from _____ (name of the **Requesting Safety Co-ordinator**) at _____ (location) that the **Safety Precautions** set out in paragraph 1.2 are no longer required and accordingly the **RISSP** is cancelled.

Signed .....(**Implementing Safety Co-ordinator**)

at .....(time) on .....(Date)

(Note: This form to be a different colour from **RISSP-A**)

OPERATING CODE NO.7

CONTINGENCY PLANNING

OC7.1 INTRODUCTION

OC7.1.1 Operating Code No.7 ("OC7") covers the following:

(a) the implementation of recovery procedures in the event of a **Total Shutdown** or **Partial Shutdown**;

(b) the **Re-Synchronisation** of parts of the **Total System** which have ceased to be **Synchronised** with each other where there is no **Total Shutdown** or **Partial Shutdown**;

(c) the establishment of a communication route and arrangements between senior management representatives of the **TSO** and **Users** involved in, or who may be involved in, actual or potential serious or widespread disruption to the **Total System** or a part of the **Total System** which requires, or may require, urgent managerial response, day or night, but which does not fall within the provisions described in OC7.1.2; and

(d) the procedure to be followed when the **TSO Control Centre** is incapacitated for any reason.

OC7.1.2 It should be noted that, under Article 58 of the **Order**, the **Department** may give directions to the **TSO** and/or any **Generator** and/or any **Supplier** for the purpose of, "mitigating the effects of any civil emergency which may occur" (i.e. for the purposes of planning for dealing with a civil emergency); a civil emergency is defined in the **Order** as "any natural disaster or other emergency which, in the opinion of the **Department**, is or may be likely to disrupt electricity supplies". Under the Energy Act 1976, the Secretary of State has powers to make orders and give directions controlling the production, supply, acquisition or use of electricity, where an Order in Council under Section 3 is in force declaring that there is an actual or imminent emergency affecting electricity supplies. In the event that any such directions are given or orders made under the Energy Act 1976, the provisions of the Grid Code will be suspended insofar as they are inconsistent with them.

OC7.1.3 As explained in the Glossary and Definitions section, references to the term "**User System**" shall be read as referring to the **Distribution System** with respect to provisions applicable to the **DNO** .

OC7.2 OBJECTIVE

The overall objectives of OC7 are:

(a) to achieve, as far as possible, restoration of the **Total System** and to enable **Demand** once again to be satisfied in the shortest possible time, taking into account **Power Station** capabilities, transfers across any **Interconnectors**

and the inter-jurisdictional **Tie Lines** between Northern Ireland and the Republic of Ireland and the operational constraints of the **Total System**;

(b) to achieve the **Re-Synchronisation** of parts of the **Total System** which have ceased to be **Synchronised** with each other;

(c) to ensure that communication routes and arrangements are available to enable senior management representatives of the **TSO** and **Users**, who are authorised to make binding decisions on behalf of the **TSO** or the relevant **User**, as the case may be, to communicate with each other in the circumstances described in OC7.1.1(c); and

(d) to ensure that the **NI System** can continue to operate in the event that the **TSO Control Centre** is incapacitated for any reason.

OC7.3 SCOPE

OC7 applies to the **TSO** and to **Users** which in this OC7 means the **DNO**, **Generators** (in respect of all **Generating Units** connected to the **Transmission System** and in respect of **CDGUs** and **Controllable PPMs** connected to the **Distribution System**) and **Large Demand Customers**.

OC7.4 **BLACK START PROCEDURE**

OC7.4.1 **Total Shutdown**

A "**Total Shutdown**" is the situation existing when all generation has ceased and there is no electricity supply across any **Interconnectors** and the inter-jurisdictional **Tie Lines** between Northern Ireland and the Republic of Ireland and, therefore, the **Total System** has shutdown with the result that it is not possible for the **Total System** to begin to function again without the **TSO's** directions relating to a **Black Start**.

OC7.4.2 **Partial Shutdown**

A "**Partial Shutdown**" is the same as a **Total Shutdown** except that all generation has ceased in a separate part of the **Total System** and there is no electricity supply across any **Interconnectors** and the inter-jurisdictional **Tie Lines** between Northern Ireland and the Republic of Ireland or other parts of the **Total System** to that part of the **Total System** and, therefore, that part of the **Total System** is shutdown with the result that it is not possible for that part of the **Total System** to begin to function again without the **TSO** directions relating to a **Black Start**, which may include re-connecting that part of the **Total System** which is subject to a **Partial Shutdown** to another, operating, part of the **Total System**.

OC7.4.3 During a **Total Shutdown** or **Partial Shutdown** and during the period leading up to such shutdowns and the subsequent recovery, the **Licence Standards** may not be met and the whole or any part of the **Total System** may be operated outside normal voltage and/or **Frequency** standards. Further, **Scheduling** and **Dispatch** in accordance with the SDCs may cease and will not be re-implemented until the **TSO** decides that the **NI System** is once again capable of operating under normal **Scheduling** and **Dispatch** procedures and that they should be re-implemented.

OC7.4.4 Certain **Power Stations** ("**Black Start Stations**") are identified, pursuant to the relevant **Generator's Connection Agreement** as having an ability for at least one of its **CDGUs** to **Start-Up** as soon as possible from **Shutdown** and to energise a part of the **Total System** and to be **Synchronised** to the **NI System** upon instruction from the **TSO**, without an external electrical power supply (i.e. power which has not been generated at the **Power Station**) ("**Black Start Capability**").

OC7.4.5 **Black Start** Situation

In the event of a **Total Shutdown** or **Partial Shutdown**, the **TSO** will inform **Users** (or, in the case of a **Partial Shutdown**, **Users** which in the **TSO's** opinion need to be informed) that a **Total Shutdown** or, as the case may be, a **Partial Shutdown**, exists and that the **TSO** intends to implement a **Black Start**.

OC7.4.6 **Black Start**

OC7.4.6.1 The procedure necessary for a recovery from a **Total Shutdown** or **Partial Shutdown** is known as a **"Black Start"**. The procedure for a **Partial Shutdown** is the same as that for a **Total Shutdown** except that it applies only to a part of the **Total System**. It should be remembered that a **Partial Shutdown** may affect parts of the **Total System** which are not themselves shutdown.

OC7.4.6.2 The complexities and uncertainties of recovery from a **Total Shutdown** or **Partial Shutdown** require that this OC7 is sufficiently flexible to accommodate the full range of **Power Station** and **Total System** characteristics and operational possibilities, and this precludes the setting out of precise chronological sequences. The overall strategy will, in general, include the overlapping phases of establishment of isolated **Power Stations**, together with complementary local **Demand**, termed **"Power Islands"**, step by step integration of these **Power Islands** into larger sub-systems and, eventually, complete re-establishment of the **Total System**.

OC7.4.6.3 The procedure for a **Black Start** will, therefore, be that specified by the **TSO** at the time. **Users** shall (subject to the provisions of OC7.4.6.6) abide by the **TSO's** instructions during a **Black Start** situation, even if they conflict with the general overall strategy outlined in OC7.4.6.2.

OC7.4.6.4 The **TSO's** instructions may (although this list should not be regarded as exhaustive) be to a **Black Start Station** relating to the commencement of generation, to a **Large Demand Customer** with respect to the restoration of **Demand** or to the **DNO** with respect to cooperating in the restoration of **Demand** on the **Distribution System**, and to a **Generating Plant** relating to preparation for commencement of generation once an external power supply has been made available to it and, in each case, may include switching instructions. Instructions to **Black Start Stations** will be in the format required for instructions to **CDGUs** under the SDCs.

OC7.4.6.5 (a) The **TSO** instructions relating to a **Black Start** will be given in the same format and will be notified to **Generators** by the same means as set out in SDC2 for normal **Dispatch Instructions**. Accordingly, the **TSO** will, as part of a **Black Start**, instruct a **Generator** with a **Black Start Station** to **Start-Up** a particular **CDGU** following which the **Generator** must **Start-Up**

that **Generating Unit** as soon as possible and confirm to the **TSO** when this has been achieved. Following such confirmation, the **TSO** will endeavour to stabilise that **CDGU** by instructing **Large Demand Customers** to establish appropriate **Demand** on the **Transmission System** and/or the **DNO** to coordinate where possible the establishment of appropriate Demand on the **Distribution System** , following which the **TSO** may instruct the **Start-Up** and **Synchronisation** of the remaining available **CDGUs** at that **Black Start Station** and their loading with appropriate **Demand** to create a **Power Island**.

(b) If during this **Demand** restoration process any **CDGU** cannot, because of the **Demand** being experienced, either keep within its **Technical Parameters** or operate outside its **Technical Parameters** without giving rise to the circumstances specified in OC7.4.6.6, the **Generator** shall inform the **TSO** and the **TSO** will, where possible, either instruct **Large Demand Customers** to alter **Demand** and/or the **DNO** to cooperate with altering **Demand**, or will re-configure the **NI System** in order to alleviate the problem being experienced by the **Generator**.

OC7.4.6.6 A **Generator** must always comply with the **TSO's** instructions relating to a **Black Start** where these are within the **Technical Parameters** of the relevant **CDGU**. In the case of a **Generator** with **PPA CDGUs**, the provisions of GC13.4 shall be imported into (and, for the purposes of the **TSO Licence**, regarded as forming part of) this OC7.4.6.6.

OC7.4.6.7 The conclusion of the **Black Start** and the time of the return to normal operation of the **Total System** will be determined by the **TSO** which shall inform **Users** (or, where there has been a **Partial Shutdown**, **Users** in the area subject to **Partial Shutdown** and other **Users** which in the **TSO**'s reasonable opinion need to be informed) that the **Black Start** situation no longer exists and that normal operation of the **Total System** has begun. The **TSO** will inform all **Generators** with **Generating Plant** when normal **Scheduling** and **Dispatch** in accordance with the SDCs has been re-implemented.

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OC7.4.6.8

(a) **Generators** shall at the request of the **TSO**, provide a quotation for providing **Black Start** capability. The **TSO** may make such a request if it considers system security to be at risk due to a lack of **Black Start** capability in its control area.

(b) **Generating Units** with **Black Start** capability shall be capable of starting from shutdown without any external electrical supply within a time frame specified by the **TSO**.

(c) A **Generating Unit** with **Black Start** capability shall be able to synchronise within the frequency limits specified in CC8.8.6.1 and voltage limits specified in CC5.4.

(d) A **Generating Unit** with **Black Start** capability shall be capable of automatically regulating voltage dips in voltage caused by connection of load.

(e) A **Generating Unit** with **Black Start** capability shall:

- be capable of regulating load connections in block load,
- be capable of operating in **LFSM-O** and **LFSM-U**, as specified in CC8.8.7,
- control frequency in case of overfrequency and underfrequency within the whole **Active Power** output range between **Minimum Generation** and **Registered Capacity** as well as at house load level,
- be capable of parallel operation of a few **Generating Units** within one island, and
- control voltage automatically during the system restoration phase.

OC7.4.6.9

(a) The **TSO** may ask for black start capability from an **HVDC System Owner** if the **HVDC System** can acquire the capability. Black start capability shall be in accordance with the requirements of the relevant **Connection Agreement.**

(b) A **HVDC System** with black start capability shall be able, in case one converter station is energised, to energise the busbar of the AC-substation to which another converter station is connected, within a timeframe after shut down of the **HVDC System** determined by the **TSOs**. The **HVDC System** shall be able to synchronise within the frequency limits set out in CC.S3.1.2.1and within the voltage limits in CC.S3.1.8.1. Wider frequency and voltage ranges can be specified by the **TSO** in the relevant **Connection Agreement** where needed in order to restore system security.

(c) The **TSO** and the **HVDC System Owner** shall agree on the capacity and availability of the black start capability and the operational procedure.

OC7.5 **RE-SYNCHRONISATION** OF **DE-SYNCHRONISED** ISLANDS

OC7.5.1 Where parts of the **Total System** have ceased to be **Synchronised** with each other but there is no **Total Shutdown** or **Partial Shutdown**, the **TSO** will instruct relevant **Users** to regulate generation or **Demand**, as the case may be, to enable the **De-Synchronised** islands to be **Re-Synchronised** and the **TSO** will inform those **Users** when **Re-Synchronisation** has taken place.

OC7.5.2 During a period in which the circumstances described in OC7.5.1 apply, the **Licence Standards** may not be met and the whole or any part of the **Total System** may be operated outside normal voltage and/or **Frequency** standards. Further, **Scheduling** and

Dispatch in accordance with the principles in the SDCs for determining which **CDGUs** will be **Scheduled** and **Dispatched** may cease and will not be re-implemented until the **TSO** decides that normal **Scheduling** and **Dispatch** procedures can be re-implemented. The **TSO** will inform all **Generators** with **Generating Plant** when normal **Scheduling** and **Dispatch** has been re-implemented.

OC7.5.3 In circumstances where the part of the **NI System** to which **Generating Units** are connected has become detached from the rest of the **NI System** and there is no **Synchronising** system available to facilitate **Re-synchronisation** with the rest of the **NI System**, then the **Generator** shall, under the **TSO's** instructions, ensure that the **Generating Units** are **Disconnected** and held ready for **Re-synchronisation** upon the **TSO's** subsequent instructions.

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OC7.5.4 With regard to quick re-synchronisation capability:

(a) in case of disconnection of the **Generating Unit** from the network, the **Generating Unit** shall be capable of quick re-synchronisation in line with the protection strategy agreed between the **TSO** in co-ordination with the **DNO** and **Generator**;

(b) a **Generating Unit** with a minimum re-synchronisation time greater than 15 minutes after its disconnection from any external power supply must be designed to trip house load from any operating point on its **Reactive Power** capability. In this case, the identification of house load operation must not be based solely on the **TSO's** switchgear position signals;

(c) **Generating Units** shall be capable of continuing operation for a minimum of 4 hours following tripping to house load, irrespective of any auxiliary connection to the external network.

OC7.6 **JOINT SYSTEM INCIDENT** PROCEDURE

OC7.6.1 A "**Joint System Incident**" is an **Event**, wherever occurring on the **Total System** which, in the opinion of the **TSO** or a **User**, has had or may have a serious and/or widespread effect, in the case of an **Event** on a **User(s) System(s)**, on the **Transmission System** and, in the case of an **Event** on the **Transmission System**, on a **User(s) System(s).** Where an **Event** on a **User(s) System(s)** has had or can have no material effect on the **Transmission System**, then such an **Event** cannot fall within the ambit of OC7 and accordingly OC7 shall not apply to it.

OC7.6.2 Each **User** must provide in writing to the **TSO** and the **TSO** must provide in writing to each **User**, a telephone number or numbers at which, or through which, senior management representatives nominated for this purpose and who are authorised fully to

make binding decisions on behalf of the **TSO** or the relevant **User**, as the case may be, can be contacted day or night for the purposes of this OC7.6. The lists of telephone numbers will be provided in accordance with the timing requirements of the **User's Connection Agreement**, **Transmission Use of System Agreement** or **Grid Code Compliance Agreement** prior to the time that a **User** connects to the **NI System** and must be up-dated (in writing) as often as the information contained in them changes.

OC7.6.3 Following notification of an **Event** under OC5, the **TSO** or a **User**, as the case may be, will, if it considers necessary, telephone the **User** or the **TSO**, as the case may be, on the telephone number referred to in OC7.6.2, to obtain such additional information as it may reasonably require.

OC7.6.4 Following notification of an **Event** under OC5, and/or the receipt of any additional information requested pursuant to OC7.6.3, the **TSO** or a **User**, as the case may be, will determine whether or not the **Event** is a **Joint System Incident** and, if so, the **TSO** and/or the **User** may set up an **Incident Room** in order to avoid overloading the existing **TSO's** or that **User's**, as the case may be, operational/control arrangements.

OC7.6.5 Where the **TSO** has determined that an **Event** is or will be a **Joint System Incident**, the **TSO** shall, as soon as possible, notify all relevant **Users** that a **Joint System Incident** has occurred or is expected to occur and, if appropriate, that it has established an **Incident Room** and the telephone number(s) of its **Incident Room** if different from those already supplied pursuant to OC7.6.2.

OC7.6.6 If a **User** establishes an **Incident Room** it shall, as soon as possible, notify the **TSO** that it has been established and the telephone number(s) of the **Incident Room** if different from those already supplied pursuant to OC7.6.2.

OC7.6.7 The **TSO Incident Room** and/or the **User's Incident Room** will not assume any responsibility for the operation of the **Transmission System** or **User's System**, as the case may be, but will be the focal point in the **TSO** or the **User**, as the case may be, for the communication and dissemination of information between the **TSO** and the senior management representatives of **User(s)** or between the **User** and the senior management representatives of the **TSO**, as the case may be, relating to the **Joint System Incident**. During a **Joint System Incident**, the normal communication channels for operational/control communication between the **TSO** and **Users** will continue to be used as normal.

OC7.6.8 All communications between the senior management representatives of the relevant parties with regard to the **TSO's** role in the **Joint System Incident** shall be made via the **TSO's Incident Room** if one has been established.

OC7.6.9 All communications between the senior management representatives of the **TSO** and a **User** with regard to that **User's** role in the **Joint System Incident** shall be made via that **User's Incident Room** if one has been established.

OC7.6.10 The **TSO** will decide when conditions no longer justify the use of its **Incident Room** and will inform all relevant **Users** of this decision.

OC7.6.11 Each **User** which has established an **Incident Room** will decide when conditions no longer justify the use of that **Incident Room** and will inform the **TSO** of this decision.

OC7.7 Loss of the **TSO Control Centre**

OC7.7.1 If the **Event** referred to in OC7.6 is the temporary loss of the **TSO Control Centre**, then the provisions of OC7.6 shall not apply but instead the following provisions shall apply.

OC7.7.2 Each **Generator** shall continue to operate its **CDGUs** in accordance with the last **Dispatch Instructions** to have been issued by the **TSO** but shall use all reasonable endeavours to maintain **NI System Frequency** at the target **Frequency** of 50Hz plus or minus 0.05Hz by monitoring **Frequency** and increasing/decreasing the output of its **CDGUs** as necessary until such time as new **Dispatch Instructions** are received from the **TSO**.

OC7.7.3 The **TSO** will have arrangements in place whereby, if the circumstances described in OC7.7.1 arise, the **TSO** may transfer the functions of the **TSO Control Centre** to an alternative control facility whereupon the **TSO** will re-commence the issue of **Dispatch Instructions** in accordance with the SDCs and inform **Users** of the communications details for the new location. The **TSO** will inform all **Generators** with **CDGUs** as and when **Scheduling** and/or **Dispatch** in accordance with the principles in the SDCs for determining which **CDGUs** will be **Scheduled** and **Dispatched** can be reimplemented.

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OC7.8 System Restoration

OC7.8.1 The **TSO** shall specify the conditions under which a **Generating Unit** is capable of reconnecting to the **NI System** after an incidental disconnection caused by an **Event**.

OC7.8.2 Installation of automatic reconnection systems shall be subject to both prior authorisation and reconnection conditions specified by the **TSO**.

OPERATING CODE NO. 8

OPERATIONAL EVENT REPORTING AND INFORMATION SUPPLY

OC8.1 INTRODUCTION

OC8 sets out the requirements for reporting in writing and, where appropriate, more fully those **Significant Incidents** which initially were reported to the **TSO** or a **Generator** orally under OC5 and the requirements for the provision to the **TSO** of information to enable it to prepare analyses and assessments of policies in the **Grid Code**. As explained in the Glossary section, references to the term "**User System**" includes references to the "**Distribution System**" where relevant.

OC8.2 OBJECTIVE

The objective of OC8 is to facilitate:

(i) the provision of more detailed information in writing of **Significant Incidents**;

(ii) the provision of information aimed at enabling the **Transmission System** to be operated in accordance with the **Grid Code**; and

(iii) the assessment of the effectiveness of policies adopted in accordance with the **Grid Code**.

OC8.3 SCOPE

OC8 applies to the **TSO** and to **Users**, which in this OC8 means the **DNO**, **Generators** (in respect of all **Generating Units** connected to the **Transmission System**), **Interconnector Owners** and **Large Demand Customers**.

OC8.4 PROCEDURE

OC8.4.1 Written Reports of **Events**

OC8.4.1.1 In the case of a **Significant Incident** which has been notified as an **Event** by a **User** to the **TSO** pursuant to OC5, the **User** shall provide a written report to the **TSO** in accordance with this OC8.

OC8.4.1.2 In the case of a **Significant Incident** which has been notified as an **Event** by the **TSO** to the **DNO**, a **Generator** or an **Interconnector Owner** pursuant to OC5, the **TSO** shall provide a written report to the **DNO**, **Generator** or **Interconnector Owner** in accordance with this OC8.

OC8.4.1.3 Form of Report

(a) A report under OC8.4.1 will be in writing and, in the case of a report by a **User**, shall be addressed to the **TSO** and marked for the attention of the System Operations Manager and, in the case of a report by the **TSO** to the **DNO**, a **Generator** or **Interconnector Owner** shall be addressed to the **DNO**, **Generator** or **Interconnector Owner** and marked for the attention of the person notified to the **TSO** by the **DNO**, **Generator** or **Interconnector Owner** in writing from time to time for this purpose (or in the absence of notification, to the Company Secretary).

(b) In either case, the report will contain a written confirmation of the oral notification given under OC5 together with such further information which has become known relating to the **Significant Incident** since the oral notification under OC5. The report shall, as a minimum, contain those matters specified in Appendix 1 to this OC8. Appendix 1 is not intended to be exhaustive.

(c) Whilst the report need not state the cause of the **Significant Incident**, it shall contain an indication as to whether the cause has been ascertained and whether it is thought likely by the party issuing the report that the matter which caused the **Significant Incident** will recur. The recipient may raise questions to clarify the report.

OC8.4.1.4 Timing

(a) Where a **User** is required to produce a written report under OC8.4.1, it shall do so as soon as possible and in any event within two **Business Days** after notification by the **TSO** under OC5.4.6.1. In the event that the **User** is unable to provide a full report within this timescale, it shall provide to the **TSO** a preliminary report containing such information as is then known to the **User** not later than two **Business Days** after the notification by the **TSO** under OC5.4.6.1 and shall provide such up-dates thereafter as the **TSO** may reasonably require. A full report shall then be provided to the **TSO** as soon as the **User** is able.

(b) Where the **TSO** is required to produce a written report under OC8.4.1, it shall do so as soon as possible and in any event within two **Business Days** after notification by the **User** under OC5.4.6.2. In the event that the **TSO** is unable to provide a full report within this timescale, it shall provide to the **User** a preliminary report containing such information as is then known to the **TSO** not later than two **Business Days** after the notification by the **User** under OC5.4.6.2 and shall provide such up-dates thereafter as the **User** may reasonably require. A full report shall then be provided to the **User** as soon as the **TSO** is able.

OC8.4.1.5 The **TSO** and **Users** shall each nominate responsible officers in order to establish communication channels to enable timely and adequate flows of information between the **TSO** and **Users** to be maintained and thus to ensure the effectiveness of this OC8.

OC8.4.1.6 Provision of Reports to Other **Generators**

Whenever a **User** has provided a written report in respect of a **Significant Incident** to the **TSO** in accordance with OC8.4.1.1, the **TSO** shall consider whether the **System** of another **User** (or **Users**) has been or is likely to have been materially affected. If the **TSO** considers that another **User System** (or **Systems**) has been or is likely to have been so affected, the **TSO** shall notify the **User** which prepared the report accordingly and the **User** shall supply an extract from its report, containing only the technical information (and no information of commercial value) which was set out in the report, to the other **Users** identified by the **TSO**.

OC8.4.1.7 Provision of Reports by the **DNO** to users connected to the **Distribution System**

Whenever the **TSO** has provided a written report in respect of a **Significant Incident** to the **DNO** in accordance with OC8.4.1.2, the **DNO** shall consider whether the system of a user connected to the **Distribution System** has been or is likely to have been materially affected. If the **DNO** considers that the system of a user connected to the **Distribution System** has been or is likely to have been so affected, the **DNO** may supply the user with an extract from the **TSO**'s report, containing only the technical information (and no information of commercial value) which was set out in the report.

OC8.4.2 The Provision of Information to the **TSO**

OC8.4.2.1 The **TSO** may require (to the extent not supplied under any other provision of the **Grid Code**) information of a technical (but not of a commercial) nature to be supplied by **Users** under this OC8.4.2 to enable it to undertake the following:

(i) the preparation of **Transmission System** and/or **Total System** appraisal statements;

(ii) surveys of **Transmission System** and/or **Total System** conditions;

(iii) analysis and validation of policies in the **Grid Code**; and

(iv) analyses of the **TSO** equipment performance;

insofar as such information is necessary to enable the **TSO** to fulfil its obligations relating to the operation of the **Transmission System**.

OC8.4.2.2 When the **TSO** requires information from a **User** or **Users** for the purposes set out in OC8.4.2.1 it shall send a written request to the **User** or **Users** setting out the information it reasonably requires, the reasons (in such detail as the **TSO** reasonably considers to be appropriate) why such information is required and the time by which it reasonably requires a response. Normally this will be within two **Business Days**.

OC8.4.2.3 The **User** or **Users** will use all reasonable endeavours to respond in writing within the time stated. However, a **User** will not be obliged to supply the information requested by the **TSO** to the extent that it considers that it is not reasonable to comply with the request. In such circumstances, the **User** must, in its written response to the **TSO**, state such reason in sufficient detail to enable the **TSO** to consider whether the **User** is acting reasonably in refusing to supply the information.

OC8.4.2.4 Although the request will set out the information required, an indication of the sort of information that may be requested is set out in Appendix 2 to this OC8. The list contained in Appendix 2 shall not limit the information which may be requested, but is merely given by way of example.

OC8.4.2.5 The information supplied to the **TSO** pursuant to this OC8.4.2 will be used by the **TSO** only for the purposes set out in OC8.4.2.1.

OC8.5 STATUTORY EVENT REPORTING PROCEDURE

Nothing in this OC8 shall be construed as relieving **Users** from their duty to report events in accordance with the Electricity Supply Regulations (N.I.) in so far as they apply to **Users.**

OC8 - APPENDIX 1

MATTERS, IF APPLICABLE TO THE SIGNIFICANT INCIDENT, TO BE INCLUDED IN A WRITTEN REPORT GIVEN IN ACCORDANCE WITH OC8.4.1

1. Time and date of **Significant Incident**.
2. Location.
3. **Plant** and/or **Apparatus** involved.
4. Brief description of **Significant Incident**.
5. Estimated time and date of return to service.
6. Supplies/generation interrupted and duration of interruption.
7. **Generating Unit/PPM** - **Frequency** response achieved.
8. **Generating Unit/PPM** - **Mvar** performance achieved.
9. Any other information which either the **TSO** or the **Generator** reasonably considers that the other might reasonably require in relation to the **Significant Incident**.

OC8 - APPENDIX 2

INDICATION OF THE SORT OF INFORMATION THAT MAY BE REQUESTED UNDER OC8.4.2

1. **FREQUENCY**
   Time and date
   Location
   Recorded **Frequency**
   Set/station
   Frequency Response Parameters (List to be included)
   Reasons for difference between **Technical Parameters** and achieved performance

2. VOLTAGE
   Time and date
   Location
   Target volts
   Actual volts
   Reason if different

3. **MW/Mvar** CAPABILITY
   Time and date
   Location
   Set identification
   Generating Unit/PPM performance parameters (List to be included)
   Reasons for difference between **Technical Parameters** and achieved performance

4. TRANSFERS AT **CONNECTION POINT**
   Time and date
   Location
   Direction and magnitude of **MW** and **Mvar** flows

5. FAULT LEVELS AT **CONNECTION POINT**
   Time and date
   Location
   Fault infeed

   The necessary data to enable (single phase to earth and three phase symmetrical) fault levels to be calculated

6. **PROTECTION** PERFORMANCE UNDER FAULT CONDITIONS

   Time and date
   Location
   Differences between anticipated and actual performance.

OPERATING CODE NO. 9

NUMBERING AND NOMENCLATURE OF PLANT AND APPARATUS AT CONNECTION SITES

OC9.1 INTRODUCTION

OC9.1.1 This **Operating Code** sets out the responsibilities and procedures for determining and notifying the **TSO** and **Users** of the numbering and/or nomenclature of the other's **Plant** and/or **Apparatus** at **Connection Sites**. For clarification, nomenclature shall include the selection of **Substation** names.

OC9.1.2 The numbering and/or nomenclature of **Plant** and/or **Apparatus** is to be included in an **Ownership Diagram** prepared for each **Connection Site** as provided in the CC.

OC9.2 OBJECTIVES

The prime objective embodied in this OC9 is to ensure that, at any **Connection Site** (including in respect to **Bulk Supply Points**), every item of **Plant** and/or **Apparatus** has numbering and/or nomenclature that, so far as possible, has been mutually agreed and that has been notified between the **TSO** and **Users** to ensure, so far as is reasonably practicable, the safe and effective operation of the **Total System** by minimising the risk of error in identifying **Plant** and/or **Apparatus**.

OC9.3 SCOPE

OC9 applies to the **TSO** and to **Users** which, in this OC9, means **Generators** (in respect only of **Generating Units** connected to the **Transmission System**), **Interconnector Owners**, **Large Demand Customers** and the **DNO**.

OC9.4 PROCEDURE

OC9.4.1 General Requirement

OC9.4.1.1 **Plant** and/or **Apparatus** of a **User** at a **Connection Site** shall have numbering and/or nomenclature which cannot be confused with that of the **TO** at that **Connection Site**.

OC9.4.1.2 In furtherance of the general requirement set out in OC9.4.1.1 above, no **User** will install, or permit the installation of, any **Plant** and/or **Apparatus** which has numbering and/or nomenclature which could be confused with that of the **TO** which is either already on that **Connection Site** or which the **TSO** has notified the **User** will be installed on that **Connection Site**. The procedure for determining the applicable numbering and nomenclature for new and existing **Connection Sites** is set out in OC9.4.2.1 and OC9.4.2.2 respectively.

OC9.4.2 **Plant** and **Apparatus**

OC9.4.2.1 New **Connection Sites**

When a **User** intends to install or the **TSO** intends to ensure the installation of **Plant** and/or **Apparatus** as part of the construction and commissioning of a new **Connection Site**, the proposed numbering and/or nomenclature shall be notified as part of the production of the **Ownership Diagram** in accordance with the provisions of the CC. The principles to apply to determine whether that proposed numbering and/or nomenclature is acceptable will be those set out in this OC9 (including, for the avoidance of doubt, the provisions of OC9.4.2.2(e)).

OC9.4.2.2 Existing **Connection Sites**

(a) When a **User** intends to install or the **TSO** intends to ensure the installation of **Plant** and/or **Apparatus** at an existing **Connection Site** the proposed numbering and/or nomenclature to be adopted for the **Plant** and/or **Apparatus** shall be notified to the other.

(b) The notification shall be made in writing to the other and will consist of a revised **Ownership Diagram** incorporating the proposed new **Plant** and/or **Apparatus** to be installed and its proposed numbering and/or nomenclature.

(c) The notification shall be made at least six months (or such shorter period as the **TSO** or the **User**, as the case may be, may agree) prior to the proposed installation of the **Plant** and/or **Apparatus.**

(d) The recipient of the notification shall respond in writing within one month of the receipt of the notification confirming receipt and confirming whether the proposed numbering and/or nomenclature is acceptable or, if not, what would be acceptable.

(e) In the event that agreement cannot be reached between the **TSO** and the **User**, the **TSO** acting reasonably, shall have the right to determine the numbering and nomenclature to be applied at the **Connection Site**.

OC9.4.3 Changes to Existing **Plant** and **Apparatus**

Where there needs to be a change of the existing numbering or nomenclature of any of the **TO's Plant** and/or **Apparatus** at a **Connection Site** or a **User** needs to change the existing numbering or nomenclature of any of its **Plant** and/or **Apparatus** at a **Connection Site**, the provisions of OC9.4.2.2 shall apply, with any amendments necessary to reflect that only a change is being made.

OC9.4.4 Clear Labelling

The **TSO** shall be responsible for ensuring the provision, erection and maintenance of clear and unambiguous labelling showing the numbering and nomenclature of the **TO's Plant** and/or **Apparatus** at **Connection Sites** and each **User** shall be responsible for the provision, erection and maintenance of clear and unambiguous labelling showing

the numbering and nomenclature of its **User's Plant** and/or **Apparatus** at **Connection Sites**.

OPERATING CODE NO. 10

SYSTEM TESTS

OC10.1 INTRODUCTION

OC10.1.1 Operating Code No. 10 ("OC10") relates to the following types of test (all of which are referred to as **"System Tests"**):

(a) tests to be carried out by a **User** or the **TSO** which involve or may involve simulating conditions or the controlled application of irregular, unusual or extreme conditions on the **User's System** or the **Transmission System** (as the case may be) which may have a material effect on the **Total System**, beyond the **User's System** or the **Transmission System** (as the case may be); and

(b) **Commissioning/Acceptance Tests** of **Plant** and **Apparatus** to be carried out by a **User** or the **TSO** which involve or may involve the application of irregular, unusual or extreme conditions and which may have a material effect on the **Total System**, beyond the **User's System** or the **Transmission System** (as the case may be).

OC10.1.2 OC10 only deals with the responsibilities and procedures for arranging and carrying out tests which have (or may have) a material effect on the **Systems** of both the **TSO** and **Users**. Accordingly, where a test proposed by a **User** will not have a material effect on the **Transmission System** or where a test proposed by the **TSO** will not have a material effect on a **User System**, such test will not fall within this OC10 and OC10 shall not apply to it.

OC10.1.3 OC10 does not cover **Commissioning/Acceptance Tests** of a **User's Equipment** which will have no material effect on the **Total System** beyond the **User's System**; such tests will be undertaken solely pursuant to CC10. Neither does it cover the type of tests which are dealt with in OC11, "**Monitoring, Testing and Investigation**".

OC10.1.4 As explained in the Glossary and Definitions section, references to the term "**User System**" shall be read as referring to the **Distribution System** with respect to provisions applicable to the **DNO**.

OC10.2 OBJECTIVE

The overall objectives of OC10 are:

(a) to ensure, so far as possible, that tests proposed to be carried out either by:

(i) a **User** which may have a material effect on the **Total System** or any part of the **Total System** (in addition to that **User's System**) including the **Transmission System**; or

(ii) the **TSO** which may have a material effect on the **Total System** or any part of the **Total System** (in addition to the **Transmission System**);

do not threaten the safety of personnel or threaten to damage **Plant** and/or **Apparatus** and cause minimum detriment to the **TSO** and **Users**; and

(b) to set out the procedures to be followed for establishing and where appropriate reporting such tests and to set out guidelines for which tests need to be notified to the **TSO** prior to the test being carried out.

OC10.3 SCOPE

OC10 applies to the **TSO** and to **Users** which, in this OC10 means:

(a) with the exception only of OC10.5**, Generators** (in respect only of all **Generating Units** connected to the **Transmission System**), **Interconnector Owners**, **Large Demand Customers** and **Aggregators**; and

(b) with the exception of OC10.4.1 only, the **DNO**.

OC10.4. PROCEDURE

OC10.4.1 **Proposal Notice**

OC10.4.1.1 The level of **Demand** on the **NI System** varies substantially according to the time of day and time of year and, consequently, certain **System Tests** which may have a significant impact on the **NI System** (for example, tests of the **Full Load** capability of a **Generating Unit** over a period of several hours) can only be undertaken at certain times of the day and year. Other **System Tests**, for example, those involving substantial **Mvar** generation or valve tests, may also be subject to timing constraints. It therefore follows that notice of **System Tests** should be given as far in advance of the date on which they are proposed to be carried out as reasonably practicable.

OC10.4.1.2 Where a **User** wishes to carry out a **System Test** it shall submit a notice (a "**Proposal Notice**") to the **TSO** as far in advance of the date it would like to undertake the proposed **System Test** as is reasonably practicable. In the event that a **User** submits to the **TSO** a programme for proposed **Commissioning/Acceptance Testing** pursuant to CC10.1.4 which the **TSO** considers may involve the application of irregular, unusual or extreme conditions and which may have a material effect on the **Total System**, beyond the **User's System**, such programme shall be treated as a **Proposal Notice** for the purposes of this OC10**.** Notwithstanding the other requirements in this OC10.4.1.2, in the case of **Significant Tests**, **Users** shall submit proposals to the **TSO** at least five **Business Days** before the test start date or, with the agreement of the **TSO**, no later than 09:00 two **Business Days** before the test start date.

OC10.4.1.3 The **Proposal Notice** shall be in writing, or in such other form as the **TSO** and the relevant **User** may otherwise agree (such agreement not to be unreasonably withheld), and shall contain details of the nature and purpose of the proposed **System Test** and shall indicate the identity and situation of the **Plant** and/or **Apparatus** involved. In the case of a **System Test** (other than an on-**Load** valve test) involving a **CDGU**, the **User** shall state in the **Proposal Notice** the level of **Availability** and the values for **Technical**

Parameters which will be declared for the **CDGU** for the period of the test in accordance with SDC1 and shall also include details of the **Dispatch Instructions** which the **User** wishes the **TSO** to issue to it for the purposes of the test which may be outside the **Availability** and **Technical Parameters** to be so declared.

OC10.4.1.4 If the **TSO** is reasonably of the view that the information set out in the **Proposal Notice** is insufficient, it will contact the person who submitted the **Proposal Notice** (the **"Test Proposer"**) as soon as reasonably practicable, with a written request for further information. The **TSO** shall not be required to do anything under this OC10 until it is satisfied with the details supplied in the **Proposal Notice** or pursuant to a request for further information.

OC10.4.1.5 If the **TSO** wishes to undertake a **System Test**, the **TSO** shall be deemed to have received a **Proposal Notice** for that **System Test**.

OC10.4.1.6 The **TSO** will use all reasonable endeavours to accommodate requests for **System Tests** but has absolute discretion as to the timing of such tests (which discretion will be exercised reasonably consistently with previous practice) to ensure the proper operation of the **Transmission System** and so as to ensure that the **Licence Standards** are not breached.

OC10.4.1.7 Without prejudice to the general description of the types of **System Tests** which have to be dealt with under this OC10, as set out in OC10.1.1 above, each **Generator** must submit a **Proposal Notice** to the **TSO** if it proposes to carry out any of the following tests, each of which is therefore a **System Test**:

(a) Var limiter tests;

(b) main steam valve tests; and

(c) **Load** rejection tests.

OC10.4.2 Establishment of **Test Panel**

OC10.4.2.1 Using the information supplied (or deemed to have been supplied) to it under OC10.4.1, the **TSO** will determine, in its reasonable estimation, which **Users**, other than the **Test Proposer**, may be materially affected by the proposed **System Test** and will notify such **Users** accordingly.

OC10.4.2.2 The **TSO** will then determine, in its reasonable opinion, whether a **Test Panel** is required taking into account the degree of severity of its possible effect on the **Systems** of the **TSO** and **Users**. A **Test Panel** will not generally be needed for a routine test and, since the majority of **System Tests** are routine, the establishment of a **Test Panel** will be the exception rather than the rule. If the **TSO**, in its reasonable discretion, decides that a **Test Panel** is necessary, the provisions set out in the **Appendix** to this OC10 will apply.

OC10.4.3 The **TSO** Supervision

OC10.4.3.1 If the **TSO** determines that no **Test Panel** is required, it will determine, acting reasonably, whether and, where appropriate, when the proposed **System Test** can take place and it will consider:

(a) the details of the nature, technical reasons for and timing of the proposed **System Test** and other matters set out in the **Proposal Notice** (together with any further information requested by the **TSO** under OC10.4.1.4);

(b) the economic, operational and risk implications of the proposed **System Test**; and

(c) the possibility of combining the proposed **System Test** with any other tests and with **Plant** and/or **Apparatus Outages** which arise pursuant to the **Operational Planning** requirements of the **TSO** and **Users**.

If the **TSO** determines that the proposed **System Test** cannot take place, it will, insofar as it is able to do so without breaching any obligations regarding confidentiality contained either in the **TSO Licence** or in any agreement, notify the **Test Proposer** of the reasons for such decision in such degree of detail as the **TSO** considers reasonable in the circumstances.

OC10.4.3.2 **Users** identified by the **TSO** under OC10.4.2.1 (and the **Test Proposer**) shall be obliged to supply the **TSO**, upon written request, with such details as the **TSO** reasonably requires in order to consider the proposed **System Test**.

OC10.4.3.3 The **TSO** will consult with each **User** identified by it under OC10.4.2.1 regarding the proposed **System Test** including, in particular, the effects which such test is likely to have on such **User's System**.

OC10.4.4 The **TSO Test Programme**

OC10.4.4.1 As soon as practicable the **TSO** shall, if it approves of the proposed **System Test** taking place (of which it will notify the **Test Proposer**), taking into account the factors specified in OC10.4.3.1, prepare a programme (the "**Test Programme**"), in such detail as the **TSO** considers, in its reasonable opinion, to be appropriate for the test, which will include:

(a) the procedure to be adopted for carrying out the **System Test**, including the switching sequence and proposed timings of the switching sequence;

(b) the manner in which the **System Test** is to be monitored;

(c) a list of those members of staff to be involved in carrying out the **System Test**, including those who will be responsible for site safety; and

(d) such other matters as the **TSO** considers appropriate including (without limitation) matters suggested by **Users** identified by the **TSO** pursuant to OC10.4.2.1.

OC10.4.4.2 The **TSO**, the **Test Proposer** and each **User** identified by the **TSO** under OC10.4.2.1 will determine by agreement the basis on which the costs of the **System Test** (including unanticipated costs, for example, costs arising from modifications etc) shall be borne as between the affected parties (the general principle being that the **Test Proposer** will bear such costs). If agreement cannot be reached (each party having acted in good faith), the **System Test** will be cancelled.

OC10.4.4.3 Without prejudice to the provisions of OC10.4.1, the **TSO** shall be entitled to require the proposed **System Test** to be modified, delayed or cancelled if, in its reasonable opinion, it considers that such test would impose unacceptable effects on the **Transmission System** or any **User System**.

OC10.4.4.4 If the **TSO** requires the proposed **System Test** to be cancelled or if it requires such test to be delayed or modified but the **Test Proposer** considers that such delay or modification is not possible, the proposed **System Test** shall not take place.

OC10.4.4.5 The **Test Programme** will, subject to OC10.4.4.6, bind the **Test Proposer** to act in accordance with the provisions of the **Test Programme** in relation to the proposed **System Test**.

OC10.4.4.6 Any problems with the proposed **System Test** perceived by the **Test Proposer** or any affected **User** or the **TSO** which arise or are anticipated after the issue of the **Test Programme** and prior to the day of the proposed **System Test** must be notified by the **Test Proposer** or affected **User** or the **TSO** (as the case may be) to the others as soon as possible in writing. If, in any such case, the **TSO** decides that these anticipated problems merit an amendment to, or postponement of, the **System Test**, it shall notify the **Test Proposer** and affected **Users** accordingly.

OC10.4.4.7 If, on the day of the proposed **System Test**, operating conditions on the **Total System** are such that any of the **TSO**, the **Test Proposer** or an affected **User** wishes to delay or cancel the start or continuance of the **System Test**, they shall immediately inform the others of this decision and the reasons for it. The **TSO** shall then postpone or cancel, as the case may be, the **System Test** and another suitable time and date shall be arranged in accordance with this OC10.4.4.

OC10.5 Interaction with the **DNO**

OC10.5.1 In circumstances where the **DNO** receives the equivalent of a **Proposal Notice** from a user whose **Plant** and **Apparatus** is connected to the **Distribution System**, the **DNO** shall inform the **TSO** as soon as reasonably practicable if it has reason to believe that the proposed **System Test** may have a material effect on the **Transmission System**. Following such notification, the **DNO** shall provide such information as the **TSO** may reasonably require.

OC10.5.2 Where the **DNO** intends to carry out a **System Test** on the **Distribution System**, it shall notify the **TSO** as soon as reasonably practicable if it has reason to believe that such **System Test** may have a material effect on the **Transmission System**. Following such notification, the **DNO** shall provide such information as the **TSO** may reasonably require.

Appendix

OC10.A.1 **Test Panel** Supervision

OC10.A.1.1 If the **TSO** determines pursuant to OC10.4.2.2 that a **Test Panel** is required, it will appoint a representative to co-ordinate the **System Test** (the **"Test Co-ordinator"**) as soon as reasonably practicable after it has, or is deemed to have, received a **Proposal Notice** and in any event prior to the distribution of the **Preliminary Notice** referred to below. The **Test Co-ordinator** shall act as Chairman of the **Test Panel** and shall be a full member of the **Test Panel**.

OC10.A.1.2 The **TSO** will notify all **Users** identified by it under OC10.4.2.1 of the proposed **System Test** by a notice in writing (a "**Preliminary Notice**") and will send a copy of the **Preliminary Notice** to the **Test Proposer**. The **Preliminary Notice** will contain:

(a) the details of the nature and purpose of the proposed **System Test**, the identity and situation of the **Plant** and/or **Apparatus** involved, the identities of the **Users** identified by the **TSO** under OC10.4.2.1 and the identity of the **Test Proposer**;

(b) an invitation to nominate within one month a suitably qualified representative (or representatives if the **Test Co-ordinator** considers that it is appropriate for a particular **User** to nominate more than one representative) to be a member of the **Test Panel** for the proposed **System Test**; and

(c) the name of the **TSO** representative whom the **TSO** has appointed as the **Test Coordinator** and who will be a member of the **Test Panel** for the proposed **System Test** together with the names of any other representatives whom the **TSO** has nominated to be members of the **Test Panel**.

OC10.A.1.3 The **Preliminary Notice** will be sent within one month of the later of either the receipt by the **TSO** of the **Proposal Notice**, or of the receipt of any further information requested by the **TSO** under OC10.4.1.3. Where the **TSO** is the proposer of the **System Test**, the **Preliminary Notice** will be sent within one month of the proposed **System Test** being fully formulated.

OC10.A.1.4 Replies to the invitation in the **Preliminary Notice** to nominate a representative to be a member of the **Test Panel** must be received by the **TSO** within one month of the date on which the **Preliminary Notice** was sent to the **User** by the **TSO**. Any **User** which has not replied within that period will not be entitled to be represented on the **Test Panel**. If the **Test Proposer** does not reply within that period, the proposed **System Test** will not take place and the **TSO** will notify all **Users** identified by it under OC10.4.2.1 accordingly.

OC10.A.1.5 The **TSO** will, as soon as possible after the expiry of that one month period, appoint the nominated persons to the **Test Panel** and notify all **Users** identified by it under OC10.4.2.1 and the **Test Proposer**, of the composition of the **Test Panel**.

OC10.A.2 **Test Panel**

OC10.A.2.1 A meeting of the **Test Panel** will take place as soon as possible after the **TSO** has notified all **Users** identified by it under OC10.4.2.1 and the **Test Proposer** of the

composition of the **Test Panel**, and in any event within one month of the appointment of the **Test Panel**.

OC10.A.2.2 The **Test Panel** shall consider:

(a) the details of the nature, technical reasons for and timing of the proposed **System Test** and other matters set out in the **Proposal Notice** (together with any further information requested by the **TSO** under OC10.4.1.3);

(b) the economic, operational and risk implications of the proposed **System Test**;

(c) the possibility of combining the proposed **System Test** with any other tests and with **Plant** and/or **Apparatus Outages** which arise pursuant to the **Operational Planning** requirements of the **TSO** and **Users**; and

(d) whether, at the conclusion of the **System Test**, the **Test Proposer** should be required to prepare a written report on the **System Test** (a "**Final Report**") in accordance with OC10.A.4 and, if so, the period within which the **Final Report** must be prepared.

OC10.A.2.3 **Users** identified by the **TSO** under OC10.4.2.1, the **Test Proposer** (whether or not they are represented on the **Test Panel**) and the **TSO** shall be obliged to supply the **Test Panel**, upon written request, with such details as the **Test Panel** reasonably requires in order to consider the proposed **System Test**.

OC10.A.2.4 The **Test Panel** shall be convened by the **Test Co-ordinator** as often as he considers necessary to conduct its business.

OC10.A.3 **Test Panel Test Programme**

OC10.A.3.1 As soon as practicable after its first meeting, the **Test Panel** shall, taking into account the factors specified in OC10.A.2.2, prepare a programme (the "**Test Programme**") which will include:

(a) the procedure to be adopted for carrying out the **System Test**, including the switching sequence and proposed timings of the switching sequence;

(b) the manner in which the **System Test** is to be monitored;

(c) a list of those members of staff to be involved in carrying out the **System Test**, including those who will be responsible for site safety; and

(d) such other matters as the **Test Panel** considers to be appropriate.

OC10.A.3.2 The **Test Panel** shall also determine the basis on which the costs of the **System Test** (including unanticipated costs) shall be borne as between the affected parties (the general principle being that the **Test Proposer** will bear such costs). If the **Test Panel** cannot agree on this (each party having acted in good faith), the **System Test** will be cancelled.

OC10.A.3.3 The **Test Co-ordinator** shall be entitled to require the proposed **System Test** to be modified, delayed or cancelled if, in his reasonable opinion, he considers that such test would impose unacceptable effects on the **NI System** or on any **User System**.

OC10.A.3.4 If the **Test Co-ordinator** requires the proposed **System Test** to be cancelled or if he requires such test to be delayed or modified but the **Test Proposer** considers that such delay or modification is not possible, the proposed **System Test** shall not take place and the **Test Panel** will disband automatically.

OC10.A.3.5 If the **Test Co-ordinator** requires the proposed **System Test** to be modified or delayed and such modification or delay is possible, the **Test Panel** shall, as soon as practicable, revise the **Test Programme** accordingly.

OC10.A.3.6 The **Test Programme** will, subject to OC10.A.3.7, bind all recipients to act in accordance with the provisions of the **Test Programme** in relation to the proposed **System Test**.

OC10.A.3.7 Any problems with the proposed **System Test** which arise or are anticipated after the issue of the **Test Programme** and prior to the day of the proposed **System Test** must be notified to the **Test Co-ordinator** as soon as possible in writing. If the **Test Co-ordinator** decides that these anticipated problems merit an amendment to, or postponement of, the **System Test**, he shall notify the **Test Proposer** (unless the test was proposed by the **TSO**) and each **User** identified by the **TSO** under OC10.4.2.1 accordingly.

OC10.A.3.8 If, on the day of the proposed **System Test**, operating conditions on the **Total System** are such that any party involved in the proposed **System Test** wishes to delay or cancel the start or continuance of the **System Test**, they shall immediately inform the **Test Co-ordinator** of this decision and the reasons for it. The **Test Co-ordinator** shall then postpone or cancel, as the case may be, the **System Test** and shall, if possible, agree with the **Test Proposer** (unless the test was proposed by the **TSO**) and all **Users** identified by the **TSO** under OC10.4.2.1 another suitable time and date. If he cannot reach such agreement, the **Test Co-ordinator** shall reconvene the **Test Panel** as soon as practicable, which will endeavour to arrange another suitable time and date for the **System Test**, in which case the relevant provisions of this OC10 shall apply.

OC10.A.4 **Test Panel Final Report**

OC10.A.4.1 At the conclusion of the **System Test**, the **Test Proposer** shall, if so decided by the **Test Panel** pursuant to OC10.A.2.2(d), prepare a **Final Report** for submission to the **TSO** and the other members of the **Test Panel**. The **Final Report** shall be submitted within the period agreed by the **Test Panel** pursuant to OC10.2.2(d).

OC10.A.4.2 The **Test Proposer** may omit from the **Final Report** matters which, in its reasonable opinion, are confidential to it and the **Final Report** shall not be submitted to any person who is not a member of the **Test Panel** unless the **Test Panel**, having considered the confidentiality issues arising, shall have unanimously approved such submission.

OC10.A.4.3 The **Final Report** shall include a description of the **Plant** and/or **Apparatus** tested and a description of the **System Test** carried out, together with the results and, where appropriate, the conclusions and recommendations of the **Test Panel**.

OC10.A.4.4 When the **Final Report** has been prepared and submitted in accordance with OC10.A.4.1, the **Test Panel** will disband automatically. If a **Final Report** is not required by the **Test Panel** then it will disband automatically upon the conclusion of the **System Test**.

OPERATING CODE NO. 11

TESTING, MONITORING AND INVESTIGATION

OC11.1 INTRODUCTION

OC11.1.1 To enable it to comply with its **Licence** and statutory obligations, the **TSO** will carry out certain **Monitoring**, **Testing** and **Investigation** in respect of the performance of **User's Equipment**. Operating Code No. 11 ("OC11") specifies the procedures to be followed.

OC11.1.2 It should be noted that the text in OC11.1, OC11.2 and OC11.3 is generic and is applicable to all **Users**. The remainder of OC11 is separated into two sections. Part A (and its Appendix) is applicable to **PPA CDGUs** only as these units have specific terminology and processes due to the terms of the **Nominated Generating Unit Agreements**. Part B (and its Appendix) is applicable to all **User's Equipment** other than **PPA CDGUs.**

OC11.1.3 **Monitoring, Testing** and **Investigation** under this OC11 are separate procedures. In general terms, **TSO** representatives likely to be present at the **Power Station** or **User Site** for a **Test** or an **Investigation**, but not for **Monitoring**. It should also be noted that **Testing** under OC11 includes **Within-Day Tests**.

OC11.1.4 The detailed procedures and methodologies for conducting certain **Tests** and undertaking certain **Monitoring** are set out in **Agreed Testing and Monitoring Procedures** each of which forms part of the **Grid Code**.

OC11.2 OBJECTIVES

The objective of OC11 is to establish whether **User's Equipment** is operating within its **Design and Operating Requirements** and is operated (to the extent subject to **Central Dispatch**) in compliance with **Dispatch Instructions** . OC11 also specifies the procedures to be followed by the **TSO** and **Users** in carrying out **Monitoring**, **Testing** and **Investigations**. In particular, this facilitates adequate assessment of each of the following:

(a) whether **PPA CDGUs, Demand Side Units** and **Relevant Plant** (as defined in OC11.10.2.1) comply with **Dispatch Instructions**;

(b) whether **CDGUs, Controllable PPMs, Aggregated Generating Units, Demand Side Units** and other items of **User's Equipment** are (to the extent applicable) in compliance with declarations of **Availability**, **System Support Services** capabilities, **Design and Operating Requirements** and any other data required to be registered for those **CDGUs, Controllable PPMs, Aggregated Generating Units, Demand Side Units** and other items of **User's Equipment** under the **Grid Code**;

(c) whether **User's Equipment** conforms with power quality requirements of the **Connection Conditions**;

(d) whether **Users** are in compliance with protection requirements and protection settings under the **Grid Code**, **User**s' **Connection Agreements** and **System Support Services Agreements** between **User**s and the **TSO**;

(e) whether **Users** are in compliance with their obligations to provide **Operating Reserve** under **System Support Services Agreements** and the **Grid Code** or, in the case of **PPA CDGUs,** in compliance with their obligations to provide **Spinning Reserve** under **Nominated Generating Unit Agreements** and the **Grid Code**;

(f) whether a **Black Start Station** has the ability to **Black Start**; and

(g) whether **CDGUs** that have the ability to generate on more than one fuel are capable of switching from operation on one fuel to operation on another fuel in compliance with a **Dispatched Fuel Notice** in accordance with the requirements of **SDC2**.

OC11.3 SCOPE

OC11 applies to the **TSO** and to **Users** which in this OC11 means **Generators** (in respect of their **Black Start Stations**, all other **Generating Units** connected to the **Transmission System** and in respect of **CDGUs** and **Controllable PPMs** connected to the **Distribution System**), **Generator Aggregators**, **Interconnector Owners**, **Demand Side Units** and **Large Demand Customers**.

OC11.4 The **TSO** may totally or partially delegate the performance of its compliance monitoring to third parties. In such cases, where data is shared with third parties working for/with the **TSO**, this data will be shared and protected under the confidentiality conditions of the **Licence**.

PART A – PPA CDGUS ONLY

OC11.4 Not Used

OC11.5 PROCEDURE FOR **MONITORING**

OC11.5.1 **Monitoring** may be carried out at any time by the **TSO** and involves the analysis of the output of **Monitoring** equipment (as required or permitted under the **CC** and/or relevant **Connection Agreements** and/or the **MC**), which is relayed to the **TSO**, which shows the output and/or performance of the **CDGU,** and associated **Equipment** in order to see whether the **CDGU,** is complying with its **Dispatch Instructions**.

OC11.5.2 In determining whether a **CDGU** has complied, or is complying, with a **Dispatch Instruction**, the **TSO** shall in each case give due regard to operating conditions on the **NI System**. The **TSO** shall also apply the **Tolerance Bands** set out in the relevant table in the Appendix to this OC11 Part A to the **Monitoring** of the relevant **Dispatch Characteristic**, as indicated in the relevant paragraphs of this OC11 Part A, and shall also apply the **Conversion Factors** and **Additional Conversion Factors** where appropriate. The **TSO** shall, when **Monitoring Active Power** or **Reactive Power**, select either the **Wide Tolerance Band** (for **Monitoring** sustained performance) or the **Narrow Tolerance Band** (for **Monitoring** stability over a short period). When **Monitoring** on the **Narrow Tolerance Band**, the **TSO** will select either the **Maximum Tolerance Band** or the **Minimum Tolerance Band**. In the event of a **Frequency Transient** occurring whilst the **TSO** is **Monitoring** the compliance by a **CDGU** with a **Dispatch Characteristic** (regardless of which **Tolerance Band** is being applied by the **TSO** at the time) to which the **CDGU** responds in accordance with the relevant **User's** obligations to provide **Spinning Reserve Response**, the **CDGU** shall not fail the **Monitoring** by reason of such response.

OC11.5.3 (a) If, having applied the relevant **Tolerance Band**, and, where appropriate, **Conversion Factors** and **Additional Conversion Factors** the **TSO** suspects that a **CDGU** has not complied, or is not complying, with a **Dispatch Instruction**, the **TSO** will, if it wishes to continue with the **Monitoring** inform the relevant **User** by submitting a **Warning Notice** (either orally or in writing) and, subject to the requirements of **System** security (which may require the **Dispatch Instruction** to be cancelled in which case the **Warning Notice** will be deemed to have been withdrawn), the **TSO** will allow the **User** 10 minutes after such notice to comply with the **Dispatch Instruction.**

(b) If in that 10 minute period the **User** still fails to comply with the **Dispatch Instruction**, the **TSO** may give notice to the **User** by submitting a **Monitoring Notice** (either orally or in writing) that the **CDGU** is being **Monitored**.

(c) The **Monitoring Notice** will:

(i) identify the **Dispatch Characteristic(s)** which is being **Monitored** and the underlying **Technical Parameter(s**);

(ii) specify, if relevant, whether the **Tolerance Band** to be used is the **Wide Tolerance Band** or the **Narrow Tolerance Band**; and

(iii) specify, if relevant, whether the **Narrow Tolerance Band** is to apply as a **Maximum Tolerance Band** or as a **Minimum Tolerance Band**.

(d) The **User** has the right, before the issue of the **Monitoring Notice**, or at any time thereafter by submitting to the **TSO** an **Availability Notice**, a **Technical Parameters Notice** or a **Technical Parameters Revision Notice** (as the case may be), to re-declare **Availability** or the **Technical Parameters** (in accordance with the provisions of SDC1) in respect of the **Dispatch Characteristic(s)** to be **Monitored**, such re-declaration to take effect from the time of receipt of the **Warning Notice** by the **User**. In the event that the **User** submits to the **TSO** an **Availability Notice** or a **Technical Parameters Notice** or a **Technical Parameters Revision Notice** at or about the same time as the **TSO** submits to the **User** a **Post Event Notice** (or **Interim Post Event Notice**) pursuant to OC11.5.4 or OC11.5.5 seeking to re-register the **Availability** or the same **Technical Parameter** (as the case may be) of the **CDGU** in question to a different value, then the value of **Availability** or the value of the relevant **Technical Parameter** shall be deemed to be redeclared to the inferior of the values specified in the two notices.

(e) The period of **Monitoring** shall not exceed the period set out in the relevant table in the Appendix to this OC11 Part A for the relevant **Dispatch Characteristic(s)** and the selected **Tolerance Band**.

OC11.5.4 Consequences of **Monitoring** and **Post Event Notices**

(a) At the end of the period of **Monitoring**, if the **User** has achieved each **Dispatch Instruction** for the period of the **Monitoring** within the relevant **Tolerance Band**, the **CDGU** will be deemed to have complied with each **Dispatch Instruction**.

(b) If the average value of the **Dispatch Characteristic(s)** in any 5 minute period during the period of **Monitoring** falls outside the relevant **Tolerance Band** the **TSO** may by submitting a **Post Event Notice** to the **Generator** re-register the value of **Availability** or of the relevant **Technical Parameter** corresponding to that **Dispatch Characteristic** to the most inferior value outside the **Tolerance Band** for any 5 minute period during the period of **Monitoring** (with effect from the **Imbalance Settlement Period** in which the **Monitoring Notice** was issued) and the **TSO** may also notify the **Generator** not later than 10 minutes before the end of the period of **Monitoring** that it will continue to **Monitor** the **CDGU** for a further period not exceeding that shown in the relevant Table in the Appendix to this OC11 Part A in respect of the particular **Dispatch Characteristic** and with reference to the relevant or selected **Tolerance Band**.

(c) If at the end of the further period of **Monitoring** the average value of the **Dispatch Characteristic(s)** in any 5 minute period during the **Monitoring** falls outside the relevant **Tolerance Band**, the **TSO** may re-register the value of the **Availability** or of the relevant **Technical Parameter** corresponding to that **Dispatch Characteristic** to the most inferior value for any 5 minute period

during the period of **Monitoring** (with effect from the **Imbalance Settlement Period** in which the **Monitoring Notice** was issued). Further periods of **Monitoring** may also take place, in accordance with the procedure set out in paragraph (b) above and the provisions of this paragraph (c) will apply to such further periods of **Monitoring**.

(d) (i) If (other than pursuant to a **Dispatch Instruction** to **De-Load**) the average value of **Output** for any 5 minute period is less than 80% of the average **Output** for either of the two immediately preceding 5 minute periods, the **TSO** may issue a **Post Event Notice** re-registering the **Availability** of the **CDGU** at the level consistent with its average value for that 5 minute period with effect from the beginning of the **Imbalance Settlement Period** in which such 5 minute period commenced.

(ii) If (following a **Dispatch Instruction** to **De-Load**) the average value of **Active Power** for any 5 minute period is less than 80% of the average value of **Active Power** which would have been generated by the **CDGU** for such 5 minute period had it been **De-Loaded** at its maximum **De-Loading** rate (registered as a **Technical Parameter**), the **TSO** may issue a **Post Event Notice** re-registering the **Availability** of the **CDGU** at the level consistent with the average value for that 5 minute period with effect from the beginning of the **Imbalance Settlement Period** in which such 5 minute period commenced.

(e) Prior to submitting a **Post Event Notice**, the **TSO** may deliver an **Interim Post Event Notice** to the **User** not later than 2 hours after:

(i) in the case of an event of the type specified in (d) (i) or (ii) above the end of the **Imbalance Settlement Period** during which the event occurred; or

(ii) in the case of instances of **Monitoring**, the end of the relevant period of **Monitoring**;

if it is not reasonably practicable for the **TSO** to deliver a **Post Event Notice** to the **User** within that time.

(f) An **Interim Post Event Notice** shall specify:

(i) the **Imbalance Settlement Period** during which the event of the type specified in (d) (i) or (ii) above occurred and, in the instance of **Monitoring**, the **Imbalance Settlement Period** during which the relevant **Warning Notice** was issued; and

(ii) the matters or values which the **TSO** intends to redeclare in a **Post Event Notice** as a result of what happened.

(g) Each **Generating Unit Agreement** contains provisions on the validity of **Post Event Notices** which shall apply to the **Grid Code.**

OC11.5.5 **Spinning Reserve Monitoring** (including **Governor Droop Monitoring**)

(a) In the case of **CDGUs**, the following provisions of this OC11.5.5 shall apply to the **Monitoring** of **Spinning Reserve** and **Governor Droop** unless Schedule 8 of the relevant **Nominated Generating Unit Agreement** otherwise requires. For the purposes of this OC11.5, in the event of any conflict between the provisions of this OC11.5 and the provisions of Schedule 8 of the relevant **Nominated Generating Unit Agreement**, the provisions of Schedule 8 shall apply. **Monitoring** of **Governor Droop** in relation to **Open Cycle Gas Turbine CDGUs** may be undertaken pursuant to the provisions of this OC11.5 set out above.

(b) For the purposes of this OC11 Part A:

(i) in respect of any **Frequency Transient**:

(a) "**Pretransient Load**" means instantaneous **Load** level (in **MW**) of the **CDGU** at 5 seconds before the **Frequency Transient** commenced;

(b) the response of the **CDGU** to such **Frequency Transient**, in terms of **Load** lift (in **MW**) above **Pretransient Load**, continuously over the period of 5 minutes starting when the **Frequency Transient** commenced, is referred to as "**Spinning Reserve Response**" and comprises **Initial Response** and **Sustained Response**;

(c) the **Spinning Reserve Response** achieved by the **CDGU** in response to such **Frequency Transient** is referred to as the "**Achieved**" response;

(c) **Spinning Reserve Response**

For the purposes of this OC11 Part A:

(i) the **Spinning Reserve Response** for the period from 10 seconds to 5 minutes after the commencement of a **Frequency Transient** is referred to as "**Sustained Response**";

(ii) a **CDGU** is required to attain and maintain at all times in this period a **Sustained Response** not less than the instantaneous value determined under (d) below (the "**Contracted**" response);

(iii) without prejudice to the relevant **Contracted Technical Parameter** (or to the requirement to attain **Contracted Sustained Response**), there is no specific requirement under this OC11.5.5(c) as to **Spinning Reserve Response** in the period from 0 to 10 seconds ("**Initial Response**");

(d) **Contracted Response**

For the purposes of this OC11 Part A, for any **Frequency Transient**, the **Contracted Sustained Response** (in **MW**) is whichever is the least of:

(i) the unconstrained response, which is the value for **Spinning Reserve** corresponding to the **Pretransient Load** on the **Sustained Load Diagram**. If the **Pretransient Load** is less than **Minimum Generation** for the **CDGU**, the unconstrained response shall be zero;

(ii) the **Availability** constrained response, which is:

A - PTL

where:

A = the **Availability** of the **CDGU** at the time at which the **Frequency Transient** commenced; and

PTL = **Pretransient Load** (**MW**);

(iii) the **Governor Droop** constrained response (SRG), determined as follows:

SRG =CC/Fg * {(Fp - Ft) - 2A/3}

where:

CC = **Contracted Capacity** (**MW**);

Fg = determined as:

50Hz * D/100

where D is specified **Governor Droop** (%) notified in the most recent relevant **Technical Parameters Notice**;

Fp = **NI System Frequency** (Hz) at the time 5 seconds before the **Frequency Transient** commenced;

Ft = the instantaneous **NI System Frequency** (Hz) at any time during the **Frequency Transient;**

A = determined as:
(Fp - Ft) - (Fg * B)
except where this term has a negative value, in which case A is 0;

where B is determined as:

0.9 - PTL/CC

except where this term has a negative value, in which case B is 0;

where PTL is **Pretransient Load**.

(e) OC3, "**Operating Margin**", specifies the timescales within which the **Operating Reserve** from **CDGUs** must be provided (and which are further described in SDC3, "**Frequency Control**"), as follows:

(i) **Primary Operating Reserve**: from the time of a **Frequency** change, which must be fully available by 5 seconds, and which must be sustainable (subject to the **Unit Load Controller** adjustment, where applicable) for at least 15 seconds. For the period from 0 to 5 seconds, **Primary Operating Reserve** therefore falls within the category of **Initial Response**. Thereafter (from 5 seconds to 15 seconds) **Primary Operating Reserve** falls within the category of **Sustained Response**;

(ii) **Secondary Operating Reserve**: which is fully available and sustainable over the period from 15 to 90 seconds following an **Event**. **Secondary Operating Reserve** therefore falls within the category of **Sustained Response**;

(iii) **Tertiary Operating Reserve band 1**: which is fully available and sustainable for a period from 90 seconds to 5 minutes following an **Event**. Where **Tertiary Operating Reserve band 1** is provided by a steam turbine **CDGU** already **Synchronised** to the **NI System**, this will, to the extent it is provided within 5 minutes from the time of a **Frequency** change, fall within the category of **Sustained Response**. **Tertiary Operating Reserve band 1** provided by gas turbine **Units** does not fall within the category of **Sustained Response** because gas turbine **Units** do not have a **Spinning Reserve Capability**;

(iv) **Tertiary Operating Reserve band 2**: which is fully available and sustainable for a period from 5 minutes to 20 minutes following an **Event**. **Tertiary Operating Reserve band 2** therefore does not fall within the category of **Sustained Response** (which is not **Monitored** after 5 minutes from the time of the **Frequency** change);

(v) **Replacement Reserve**: which is fully available and sustainable for a period from 20 minutes to 4 hours following an **Event**; and

(vi) **Substitute Reserve**: which is fully available and sustainable for a period from 4 hours to 24 hours following an **Event**.

(f) **Not used**

(g) **Achieved Response**

(i) The event recorders described in Sub-Code 3 of the **MC** will capture (at 0.1 second intervals), and upon the occurrence of a **Frequency Transient**, the **Frequency** logging equipment constituting part of **Operational Metering** will record (from not less than 5 seconds before the **Frequency Transient** commenced) and retain, the instantaneous **Load** level of the **CDGU**.

(ii) The **Spinning Reserve Response Achieved** by the **CDGU** will be determined from the data referred to in (i) above and will be compared with the **Contracted** response.

(h) **Sustained Response Capability**

(i) For the purposes of the **Grid Code** the **"Sustained Response Capability"** is a factor (not greater than one) which represents actual or anticipated **Achieved Sustained Response** as a fraction of (where less than) **Contracted Sustained Response**. **Sustained Response Capability** may be:

(a) declared by the **Generator** by submitting a **Technical Parameters Notice** or a **Technical Parameters Revision Notice** on the basis of anticipated response (generically, for all possible **Frequency Transients** and sets of relevant circumstances);

(b) determined by the **TSO** (and notified to the **Generator** in a **Post Event Notice**) following the occurrence of a **Frequency Transient**, based on the instantaneous values of the **Contracted Sustained Response** and **Achieved Sustained Response** for which the **Sustained Response Deviation** (as defined below) was determined; or

(c) determined on the basis of the result of a **Test** as described in OC11.6.2.

(ii) For the purposes of this OC11 Part A, in respect of any **Frequency Transient**, the "**Adjusted Contracted Sustained Response**" **(ACSR)** is the **Contracted Sustained Response (CSR)** adjusted by the prevailing **Sustained Response Capability (SRC)**, determined as follows:

ACSR = CSR * SRC

(i) **Spinning Reserve Deviation**

For the purposes of this OC11 Part A:

(a) the "**Sustained Response Deviation**" is the greatest amount (in **MW**) by which, following a **Frequency Transient**, at any time

over the relevant period, the instantaneous value of **Sustained Response Achieved** deviated below the **Adjusted Contracted Sustained Response**;

(b) the **Spinning Reserve Deviation** is the **Sustained Response Deviation**; and

(c) the **Spinning Reserve Deviation** shall be zero if it would otherwise be negative.

(j) **Spinning Reserve Failure**

For the purposes of this OC11 Part A, there is a "**Spinning Reserve Failure**" whenever following a **Frequency Transient**, the **Spinning Reserve Response Achieved** deviated (as described in (g) above) below the **Contracted** response and the **Spinning Reserve Deviation** is the amount of such deviation (determined in accordance with (g) above).

(k) Successive **Frequency Transients**

Where a **Frequency Transient** has occurred while the **CDGU** was **Synchronised**, the **CDGU** will not be required to respond to any further **Frequency Transient** for 5 minutes after the end of the first **Frequency Transient**; and the provisions of this OC11 Part A shall apply accordingly.

(l) The **Generator** shall be entitled at any time, by submitting a **Technical Parameters Notice** or a **Technical Parameters Revision Notice** to the **TSO**, to re-declare the **Sustained Response Capability** or the **Governor Droop** value of a **CDGU**. Within 48 hours of receiving the **Technical Parameters Notice** or the **Technical Parameters Revision Notice** from the **Generator**, the **TSO** may require the **Generator** to carry out a **Sustained Response Test** or a **Governor Droop Test** and if the test is failed, the **TSO** may by issuing a **Post Event Notice** to the **Generator**, re-register the **Spinning Reserve Capability** or the **Governor Droop** value for that **CDGU**, such re-registration to take effect from the beginning of the **Imbalance Settlement Period** in which the **Technical Parameters Notice** or the **Technical Parameters Revision Notice** took effect.

OC11.5.6 In addition to the provisions set out in OC11.5.5, a **Generator** shall, having redeclared or having had a **Technical Parameter** of one of its **CDGUs** re-registered as a result of non-compliance, notify the **TSO** when it has rectified the fault which caused that non-compliance or believes reasonably that the **CDGU** is no longer so failing to comply by submitting a **Technical Parameters Notice** or a **Technical Parameters Revision Notice** to the **TSO** under SDC1. Upon the **TSO** receiving such notification, the relevant **Technical Parameter** will be deemed to be re-declared to either its original value or to the value specified in the **Technical Parameters Notice** or the **Technical Parameters Revision Notice** (which may be a lesser value which is an improved value to that to which it had been re-registered). The re-declared value will be regarded for all purposes as the applicable value for that **Technical Parameter**.

OC11.5.7 The **TSO** may then, of course, **Monitor** that re-declared value in accordance with the provisions of this OC11 Part A and may, if the **CDGU** fails to comply with the re-registered **Technical Parameter,** follow the procedures set out in OC11.5.

OC11.6 PROCEDURE FOR **TESTING**

OC11.6.1 **Testing** (other than relating to **Spinning Reserve**)

(a) In circumstances where the **TSO** reasonably considers that, in relation to a **CDGU** or item of **User's Equipment**, a **Generator** might be failing to comply or might in the foreseeable future fail to comply with the relevant **Design and Operating Requirements**, the **TSO** may, upon giving reasonable notice identifying the **Design and Operating Requirement** concerned, send representatives to the relevant **Power Station** in order to verify by **Testing** or inspection (in the case of **Testing,** conducted by the **Generator**) whether in relation to the **CDGU** or item of **User's Equipment,** as the case may be**,** the **Design and Operating Requirement** is being complied with. The **Test** or inspection may involve the giving of specific **Dispatch Instructions** within the provisions of SDC2, including instructions in connection with **Black Starts** and **Dispatched Fuel Notices**. The period of notice which is reasonable will depend upon all the circumstances, including the **Design and Operating Requirement** in question.

(b) A **Generator** must allow the **TSO** representative's access to all relevant parts of its **Power Station** for the purposes of this OC11 Part A.

(c) Where a **Test** falls within the scope of an **Agreed Testing and Monitoring Procedure**, the procedure for conducting the **Test** and the criteria for passing the **Test** will be as set out in the applicable **Agreed Testing and Monitoring Procedure**. Where a **Test** falls outside the scope of the **Agreed Testing and Monitoring Procedures**, the procedure for the **Test**, and the criteria for passing the **Test**, will, if not agreed between the **TSO** and the **Generator**, be as determined by the **TSO** acting reasonably and as notified to the **Generator** at the time. In all cases, the **Generator** must comply with all reasonable instructions of the **TSO** in carrying out the **Test**.

(d) If the procedure for the **Test**, and the criteria for passing the **Test**, are determined by the **TSO** under OC11.6.1(c) and, within 48 hours after completion of the **Test**, the **Generator** notifies the **TSO** in writing that it objects to the procedure and/or the criteria which were used for the **Test**, then the question of whether the **Test** procedure and/or the criteria were valid shall:

(i) in the case of a **Design and Operating Requirement** contained in the **Generator's** relevant **Nominated Generating Unit Agreement** (or **Nominated Power Station Agreement**), be decided by the Expert in accordance with the relevant dispute resolution procedure set out in that Agreement; or

(ii) in the case of a **Design and Operating Requirement** contained in the **Grid Code**, be decided in accordance with the relevant dispute

resolution procedure set out in the **Generator's** relevant **Connection Agreement**; or

(iii) in the case of a **Design and Operating Requirement** contained in the **Generator's** relevant **Connection Agreement**, be decided in accordance with the relevant dispute resolution procedure set out in the **Generator's** relevant **Connection Agreement**;

and, in any such case, the effects of the **Test** shall be suspended until such time as it has been determined that the procedure for the **Test** or the criteria for passing the **Test** were valid. If it is determined that the procedure for the **Test** or the criteria for passing the **Test** were not valid, then the **Test** shall not be effective for the purposes of the relevant **Agreement** or the **Grid Code**, as the case may be. The **TSO** may, however, conduct a further **Test** in accordance with this OC11.6 (including this OC11.6(d)), taking into account any relevant recommendations of the Expert, in determining the procedure and/or criteria for such further **Test.**

(e) (i) In determining whether the **CDGU** or item of **User's Equipment,** as the case may be, has passed a **Test**, due regard will be given by the **TSO** to operating conditions on the **NI System** and (where applicable) the relevant **Tolerance Bands** will be applied to the relevant matters being **Tested** as set out in the Appendix to this OC11 Part A and the **Conversion Factors** and the **Additional Conversion Factors** shall also be applied where appropriate.

(ii) If, within 48 hours after completion of the **Test**, the **Generator** notifies the **TSO** in writing that it disagrees that the results show that the **CDGU** or item of **User's Equipment**, has failed the **Test**, then the question of whether the **Test** has been passed or failed shall:

(a) in the case of a **Design and Operating Requirement** contained in the **Generator's** relevant **Nominated Generating Unit Agreement** (or **Nominated Power Station Agreement**), be decided by the Expert in accordance with the relevant dispute resolution procedure set out in that Agreement; or

(b) in the case of a **Design and Operating Requirement** contained in the **Grid Code**, be decided in accordance with the relevant dispute resolution procedure set out in the **Generator's** relevant **Connection Agreement**; or

(c) in the case of a **Design and Operating Requirement** contained in the **Generator's** relevant **Connection Agreement**, be decided in accordance with the relevant dispute resolution procedure set out in the **Generator's** relevant **Connection Agreement**;

and, in any such event, the effects of the **Test** shall be suspended until such time as it has been determined that the **CDGU** or item of **User's Equipment** has failed the **Test**.

(f) If in relation to the **CDGU** or item of **User's Equipment**, as the case may be, the **Generator** fails the **Test** then:

(i) if the **Design and Operating Requirement** is one under the **Grid Code**, the **TSO** may, in the case of those **Design and Operating Requirements** where a parameter or other data item can be registered (that is, those other than CC parameters), re-register the value of the relevant **Design and Operating Requirement** to reflect the lower level of compliance shown by the **Test**;

(ii) the **Generator** will, if the **Design and Operating Requirement** is one under a **Nominated Generating Unit Agreement** to which it is a party, be subject to such consequences (if any) as may arise under that agreement; or

(iii) the **Generator** will, if the **Design and Operating Requirement** is one under a **Connection Agreement** to which it is a party, be subject to such consequences (if any) as may arise under that agreement.

OC11.6.2 **Testing** relating to **Spinning Reserve**

(a) In certain circumstances and in relation to steam turbine **CDGUs** in relation to their **Steam Turbine Units** only, **Sustained Response Capability** and **Governor Droop** may, unless **Schedule 8** of the relevant **Generating Unit Agreement** otherwise requires, be tested as described in this OC11.6.2. For the purposes of this OC11.6.2, in the event of any conflict between the provisions of this OC11.6.2 and the provisions of Schedule 8 of the relevant **Generating Unit Agreement**, the provisions of Schedule 8 shall apply.

(b) The following provisions apply as to **Testing** of **Sustained Response Capability** for steam turbine **CDGUs** in relation to their **Steam Turbine Units**:

(i) A **Test** (**"Sustained Response Test"**) in respect of **Sustained Response Capability** may be requested in the following circumstances:

(a) by the **Generator**, at any time; in which case the **TSO** will by the same time on the second **Business Day** thereafter specify the time (within 3 days) for the **Test** which shall be as soon as reasonably practicable having regard to **System** constraints (but in any event within 3 days); and

(b) by the **TSO**, on not less than 24 hours' notice of the start of the **Test**:

(i) at any time, if the **TSO** has reasonable grounds to believe that the **Sustained Response Capability** is impaired; or

(ii) within 48 hours (the **Test** to start within 72 hours) after the **Generator** redeclared up the value of the **Sustained Response Capability** either:

(1) where the **Sustained Response Capability** had earlier been declared down following a **Frequency Transient**; or

(2) where following a previous **Test** under this paragraph OC11.6.2.(b)(i) (b) (ii) **Sustained Response Capability** had been determined at a level lower than previously declared by the **Generator**.

(ii) If the **TSO** requests a test pursuant to OC11.6.2(b)(i)(b)(ii) above and the **Sustained Response Capability** determined pursuant to such **Test** is lower than the value which had been redeclared (as described in (1) or (2) thereof) by the **TSO**, the value determined pursuant to such test shall be applied retrospectively (from the **Imbalance Settlement Period** in which the **TSO's** redeclaration was made) in calculating the value of the "Sustained Response Inflexibility Factor" (as such term is defined in the relevant **Nominated Generating Unit Agreement**) under paragraph 10.9 of Schedule 2 to each **Nominated Generating Unit Agreement** relating to steam turbine **CDGUs** in relation to their **Steam Turbine Units**.

(iii) The **Sustained Response Test** is a **Test** of sustained **Load** increases at particular initial **Load** levels, in comparison with expected values shown on the diagram included in the relevant **Nominated Generating Unit Agreement** (the **"Sustained Load Diagram"**). The **Test** is carried out using turbine speeder input and involves fast **Load** increases of various magnitudes (up to the applicable value on the **Sustained Load Diagram**) at up to 3 different initial **Loads** nominated by the party which called for the **Test**. During the **Test** the event recorder is used to monitor relevant parameters.

(iv) For each initial **Load** level, the maximum **Load** increase which was sustained for 5 minutes will set the value (of **Load** increase) at which the **Test** was passed ("the achieved sustained increase"). If for any initial **Load** level the achieved sustained increase deviated from (and below) the relevant expected value on the **Sustained Load Diagram** by more than the greater of 2**MW** and 5% (the "test tolerance"), the party which called for the **Test** may redeclare the value of the **Sustained Response Capability (SRC)** (but subject to the right of the **Generator** subsequently to redeclare), determined as:

SRC = Va/{(1-T) * Ve}

where:

Va = the value (in **MW**) of the **Achieved Sustained Response**;

Ve = the relevant expected value (in **MW**) on the **Sustained Load Diagram**; and

T = the **Test** tolerance, which shall be 5%, and expressed as a decimal fraction of one for the purposes of the above equation.

(c) The following provisions apply as to **Testing** of **Governor Droop** in relation to steam turbine **CDGUs** in relation to their **Steam Turbine Units** (**Governor Droop** may be tested in relation to gas turbine **CDGUs** under OC11.6.1):

(i) For the purposes of this OC11 Part A, "**Specified Governor Droop**" means the highest incremental **Governor Droop** at any **Load** below 90% of **Contracted Capacity**. For a given **Specified Governor Droop** (**SGD**):

(a) the lowest incremental **Governor Droop** at any **Load** between zero and 90% of **Contracted Capacity** shall be:

0.4 * SGD

(b) the highest incremental **Governor Droop** at any **Load** above 90% of **Contracted Capacity** shall be:

3 * SGD

(ii) A **Test** of **Governor Droop** may be requested by the **TSO**, on not less than 24 hours' notice, at any time if the **TSO** has reasonable grounds to believe that the **Specified Governor Droop** of the **CDGU** in relation to its **Steam Turbine Units** is higher than its declared value. The **Test** is carried out with the turbine at speed but with the **CDGU** not **Synchronised**, and determines the relationship between governor hydraulic output and turbine speed, as turbine speed is decreased, from several speeder set points. Incremental **Governor Droop** values are calculated for the turbine **Load** range from the recorded results of the **Test**.

(iii) The **TSO** may then redeclare the value of **Specified Governor Droop** to the value determined according to such **Test** (to the extent that it is higher than the value previously declared by the **Generator**).

(d) (i) To the extent that the **TSO** and a **Generator** are unable to agree on any further details or procedures for carrying out the **Sustained Response Test** or testing of **Governor Droop**, an Expert may be requested, pursuant to the relevant **Nominated Generating Unit Agreement**, to determine such details or procedures, which will then be adopted and thereafter applied in any further **Testing** by the parties.

(ii) In the event of a dispute as to the result of a **Sustained Response Test** or a **Test** of **Governor Droop**, the matter shall be referred to an Expert for determination pursuant to the relevant **Nominated Generating Unit Agreement**.

OC11.7 **INVESTIGATIONS**

(a) The **TSO** may, upon giving reasonable notice (in any event not less than 2 **Business Days**), send representatives to a **Power Station** in order to investigate any equipment or operational procedure.

(b) An **Investigation** may take place only for the purposes of enabling the **TSO** to fulfil its obligations relating to the operation of the **Transmission System** (and where in the reasonable opinion of the **TSO** in the absence of an **Investigation** it would be unable properly to fulfil such obligations).

(c) An **Investigation** shall not take place during or less than 2 days before or after a period of **Monitoring** (carried out following the issue of a **Warning Notice**) or **Test** in respect of **Plant** or equipment at the relevant **Power Station** .

(d) The **TSO's** notice under (a) shall specify:

(i) the nature and purpose of the **Investigation** and the reasons therefor;

(ii) the equipment or operational procedure subject to the **Investigation**; and

(iii) the procedure (as reasonably determined by the **TSO**) for the **Investigation**.

(e) The scope of an **Investigation** and the information and parts of the **Power Station** to which the **TSO** shall be entitled to access shall be limited to that required for the purposes of the **Investigation** as specified in the **TSO's** notice under (d).

(f) The **Generator** shall comply with the reasonable requests of the **TSO** in carrying out the **Investigation**, and allow the **TSO** representative access to all relevant parts of the **Power Station** to conduct the **Investigation**.

(g) An **Investigation** shall not of itself result in consequences for the **Generator** under the **Grid Code** or any **Nominated Generating Unit Agreement**, **Nominated Power Station Agreement** or **Connection Agreement**.

(h) These provisions shall be without prejudice to **TSO's** rights of access under any other document or agreement.

OC11.8 TESTING AT THE REQUEST OF A **GENERATOR**

OC11.8.1 A **Generator** shall, subject to OC11.8.2, be entitled, by notice in writing setting out the desired procedure (or, if the **TSO** acting reasonably so agrees, taking into account the nature of the test being requested, by oral request specifying the desired procedure, such oral request to be confirmed in writing as soon as reasonably practicable thereafter), to request the **TSO** to assist it (by **Dispatch**) in carrying out a test on any of its **CDGUs**, as such **Generator**, acting reasonably in accordance with **Prudent Operating Practice**, may request. In the case of a test (other than an on-**Load** valve test) on a **CDGU**, the

procedure set out in the notice or specified in the oral request (as the case may be) shall include the level of **Availability** and the values for **Technical Parameters** which will be declared for the **CDGU** for the period of the test in accordance with SDC1 and shall also include details of the **Dispatch Instructions** which the **Generator** wishes the **TSO** to issue to it for the purposes of the test which may be outside the **Availability** and **Technical Parameters** to be so declared. Notwithstanding the other requirements in this OC11.8.2, in the case **Significant Tests**, **Generators** shall submit proposals to the **TSO** at least five **Business Days** before the test start date or, with the agreement of the **TSO**, no later than 09:00 two **Business Days** before the test start date.

OC11.8.2 The **TSO** shall be entitled to refuse to conduct any test requested under OC11.8.1 (or refuse to conduct it in accordance with the procedure or at the time requested) if, in the **TSO's** reasonable opinion, it is unsafe for the **NI System** to conduct such a test or if it is otherwise not practicable to do so (or to do so in accordance with the procedure or at the time requested) for **System** or any other reasons, including if all reasonable costs and expenses of the **TSO** are not, in the **TSO's** reasonable view, adequately covered by the **User**. The **TSO** may only continue to refuse to conduct the test (or to conduct it in accordance with the procedure) for so long as these reasons continue.

OC11.8.3

(a) If the **TSO** refuses to conduct the test, either at all or in accordance with the procedure or at the time requested, the **TSO** and the **Generator** may discuss an alternative form of test or procedure for conducting the test or timing of the test to see whether agreement can be reached.

(b) If the **TSO** agrees to the test taking place, to the procedure for conducting the test and to the time of the test, either in response to the original request or following the discussion referred to in (a) above, it will notify the **Generator** accordingly.

(c) If the **TSO** does not (following the discussion referred to in (a)) agree to the test taking place, then it will not take place, provided that as indicated in OC11.8.2 above, the **TSO** may only continue to refuse to conduct the test for so long as the reasons set out in that paragraph continue to apply.

(d) If the **TSO** does not (following such discussion) agree to the procedure for conducting the test, then if the test is to go ahead, the **TSO's** requirements relating to the procedure will prevail, unless the reasons set out in OC11.8.2 above no longer continue.

(e) If the **TSO** does not (following such discussion) agree to the timing of the test, then if the test is to go ahead, the **TSO's** requirements relating to timing will prevail.

OC11.8.4

(a) The **TSO** may then, in accordance with the agreed (or otherwise settled) procedure and timing and if agreed by the **Generator**, send representatives to the **Power Station** in order to witness the test.

(b) The **Generator** must, if agreed under (a) above, allow the **TSO** witnesses access to all relevant parts of its **Power Station** in order to witness such a test.

(c) The **TSO** shall take all reasonable steps to ensure that any representatives that it sends to the **Power Station** pursuant to (a) above comply at all times with all

relevant safety requirements of the **Generator** of which they are made aware and with all reasonable directions of the **Generator** and (but subject to (b) above) any reasonable restrictions on access whilst at the **Power Station** in question.

OC11.9 **COMMISSIONING/ACCEPTANCE TESTING**

The CC reflects the **Commissioning/Acceptance Testing** which will be required under each **Connection Agreement** for **User's Equipment** prior to being certified as acceptable to be and remain connected (or to be reconnected) to the **Transmission System** and for modifications to existing **User's Equipment.**

OC11 PART A – APPENDIX

TABLE A

TABLE OF **TOLERANCE BANDS** FOR **DISPATCH INSTRUCTIONS**

DISPATCH CHARACTERISTIC	**Wide Tolerance Band**	Maximum period of **Monitoring** at **Wide Tolerance Band**	**Narrow Tolerance Band**	Max. period of **Monitoring** at **Narrow Tolerance Band**
Active Power (**MW**)	±5**MW** or ± 5% of **Dispatched Load** whichever is greater	6 hours	**Maximum Tolerance Band:** + 1**MW** and -5**MW**. **Minimum Tolerance Band**: -1**MW** and +5**MW**.	30 minutes
Reactive Power (Mvar)	±10 **Mvar**	2 hours	±5 **Mvar**	1 hour
Loading Rate (**MW**/min)	±5% or ±2 minutes for period to achieve **Load** whichever is longer	period to achieve **Load**	Not Applicable	Not Applicable
Synchronising Time	±5 minutes	Not Applicable	Not Applicable	Not Applicable
Governor Droop	3.5-5.5%	Not Applicable	Not Applicable	Not Applicable

OC11 PART A – APPENDIX

TABLE B

TABLE OF **TOLERANCE BANDS** FOR **DISPATCH INSTRUCTIONS: GAS TURBINE UNITS**

DISPATCH CHARACTERISTIC	**Wide Tolerance Band**	Maximum period of **Monitoring** at **Wide Tolerance Band**	**Narrow Tolerance Band**	Max. period of **Monitoring** at **Narrow Tolerance Band**
Active Power (MW)	**± 3MW**	**2 hours**	**Maximum Tolerance Band: +1MW and -5MW Minimum Tolerance Band: -1MW and +5MW**	**30 Minutes**
Reactive Power (Mvar)	**± 5Mvar**	**2 hours**	**± 3Mvar**	**30 minutes**
Loading Rate (**MW**/min)	**± 5%**	**period to achieve Load**	**Not applicable**	**Not applicable**
Synchronous Compensation	**± 5Mvar**	**2 hours**	**± 3Mvar**	**30 minutes**
Governor Droop	**4%**	**Not applicable**	**Not applicable**	**Not applicable**

PART B – ALL USER'S EQUIPMENT OTHER THAN PPA CDGUS

OC11.10 **MONITORING**

OC11.10.1 Procedure for **Monitoring**

OC11.10.1.1 **Monitoring** of **User's Equipment** is normally continuous or continuous for periods of time, and involves the analysis of the output of **Monitoring** equipment (as required or permitted under the CC and/or relevant **Connection Agreements** and/or **SSS Agreements** and/or the **MC**), **Generator Aggregator System Operator Agreement (SOA)** or by such other methods as the **TSO** shall reasonably determine are appropriate in the circumstances. It does not require advance notification from the **TSO** to **Users**.

OC11.10.2 Compliance with **Dispatch Instructions**

OC11.10.2.1 The **TSO** will **Monitor CDGUs, Aggregated Generating Units** and **Interconnectors (**referred to in the following paragraphs of this OC11.10 as **"Relevant Plant")** in accordance with the following provisions of this OC11.10.2 when it wishes to determine whether they are being operated in compliance with **Dispatch Instructions**.

OC11.10.2.2 In determining whether **Relevant Plant** has complied, or is complying, with a **Dispatch Instruction**, the **TSO** shall in each case give due regard to operating conditions on the **NI System**. The **TSO** shall also apply the **Tolerance Bands** set out in the relevant table in the Appendix to this OC11 Part B to the **Monitoring** of the relevant **Dispatch Characteristic**, as indicated in the relevant paragraphs of this OC11 Part B, and shall also apply the **Conversion Factors** and **Additional Conversion Factors** where appropriate. The **TSO** shall, when **Monitoring Active Power** or **Reactive Power**, select either the **Wide Tolerance Band** (for **Monitoring** sustained performance) or the **Narrow Tolerance Band** (for **Monitoring** stability over a short period). When **Monitoring** on the **Narrow Tolerance Band**, the **TSO** will select either the **Maximum Tolerance Band** or the **Minimum Tolerance Band**. In the event of a **Frequency Transient** occurring whilst the **TSO** is **Monitoring** the compliance by **Relevant Plant** (regardless of which **Tolerance Band** is being applied by the **TSO** at the time) to which the **CDGU** responds in accordance with the relevant **User's** obligations to provide **Operating Reserve**, the **CDGU** shall not fail the **Monitoring** by reason of such response.

OC11.10.2.3 (a) If, having applied the relevant **Tolerance Band**, and, where appropriate, **Conversion Factors** and **Additional Conversion Factors** the **TSO** suspects that any **Relevant Plant** has not complied, or is not complying, with a **Dispatch Instruction**, the **TSO** will, if it wishes to continue with the **Monitoring** inform the relevant **User** by submitting a **Warning Notice** (either orally or in writing) and, subject to the requirements of **System** security (which may require the **Dispatch Instruction** to be cancelled in which case the **Warning Notice** will be

deemed to have been withdrawn), the **TSO** will allow the **User** 10 minutes after such notice to comply with the **Dispatch Instruction**.

(b) If in that 10 minute period the **User** still fails to comply with the **Dispatch Instruction**, the **TSO** may give notice to the **User** by submitting a **Monitoring Notice** (either orally or in writing) that the **Relevant Plant** is being **Monitored**.

(c) The **Monitoring Notice** will:

(i) identify the **Dispatch Characteristic(s)** which is being **Monitored** and the underlying **Technical Parameter(s**);

(ii) specify, if relevant, whether the **Tolerance Band** to be used is the **Wide Tolerance Band** or the **Narrow Tolerance Band**; and

(iii) specify, if relevant, whether the **Narrow Tolerance Band** is to apply as a **Maximum Tolerance Band** or as a **Minimum Tolerance Band**.

(d) The **User** has the right, before the issue of the **Monitoring Notice**, or at any time thereafter by submitting to the **TSO** an **Availability Notice**, a **Technical Parameters Notice** or a **Technical Parameters Revision Notice** (as the case may be), to re-declare **Availability** or the **Technical Parameters** (in accordance with the provisions of SDC1) in respect of the **Dispatch Characteristic(s)** to be **Monitored**, such re-declaration to take effect from the time of receipt of the **Warning Notice** by the **User**. In the event that the **User** submits to the **TSO** an **Availability Notice** or a **Technical Parameters Notice** or a **Technical Parameters Revision Notice** at or about the same time as the **TSO** submits to the **User** a **Post Event Notice** (or **Interim Post Event Notice**) pursuant to the following provisions of this OC11.10.2 seeking to re-register the **Availability** or the same **Technical Parameter** (as the case may be) of the **Relevant Plant** in question to a different value, then the value of **Availability** or the value of the relevant **Technical Parameter** shall be deemed to be redeclared to the inferior of the values specified in the two notices.

(e) The period of **Monitoring** shall not exceed the period set out in the relevant table in the Appendix to this OC11 Part B for the relevant **Dispatch Characteristic(s)** and the selected **Tolerance Band**.

OC11.10.2.4 At the end of the period of **Monitoring**, if the **User** has achieved each **Dispatch Instruction** for the period of the **Monitoring** within the relevant **Tolerance Band**, the **Relevant Plant** will be deemed to have complied with each **Dispatch Instruction**.

OC11.10.2.5 If the average value of the **Dispatch Characteristic(s)** in any 5 minute period during the period of **Monitoring** falls outside the relevant **Tolerance Band** the **TSO** may by submitting a **Post Event Notice** to the **Generator** re-register the value of **Availability** or the value of the relevant **Technical Parameter** corresponding to that **Dispatch Characteristic** to the most inferior value outside the **Tolerance Band** for any 5 minute period during the period of **Monitoring** (with effect from the **Imbalance Settlement Period** in which the **Monitoring Notice** was issued) and the **TSO** may also notify the **Generator** not later than 10 minutes before the end of the period of **Monitoring** that it will continue to **Monitor** the **Relevant Plant** for a further period not exceeding that

shown in the relevant Table in the Appendix to this OC11 Part B in respect of the particular **Dispatch Characteristic** and with reference to the relevant or selected **Tolerance Band**.

OC11.10.2.6 If at the end of the further period of **Monitoring** the average value of the **Dispatch Characteristic(s)** in any 5 minute period during the **Monitoring** falls outside the relevant **Tolerance Band**, the **TSO** may re-register the value of the **Availability** or the value of the relevant **Technical Parameter** corresponding to that **Dispatch Characteristic** to the most inferior value for any 5 minute period during the period of **Monitoring** (with effect from the **Imbalance Settlement Period** in which the **Monitoring Notice** was issued). Further periods of **Monitoring** may also take place, in accordance with the procedure set out in OC11.10.2.5 and the provisions of this OC11.10.2.6 will apply to such further periods of **Monitoring**.

OC11.10.2.7 (a) If (other than pursuant to a **Dispatch Instruction** to **De-Load**) the average value of **Output** for any 5 minute period is less than 80% of the average **Output** for either of the two immediately preceding 5 minute periods, the **TSO** may issue a **Post Event Notice** re-registering the **Availability** of the **Relevant Plant** at the level consistent with its average value for that 5 minute period with effect from the beginning of the **Imbalance Settlement Period** in which such 5 minute period commenced.

(b) If (following a **Dispatch Instruction** to **De-Load**) the average value of **Active Power** for any 5 minute period is less than 80% of the average value of **Active Power** which would have been generated by the **Relevant Plant** for such 5 minute period had it been **De-Loaded** at its maximum **De-Loading** rate (registered as a **Technical Parameter**), the **TSO** may issue a **Post Event Notice** re-registering the **Availability** of the **CDGU** at the level consistent with the average value for that 5 minute period with effect from the beginning of the **Imbalance Settlement Period** in which such 5 minute period commenced.

OC11.10.2.8 Prior to submitting a **Post Event Notice**, the **TSO** may deliver an **Interim Post Event Notice** to the **User** not later than 2 hours after:

(a) in the case of an event of the type specified in OC11.10.2.7 (a) or (b) the end of the **Imbalance Settlement Period** during which the event occurred; or

(b) in the case of instances of **Monitoring**, the end of the relevant period of **Monitoring,**

if it is not reasonably practicable for the **TSO** to deliver a **Post Event Notice** to the **User** within that time.

OC11.10.2.9 An **Interim Post Event Notice** shall specify:

(a) the **Imbalance Settlement Period** during which the event of the type specified in OC11.10.2.7 (a) or (b) occurred and, in the instance of **Monitoring**, the **Imbalance Settlement Period** during which the relevant **Warning Notice** was issued; and

(b) the matters or values which the **TSO** intends to redeclare in a **Post Event Notice** as a result of what happened.

OC11.10.2.10 A **Post Event Notice** shall not be validly issued:

(a) if submitted to the **User** under OC11.10.2.5 later than 5pm on the 5th **Business Day** following the day on which the **Monitoring** was undertaken or, in the case of an event of the type specified in OC11.10.2.7(a) or (b), later than 5pm on the 5th **Business Day** following the day on which the event occurred;

(b) if submitted to the **User** under OC11.10.2.5 later than 2 hours after the end of the relevant period of **Monitoring** or, in the case of an event of the type specified in OC11.10.2.7 (a) or (b), later than 2 hours after the **Imbalance Settlement Period** in which the event occurred and no **Interim Post Event Notice** was issued in accordance with OC11.10.2.9; or

(c) to the extent that the **Post Event Notice** re-registers matters or values that were not specified in an **Interim Post Event Notice** issued in accordance with OC11.10.2.9.

OC11.10.3 **Demand Side Units**

A **Demand Side Unit** shall be deemed compliant with a **Dispatch Instruction** if:

(i) the **Demand Side Unit MW Response** of the **Dispatch Instruction** is achieved in the **Demand Side Unit MW Response Time** and maintained until the subsequent **Dispatch Instruction** or until the **Maximum Down-Time** of the **Demand Side Unit** has elapsed; and

(ii) the **Demand Side Unit Performance Monitoring Percentage Error** is less than 5% for each full half-hour **Meter** period of the **Demand Side Unit MW Response** for 90% of the last ten **Dispatches** or 90% of the **Dispatches** in a three-hundred and sixty-five day period

or

the **Demand Side Unit Performance Monitoring Error** is less than 0.25 **MWh** for each full half-hour **Meter** period of the **Demand Side Unit MW Response** in 90% of the last ten **Dispatches** or 90% of the **Dispatches** in a three-hundred and sixty-five day period; and

(iii) the **Demand Side Unit Performance Monitoring Percentage Error** is less than 10% for each full half-hour **Meter** period of the **Demand Side Unit MW Response**

or

the **Demand Side Unit Performance Monitoring Error** is less than 0.5 **MWh** for each full half-hour **Meter** period of the **Demand Side Unit MW Response**; and

(iv) the **Demand Side Unit Performance Monitoring Percentage Error** is on average less than 5% for each full half-hour **Meter** period of the **Demand Side Unit MW Response**

or

the **Demand Side Unit Performance Monitoring Error** is on average less than 0.25 MWh for each full half-hour **Meter** period of the **Demand Side Unit MW Response**; and

(v) the **Demand Side Unit SCADA Percentage Error** is less than 5% or the **Demand Side Unit SCADA Error** is less than 0.5 **MWh**.

OC11.10.4 **Operating Reserve** capability

OC11.10.4.1 **Monitoring** to determine whether a **Relevant Plant** is able to achieve its **Primary Operating Reserve, Secondary Operating Reserve** and/or **Tertiary Operating Reserve band 1 (**for the purposes of this OC11 Part B, **"Relevant Operating Reserve")** capability will be undertaken by the **TSO** in accordance with the applicable **Agreed Testing and Monitoring Procedure.**

OC11.10.4.2 If a **Relevant Plant** is found by the **TSO** to be non-compliant pursuant to OC11.10.4.1 the **TSO** may re-register the value of the **Generator's** declared **Relevant Operating Reserve** in accordance with the provisions of the applicable **Agreed Testing and Monitoring Procedure**.

OC11.11 **TESTING**

OC11.11.1 Procedure for **Testing**

OC11.11.1.1 In circumstances where the **TSO** reasonably considers that, in relation to a **CDGU, Controllable PPM, Demand Side Unit** or item of **User's Equipment**, a **User** might be failing to comply or might in the foreseeable future fail to comply with the relevant **Design and Operating Requirements** (or the requirements of the **SSS Agreement**, as the case may be), the **TSO** may, upon giving reasonable notice identifying the **Design and Operating Requirement** concerned, send representatives to the relevant **Power Station** or **User Site** in order to verify by **Testing** or inspection (in the case of **Testing** conducted by the **User**) whether in relation to the **CDGU, Controllable PPM, Demand Side Unit** or item of **User's Equipment**, as the case may be, the **Design and Operating Requirement** (or **SSS Agreement** requirement, and the case may be) is being complied with. The **Test** or inspection may involve the giving of specific **Dispatch Instructions** within the provisions of SDC2, including instructions in connection with **Black Starts** and **Dispatched Fuel Notices**. The period of notice which is reasonable will depend upon all the circumstances, including the **Design and**

Operating Requirement (or **SSS Agreement** requirement, as the case may be) in question.

OC11.11.1.2 A **Generator, Demand Side Unit Operator** or other **User**, as the case may be, must allow the **TSO** representatives access to all relevant parts of its **Power Station** or **User Site** for the purposes of this OC11.11.

OC11.11.1.3 In the case of a **Test** of **Relevant Operating Reserve** capability or any other **Test** that falls within the scope of an **Agreed Testing and Monitoring Procedure**, the procedure for conducting the **Test** and the criteria for passing the **Test** will be as set out in the applicable **Agreed Testing and Monitoring Procedure.** If a **Test** falls outside the scope of the **Agreed Testing and Monitoring Procedures**, the procedure for the **Test**, and the criteria for passing the **Test** will, if not agreed between the **TSO** and the **Generator, Demand Side Unit Operator** or other **User**, be as determined by the **TSO** acting reasonably and as notified to the **Generator, Demand Side Unit Operator** or other **User**, as the case may be, at the time and the **Generator, Demand Side Unit Operator** or other **User**, as the case may be, will comply with all reasonable instructions of the **TSO** in carrying out the **Test**.

OC11.11.1.4 If the procedure for the **Test**, and the criteria for passing the **Test**, are determined by the **TSO** under OC11.11.1.3 and, within 48 hours after completion of the **Test**, the **User** notifies the **TSO** in writing that it objects to the procedure and/or the criteria which were used for the **Test**, then the question of whether the **Test** procedure and/or the criteria were valid shall:

(a) in the case of a **Design and Operating Requirement** contained in the **Grid Code**, be decided in accordance with the relevant dispute resolution procedure set out in the **User's** relevant **Connection Agreement**, **Transmission Use of System Agreement** or **Grid Code Compliance Agreement**; or

(b) in the case of a **Design and Operating Requirement** contained in the **User's** relevant **Connection Agreement**, **Transmission Use of System Agreement** or **Grid Code Compliance Agreement** be decided in accordance with the relevant dispute resolution procedure set out in the **User's** relevant **Connection Agreement, Transmission Use of System Agreement** or **Grid Code Compliance Agreement**; or

(c) in the case of a requirement contained in the **User's** relevant **SSS Agreement**, be decided in accordance with the relevant dispute resolution procedure set out in the **User's** relevant **SSS Agreement,**

and, in any such case, the effects of the **Test** shall be suspended until such time as it has been determined that the procedure for the **Test** or the criteria for passing the **Test** were valid. If it is determined that the procedure for the **Test** or the criteria for passing the **Test** were not valid, then the **Test** shall not be effective for the purposes of the relevant **Agreement** or the **Grid Code**, as the case may be. The **TSO** may, however, conduct a further **Test** in accordance with this OC11.11 (including this OC11.11.1.4).

OC11.11.1.5 (a) In determining whether the **CDGU**, **Controllable PPM, Demand Side Unit**s or item of **User's Equipment**, as the case may be, has passed a **Test**, due regard will be given by the **TSO** to operating conditions on the **NI System** and (where

applicable) the relevant **Tolerance Bands** will be applied to the relevant matters being **Tested** as set out in the Appendix to this OC11 Part B and the **Conversion Factors** and the **Additional Conversion Factors** shall also be applied where appropriate.

(b) If, within 48 hours after completion of the **Test**, the **User** notifies the **TSO** in writing that it disagrees that the results show that the **CDGU**, **Controllable PPM, Demand Side Unit** or item of **User's Equipment** has failed the **Test**, then the question of whether the **Test** has been passed or failed shall:

(i) in the case of a **Design and Operating Requirement** contained in the **Grid Code**, be decided in accordance with the relevant dispute resolution procedure set out in the **User's** relevant **Connection Agreement**, **Transmission Use of System Agreement** or **Grid Code Compliance Agreement**; or

(ii) in the case of a **Design and Operating Requirement** contained in the **User's** relevant **Connection Agreement**, **Transmission Use of System Agreement** or **Grid Code Compliance Agreement**, be decided in accordance with the relevant dispute resolution procedure set out in the **User's** relevant **Connection Agreement**, **Transmission Use of System Agreement** or **Grid Code Compliance Agreement**; or

(iii) in the case of a requirement contained in the **Users** relevant **SSS Agreement**, be decided in accordance with the relevant dispute resolution procedure set out in the **User's** relevant **SSS Agreement**,

and, in any such event, the effects of the **Test** shall be suspended until such time as it has been determined that the **CDGU, Demand Side Unit** or item of **User's Equipment** has failed the **Test**.

OC11.11.2 Consequences of failing a **Test**

OC11.11.2.1 If in relation to the **CDGU, Demand Side Unit** or item of **User's Equipment**, as the case may be, the **Generator** or **Demand Side Unit** fails the **Test** then:

(a) if the **Design and Operating Requirement** is one under the **Grid Code**, the **TSO** may, in the case of those **Design and Operating Requirements** where a parameter or other data item can be registered (that is, those other than CC parameters), re-register the value of the relevant **Design and Operating Requirement** to reflect the lower level of compliance shown by the **Test**;

(b) the **User** will, if the **Design and Operating Requirement** is one under a **Connection Agreement**, **Transmission Use of System Agreement** or **Grid Code Compliance Agreement** to which it is a party, be subject to such consequences (if any) as may arise under that agreement; and

(c) the **User** will, if it is a **SSS Agreement** requirement, be subject to such consequences as may arise under that agreement.

OC11.12 **INVESTIGATION**

OC11.12.1 The **TSO** may, if it reasonably considers that there may be an issue of non-compliance by the **User,** carry out an **Investigation** to acquire or verify information relevant to **User's Equipment** design, operation or connection requirements under the **Grid Code, Connection Agreements, Generator Aggregator System Operator Agreement (SOA)** and **System Support Service Agreements** between **Users** and the **TSO**.

OC11.12.2 Investigation by the **TSO** usually applies to information not collected on a regular basis by means of **Monitoring** and **Testing**. The **TSO** may, having given not less than 2 **Business Days**' notice, send a representative or subcontractor to a **User's Site** in order to investigate any equipment or operational procedure on or applicable to the **User Site** insofar as the condition of that equipment or operational procedure is relevant to compliance with the **Grid Code, Connection Agreements**, and/or other agreements between **Users** and the **TSO**. A site visit by the **TSO** or his representative, as part of an **Investigation** will, generally not take place less than 2 days before or after **Testing**.

OC11.12.3 An **Investigation** shall not of itself result in consequences for the **User** under the **Grid Code** or **Connection Agreement**.

OC11.12.4 These provisions shall be without prejudice to the **TSO's** rights of access under any other document or agreement.

OC11.13 TESTING AT THE REQUEST OF A **GENERATOR** OR **USER**

OC11.13.1 A **Generator, Demand Side Unit Operator** or other **User**, as the case may be, shall, subject to OC11.13.2, be entitled, by notice in writing setting out the desired procedure (or, if the **TSO** acting reasonably so agrees, taking into account the nature of the test being requested, by oral request specifying the desired procedure, such oral request to be confirmed in writing as soon as reasonably practicable thereafter), to request the **TSO** to assist it (by **Dispatch**) in carrying out a test on any of its **CDGUs, Demand Side Unit** or **User's Equipment**, as the case may be, as such **Generator, Demand Side Unit Operator** or other **User**, acting reasonably in accordance with **Prudent Operating Practice**, may request. In the case of a test (other than an on-**Load** valve test) on a **CDGU** or **Demand Side Unit Operator** the procedure set out in the notice or specified in the oral request (as the case may be) shall include the level of **Availability** and the values for **Technical Parameters** which will be declared for the **CDGU, Demand Side Unit, Aggregated Generating Unit** or **Interconnector** for the period of the test in accordance with SDC1 and shall also include details of the **Dispatch Instructions** which the **Generator** or **Demand Side Unit Operator** wishes the **TSO** to issue to it for the purposes of the test which may be outside the **Availability** and **Technical Parameters** to be so declared.

OC11.13.2 The **TSO** shall be entitled to refuse to conduct any test requested under OC11.13.1 (or refuse to conduct it in accordance with the procedure or at the time requested) if, in the **TSO's** reasonable opinion, it is unsafe for the **NI System** to conduct such a test or if it is otherwise not practicable to do so (or to do so in accordance with the procedure or at the time requested) for **System** or any other reasons, including if all reasonable costs and expenses of the **TSO** are not, in the **TSO's** reasonable view, adequately covered by the **User**. The **TSO** may only continue to refuse to conduct the test (or to conduct it in accordance with the procedure) for so long as these reasons continue.

OC11.13.3 (a) If the **TSO** refuses to conduct the test, either at all or in accordance with the procedure or at the time requested, the **TSO** and the **Generator, Demand Side Unit Operator** or other **User**, as the case may be, may discuss an alternative form of test or procedure for conducting the test or timing of the test to see whether agreement can be reached.

(b) If the **TSO** agrees to the test taking place, to the procedure for conducting the test and to the time of the test, either in response to the original request or following the discussion referred to in (a) above, it will notify the **Generator, Demand Side Unit Operator** or other **User**, as the case may be, accordingly.

(c) If the **TSO** does not (following the discussion referred to in (a)) agree to the test taking place, then it will not take place, provided that as indicated in OC11.13.2 above, the **TSO** may only continue to refuse to conduct the test for so long as the reasons set out in that paragraph continue to apply.

(d) If the **TSO** does not (following such discussion) agree to the procedure for conducting the test, then if the test is to go ahead, the **TSO's** requirements relating to the procedure will prevail, unless the reasons set out in OC11.13.2 above no longer continue.

(e) If the **TSO** does not (following such discussion) agree to the timing of the test, then if the test is to go ahead, the **TSO's** requirements relating to timing will prevail.

OC11.13.4 (a) The **TSO** may then, in accordance with the agreed (or otherwise settled) procedure and timing and if agreed by the **User**, send representatives to the **Power Station** or **User Site**, as the case may be, in order to witness the test.

(b) The **Generator, Demand Side Unit Operator** or other **User**, as the case may be, must, if agreed under (a) above, allow the **TSO** witnesses access to all relevant parts of its **Power Station** or **User Site** in order to witness such a test.

(c) The **TSO** shall take all reasonable steps to ensure that any representatives that it sends to the **Power Station** or **User Site** pursuant to (a) above comply at all times with all relevant safety requirements of the **Generator, Demand Side Unit Operator** or other **User** (as the case may be) of which they are made aware and with all reasonable directions of the **Generator** or **Demand Side Unit Operator** and (but subject to (b) above) any reasonable restrictions on access whilst at the **Power Station** or **User Site** in question.

OC11.14 **COMMISSIONING/ACCEPTANCE TESTING**

The CC reflects the **Commissioning/Acceptance Testing** which will be required under each **Connection Agreement** for **User's Equipment** prior to being certified as acceptable to be and remain connected (or to be reconnected) to the **Transmission System** and for modifications to existing **User's Equipment.**

OC11 PART B – APPENDIX

TABLE A

TABLE OF **TOLERANCE BANDS** FOR **DISPATCH INSTRUCTIONS**

DISPATCH CHARACTERISTIC	**Wide Tolerance Band**	Maximum period of **Monitoring** at **Wide Tolerance Band**	**Narrow Tolerance Band**	Max. period of **Monitoring** at **Narrow Tolerance Band**
Active Power (**MW**)	±5**MW** or ± 5% of **Dispatched Load** whichever is greater	6 hours	**Maximum Tolerance Band:** + 1**MW** and -5**MW**. **Minimum Tolerance Band**: -1**MW** and +5**MW**.	30 minutes
Reactive Power (Mvar)	±10 **Mvar**	2 hours	±5 **Mvar**	1 hour
Loading Rate (**MW**/min)	±5% or ±2 minutes for period to achieve **Load** whichever is longer	period to achieve **Load**	Not Applicable	Not Applicable
Synchronising Time	±5 minutes	Not Applicable	Not Applicable	Not Applicable
Governor Droop	3.5-5.5%	Not Applicable	Not Applicable	Not Applicable

OC11 PART B – APPENDIX

TABLE B

TABLE OF **TOLERANCE BANDS** FOR **DISPATCH INSTRUCTIONS: GAS TURBINE UNITS**

DISPATCH CHARACTERISTIC	**Wide Tolerance Band**	Maximum period of **Monitoring** at **Wide Tolerance Band**	**Narrow Tolerance Band**	Max. period of **Monitoring** at **Narrow Tolerance Band**
Active Power (MW)	**± 3MW**	**2 hours**	**Maximum Tolerance Band:** **+1MW and -5MW** **Minimum Tolerance Band:** **-1MW and +5MW**	**30 Minutes**
Reactive Power (Mvar)	**± 5Mvar**	**2 hours**	**± 3Mvar**	**30 minutes**
Loading Rate (**MW**/min)	**± 5%**	**period to achieve Load**	**Not applicable**	**Not applicable**
Synchronous Compensation	**± 5Mvar**	**2 hours**	**± 3Mvar**	**30 minutes**
Governor Droop	**4%**	**Not applicable**	**Not applicable**	**Not applicable**

OC11 PART B – APPENDIX

TABLE C

TABLE OF **TOLERANCE BANDS** FOR **DISPATCH INSTRUCTIONS: DEMAND SIDE UNITS**

DISPATCH CHARACTERISTIC	**Tolerance Band**
Real Time Validation	
Active Power (MW)	**±5%** of the **Dispatch Instruction**
Post event validation	
Demand Side Unit Energy Profile – (metered **Demand + Demand Side Unit MW Response)**	**< ±5%** of the **Demand Side Unit Energy Profile**
Demand Side Units not **Dispatched** but declared **Available** in an **Availability Notice**	
Demand Side Unit Energy Profile – metered **Demand**	**< ± 5%** of the **Demand Side Unit Energy Profile**

SCHEDULING AND DISPATCH CODE NO.1

UNIT SCHEDULING

SDC1.1 INTRODUCTION

SDC1.1.1 **SEM** Provisions

(a) This Scheduling and Dispatch Code No. 1 ("SDC1") forms part of the **Sections under Common Governance** of the **Grid Code**. The **Sections under Common Governance** are those parts of the **Grid Code** which are under common governance in both the **Grid Code** and **the Other Grid Code**.

(b) The form of this SDC1 is similar to the SDC1 in the **Other Grid Code.** Differences relate to references to relevant power systems and related terms. Where there is a difference between a provision in this **Grid Code** and an equivalent provision in the **Other Grid Code**, the wording in question is shaded in grey. In addition, those parts of this SDC1 that are not part of the **Other Grid Code** are shaded in grey in this SDC1. Differences between the form of this SDC1 and the SDC1 in the **Other Grid Code** are summarised in Annex 1 to this SDC1.

(c) This SDC1 is intended to work in conjunction with other documents, including the **Trading and Settlement Code ("TSC")**. The provisions of the **Grid Code** and the **Other Grid Code** will take precedence over the **TSC**.

(d) Where stated in this SDC1, the obligation to submit data in relation to some of the information required to be provided to the **TSO** may be fulfilled by **Users** where such information submitted under the **TSC** by a **User** or by an **Intermediary** on behalf of **Users** is then provided to the **TSO** by the **Market Operator** in accordance with the **TSC**, as further provided in this SDC1. The **TSO** may require **Users** to verify or provide revisions to data received by it via the **Market Operator**.

(e) Further provisions dealing with the **Sections under Common Governance** are contained in the **General Conditions**.

SDC1.1.2 SDC1 sets out the procedure used by the **TSO** to develop unit commitment **Schedules** in respect of **CDGU's, Controllable PPMs** and **Demand Side Units** including the requirements for **Users** to submit data to support this procedure:

(a) **Availability**: the submission by a **User** to the **TSO** of an **Availability Notice** in respect of each of its:

(i) **CDGUs** (which for the avoidance of doubt comprise, **Generating Units** subject to **Central Dispatch**, **CCGT Installations**, **Hydro Units**, **Pumped Storage Generation** (but

not **Pumped Storage Plant Demand**) and **Dispatchable PPMs**);

(ii) **Pumped Storage Plant Demand**;

(iii) **Energy Storage Power Station Demand**;

(iv) **Interconnector Availability** (in the case of the **Interconnector Owner**);

(v) **Demand Side Units**;

(vi) in the case of **Generator Aggregators**, its **Aggregated Generating Units**; and

(vii) **Controllable PPMs.**

(b) **Technical Parameters**: the daily notification to the **TSO** of the **Technical Parameters**, in respect of the following **Trading Day**, by each **User** in a **Technical Parameters Notice**, notification of **Other Relevant Data** and notification of other technical data including **System Support Services** capability;

(c) **Commercial Offer Data**: the notification of **Commercial Offer Data** in accordance with the **TSC**;

(d) **Physical Notifications:** the declaration by a **User** to the **TSO** of **Physical Notifications** data in accordance with the **TSC**;

(e) **Interconnector Schedule Quantities**: the declaration by a **Scheduling Agent** to the **TSO** of **Interconnector Schedule Quantities** in accordance with the **TSC**;

(f)

(f) Revisions/**Re-declarations:** revisions / **Re-declarations** by **Electronic Interface** or by other form as the **TSO** may reasonably notify to each **User** from time to time of any real time changes in the information submitted in an **Availability Notice**, **Additional Grid Code Availability Notice**, **Technical Parameters Notice, Additional Grid Code Characteristics Notice, Commercial Offer Data** notification and **Physical Notifications** as provided for this in SDC1

(g) **Indicative Operations Schedules**: the periodic production and issuing by the **TSO** of **Indicative Operations Schedules** as required under SDC1.4.8.9 as a statement of which:

(i) **CDGUs;**

(ii) **Pumped Storage Plant Demand;**

(iii) **Energy Storage Power Station Demand;**

(iv) **Interconnectors;**

(v) **Demand Side Units;**

(vi) **Aggregated Generating Units;** and/or

(vii) **Controllable PPMs**

may be required.

SDC1.1.3 The **TSO** (in conjunction with the **Other TSO**) shall develop, maintain and publish the process describing the methodology and parameters to be used by the **TSO** (and the **Other TSO**) in discharging their role under this SDC1 and SDC2.

SDC1.1.4 In respect of **PPA Generation** the provisions of Appendix B prevail and replace, as stated, the other parts of this SDC1 in relation to such **PPA Generation**.

SDC1.2 OBJECTIVE

The objectives of SDC1 are:

(a) to ensure (so far as possible) the integrity of the **Transmission System** and to ensure that the **TSO** acts in conjunction with the **Other TSO** so that the **Other TSO** can ensure the integrity of the **Other Transmission System** (with the **Other TSO** having a similar objective);

(b) to ensure the security and quality of supply in relation to the **Transmission System** and to ensure that the **TSO** acts in conjunction with the **Other TSO** so that the **Other TSO** can ensure the security and quality of supply in relation to the **Other Transmission System** (with the **Other TSO** having a similar objective);

(c) to ensure that sufficient available capacity is **Scheduled** to meet the electrical power **Demand**, and thereby in conjunction with the **Other TSO** to ensure that there is sufficient capacity to meet the **Demand** on the Island of Ireland at all times and in both cases together with an appropriate margin of reserve;

(d) to enable the **TSO**, in conjunction with the **Other TSO**, to prepare **Indicative Operations Schedules** to be used in the **Scheduling** and **Dispatch** process;

(e) to ensure that **Indicative Operations Schedules** are published as provided for in this SDC1;

and, subject to delivering the objectives in SDC1.2 (a), SDC1.2(b), and SDC1.2(c) and taking account of the factors set out in SDC1.4.8.3,

(f) minimise the cost of **Scheduled** divergence from the **Physical Notifications** in accordance with **Merit Order**, subject to SDC1.2(g);

(g) In fulfilling the objective in SDC1.2(c), minimise the requirement to issue **Notices to Synchronise** before **Gate Closure 2**.

SDC1.3 SCOPE

SDC1.3.1 SDC1 applies to the **TSO** and to the following **Users**:

(a) **Generators** with regard to their:
CDGUs; and
Controllable PPMs

(b) **Pumped Storage Generators** with regard to their **Pumped Storage Plant Demand**;

(c) **Energy Storage Generators** with regard to their **Energy Storage Power Station Demand**;

(d) In respect of the submission of **Availability Notices** under SDC1.4.1, **Interconnector Owners** with regard to their **Interconnectors**;

(e) In respect of the submission of **Interconnector Schedule Quantities** under SDC1.4.4.6, **Scheduling Agents** with regard to the scheduling of imports and exports across each **Interconnector** they have been nominated to schedule;

(f) **Demand Side Unit Operators** in relation to their **Demand Side Units**; and

(g) **Generator Aggregators** in respect of their **Aggregated Generating Units**.

Each of which (other than the **TSO**) is a "**User**" under this SDC1.

SDC1.3.2 In this SDC1, the term "**User**" shall include users of the **Distribution System** that fall under one of the above categories and are subject to **Central Dispatch**.

SDC1.3.3 The **TSO** shall inform the **DNO** as soon as reasonably practicable after it becomes aware that a **User** that is connected to the **Distribution System** is required to comply with the **Grid Code**.

SDC1.4 PROCEDURE

SDC1.4.1 **Availability Notice**

SDC1.4.1.1 Requirement

(a) Each **User** shall, by not later than the **Gate Closure 1** each day, notify the **TSO** by means of an **Availability Notice** (in such form as the **TSO** may reasonably notify from time to time or in the form published on the

TSO website) of changes to the **Availability** and/or **Demand Side Unit MW Availability** (as the case may be) of each of its:

(i) **CDGUs**;

(ii) **Controllable PPMs**;

(iii) **Pumped Storage Plant Demand**;

(iv) **Energy Storage Power Station Demand**;

(v) **Interconnectors** (to be submitted by the **Interconnector Owner**);

(vi) **Demand Side Units**; or

(vii) **Aggregated Generating Units** as the case may be.

(b) A **User** may satisfy this obligation by submitting the data under the **TSC**, unless the **TSO** requires, by notice to the **User**, the data to be submitted to it directly under the **Grid Code**.

(c) A **Generator Aggregator** will satisfy the obligation in this SDC1.4.1.1 by notifying to the **TSO** in an **Availability Notice** in the form described in paragraph (a) above the **Availability** of its **Aggregated Generating Units** as the case may be.

(d) As a general requirement, the **User** shall ensure that the data in any **Availability Notice** or any revision thereto is consistent with its obligations under SDC1.4.3.2 and SDC1.4.3.4.

SDC1.4.1.2 Content

(a) The **Availability Notice** shall state the **Availability** of the relevant **CDGU**, **Controllable PPM**, **Interconnector**, **Demand Side Unit, Energy Storage Power Station** or **Pumped Storage Plant Demand** or **Energy Storage Power Station Demand** as the case may be, (including, in the case of a **CCGT Installation**, the **Availability** of each of the **CCGT Modules** within it) for each **Imbalance Settlement Period** in the time up to an including the end of the relevant **Trading Day** (subject to revision under SDC1.4.3.6). A new **Availability Notice** will supersede the previous one in relation to **Availability** for **Imbalance Settlement Periods** which are covered by the new one.

(b) (b)

(c) In respect of **Interconnectors**, the **Availability Notice** shall state the physical capability of the **Interconnector**, and shall take account of any further restrictions placed by any relevant agreement or the provisions of any licence in respect of the **Interconnector**, but shall not otherwise take account of any expected transmission constraints or other aspects of the operation of the Transmission System or an **External System**. A new **Availability Notice** will supersede the previous one in relation to

Availability for **Imbalance Settlement Periods** which are covered by the new one.

(c) In the case of a **Generator Aggregator**, the **Availability Notice** shall state the **Availability** of its **Aggregated Generating Units** as a whole.

SDC1.4.1.3 Whole Numbers: The **MW** figure stated in the **Availability Notice** shall be a whole number.

SDC1.4.1.4 Atmospheric Conditions: In the case of **CDGUs** and **Controllable PPMs** which are affected by ambient conditions, an **Availability Notice** submitted by a **Generator** shall be stated as being the **User's** best estimate of the prevailing atmospheric conditions for the **Imbalance Settlement Period** to which each part of the **Availability Notice** relates.

SDC1.4.2 **Additional Grid Code Availability Notice**

The following items are required to be submitted by each **User** by no later than the **Gate Closure 1** each day, with the exception of **Aggregators** and **Demand Side Unit Operators**, direct to the **TSO**, regardless of whether these have to be submitted under the **TSC**. The requirements in SDC1.4.1 in relation to data apply to this SDC1.4.2 as if repeated here.

SDC1.4.2.1 Fuels: In the case where a **CDGU** is capable of firing on different fuels, then the **Generator** shall submit an **Availability Notice** setting out the information in SDC1.4.1 above for each fuel for the **CDGU**. The provisions of this SDC1.4.2.1 shall, with respect to **PPA Generation**, be read in conjunction with the provisions of SDC1.B.3.1

SDC1.4.2.2 **CCGT Availability**

(a) The **Availability** of each **CCGT Module** within each **CCGT Installation**;

CCGT Installations

(b) In the case of a **CCGT Installation**, the **CCGT Installation Matrix** submitted by the **Generator** under PCA2.3.4 of the **Planning Code** (as may be revised as therein provided is used and relied upon by the **TSO** as a 'look up table' to determine the number of **CCGT Modules** within a **CCGT Installation** which will be synchronised to achieve the **MW Output** specified in a **Dispatch Instruction**. When using a **CCGT Installation Matrix** for **Scheduling** purposes, the **TSO** will take account of any updated information on the individual **Availability** of each **CCGT Module** contained in an **Availability Notice** submitted by a **Generator** pursuant to this SDC1. The individual **Availability** figures submitted under this SDC1.4.2.2 must be consistent with the **Generator's** submission under the **TSC**.

(c) It is accepted that in cases of change in **MW Output** in response to **Dispatch** instructions issued by the **TSO**, there may be a transitional variance to the conditions reflected in the **CCGT Installation Matrix**.

Each **Generator** shall notify the **TSO** as soon as practicable after the event of any such variance.

(d) In achieving a **Dispatch Instruction** the range or number of **CCGT Modules** envisaged in moving from one **MW Output** level to the other should not be departed from.

(e) There is a provision in SDC1.4.5 for the **Generator** to revise the individual **Availability** of each **CCGT Module** within each **CCGT Installations**, subject always to the provisions of this SDC1.4.2.2;

(f) The **CCGT Installation Matrix** can only be amended such that the **CCGT Installation** comprises different **CCGT Modules** in accordance with PCA2.3.5.

SDC1.4.2.3 Constraints: Fuel constraints, emission constraints or any other technical related constraint which may affect the **Output** or **Demand Reduction** of a **Plant** as the case may be both immediately and in the longer term.

SDC1.4.3 **General Availability Requirements**

The provisions at SDC1.4.3.1, SDC1.4.3.2 and SDC1.4.3.3 do not apply to **PPA Generation** which is dealt with in Appendix B.1.

SDC1.4.3.1 **Availability** of **Generating Units**

Each **Generator** and **Generator Aggregator** shall in relation to its **CDGUs**, **Controllable PPMs** or **Aggregated Generating Units** maintain, repair, operate and fuel the **CDGU** and/or **Controllable PPM** and/or **Aggregated Generating Unit** as required by **Prudent Operating Practice** and any legal requirements applicable to its jurisdiction, with a view to providing the required **System Support Services** as provided for in a **System Support Services Agreement**.

SDC1.4.3.2 Each **Generator**, and where relevant each **Generator Aggregator**, shall, subject to the exceptions in SDC1.4.3.3 and SDC1.4.3.3A, use reasonable endeavours to ensure that it does not at any time declare in the case of its **CDGU**, **Controllable PPM**, or **Aggregated Generating Unit**, the **Availability** or **Technical Parameters** at levels or values different from those that the **CDGU, Controllable PPM**, and/or an **Aggregated Generating Unit** could achieve at the relevant time. The **TSO** can reject declarations to the extent that they do not meet these requirements.

SDC1.4.3.3 SDC1.4.3.2 shall not apply to the extent:

(a) it would require the **Generator** or, where relevant, the **Generator Aggregator** to declare levels or values better than the **Registered Capacity** and **Technical Parameters** as submitted under the **Planning Code** in respect of a **CDGU**, a **Controllable PPM** and/or an **Aggregated Generating Unit**;

(b) necessary during periods of **Planned Outage** or **Planned Maintenance Outage** or otherwise with the consent of the **TSO**;

(c) necessary while repairing or maintaining the **CDGU**, the **Controllable PPM** and/or the **Aggregated Generating Unit** or equipment necessary to the operation of the **CDGU**, the **Controllable PPM** and/or the **Aggregated Generating Unit** where such repair or maintenance cannot reasonably, in accordance with **Prudent Operating Practice** be deferred to a period of **Planned Outage** or **Planned Maintenance Outage**;

(d) necessary to avoid an imminent risk of injury to persons or material damage to property (including the **CDGU**, the **Controllable PPM** and/or the **Aggregated Generating Unit**); or

(d) it is not lawful for the **Generator** to operate the **CDGU**, the **Controllable PPM** and/or the **Aggregated Generating Units**.

SDC1.4.3.3A SDC1.4.3.2 shall not apply for a **CDGU, Controllable PPM, Aggregated Generating Unit**, **Energy Storage Power Station** or **Pumped Storage Plant Demand** that is disconnected during any one of the following:

(a) any **TSO** scheduled **Annual Maintenance Outage** or portion thereof on the **Outturn Availability Connection Asset.** Lasting up to and including a maximum of five days in total in a calendar year; or

(b) where work to the Transmission System is being carried out that is driven by the relevant **CDGU, Controllable PPM, Aggregated Generating Unit**, **Energy Storage Power Station** or **Pumped Storage Plant Demand** or driven by works related to the **Connection Agreement** of the relevant **CDGU, Controllable PPM, Aggregated Generating Unit**, **Energy Storage Power Station** or **Pumped Storage Plant Demand**. This does not include work carried out related to another Generating Unit with a different **Connection Point** but a shared asset.

The relevant **CDGU, Controllable PPM, Aggregated Generating Unit**, **Energy Storage Power Station** or **Pumped Storage Plant Demand** shall declare **Availability** at a value of zero during any one or more of (a) or (b) above, as advised by the **TSO**.

SDC1.4.3.4 **Availability of Demand Side Units**

Each **Demand Side Unit Operator** shall, subject to the exceptions in SDC1.4.3.5 and SDC1.4.3.5A, use reasonable endeavours to ensure that it does not at any time declare the **Demand Side Unit MW Availability** and the **Demand Side Unit** characteristics of its **Demand Side Unit** at levels or values different from those that the **Demand Side Unit** could achieve at the relevant time. The **TSO** can reject declarations to the extent that they do not meet these requirements.

SDC1.4.3.5 SDC1.4.3.4 shall not apply to the extent:

(a) it would require the **Demand Side Unit Operator** to declare levels or values better than **Demand Side Unit MW Capacity** and **Technical Parameters** as submitted under the Planning Code in respect of a **Demand Side Unit**;

(b) necessary during periods of **Planned Outage** or **Planned Maintenance Outage** or otherwise with the consent of the **TSO**;

(c) necessary while repairing or maintaining the **Demand Side Unit** or equipment necessary to the operation of the **Demand Side Unit** where such repair or maintenance cannot reasonably, in accordance with **Prudent Operating Practice**, be deferred to a period of **Planned Outage** or **Planned Maintenance Outage.**

(d) necessary to avoid an imminent risk of injury to persons or material damage to property (including the **Demand Side Unit**);

(e) it is not lawful for the **Demand Side Unit Operator** to change its **Demand Side Unit MW Response** or to operate its **Demand Side Unit**.

SDC1.4.3.5A SDC1.4.3.4 shall not apply for a **Demand Side Unit** that is disconnected during any one of the following:

(a) any **TSO** scheduled **Annual Maintenance Outage** or portion thereof on the **Outturn Availability Connection Asset.** Lasting up to and including a maximum of five days in total in a calendar year; or

(a) where work to the Transmission System is being carried out that is driven by the relevant **Demand Side Unit** or driven by works related to the **Connection Agreement** of the Demand Side Unit. This does not include work carried out related to another Generating Unit with a different **Connection Point** but a shared asset.

The relevant **Demand Side Unit** shall declare **Availability** at a value of zero during any one or more of (a) or (b) above, as advised by the **TSO**.

SDC1.4.3.6 Changes in **Availability**:

(a)

(i) A **User** must, as soon as reasonably practicable after it becomes aware of a change in its **Availability** in real time, submit, via **Electronic Interface** or in such other form as the **TSO** may reasonably notify each **User** from time to time, a declaration of its actual real time **Availability**.

(ii) A **User** must, as soon as reasonably practicable after it becomes aware of a change to the information in the **Availability Notice** submitted to the **TSO** under SDC1.4.1.1 and as provided in this SDC1, submit a **Re-declaration** to such **Availability Notice** in accordance with its obligations to make the **Unit Available** under SDC1.4.3 and Appendix B to this SDC1, such **Re-declaration** to be submitted via **Electronic Interface** or in such other form as the **TSO** may reasonably notify to each **User** from time to time.

(b) In the event that the **TSO** submits a **Post Event Notice** under OC11 in relation to any part of the period covered by the **Availability Notice** at any

time after submission of the **Availability Notice**, the **User** shall be deemed to have submitted a revised **Availability Notice** consistent with such **Post Event Notice**.

(c) The revisions to the **Availability Notice** may include revisions of the levels of **Availability** in the **CCGT Installation Matrix** reflecting the revised **Availability**.

(d) Additional **Availability Notice**: A User must, as soon as reasonably practicable after it becomes aware of a change to the information in the Additional Grid Code Availability Notice submitted to the TSO under SDC1.4.2 and as provided in this SDC1, submit a Re-declaration to such Additional Grid Code Availability Notice in accordance with its obligations to make the Unit Available under SDC1.4.3 and Appendix B to this SDC1, such Re-declaration to be submitted via Electronic Interface or in such other form as the TSO may reasonably notify each User from time to time.

(e) Increasing Availability: If a **Generator**, a **Generator Aggregator** or a **Demand Side Unit Operator** in respect of a **CDGU**, an **Aggregated Generating Unit,** a **Demand Side Unit, Energy Storage Power Station** or **Pumped Storage Plant** in relation to **Demand**, issues an **Availability Notice** or a **Re-declaration** increasing (from zero or otherwise) the level of **Availability** or **Demand Side Unit MW Availability** from a specified time, such notice shall be construed as meaning that:

(i) in the case of a **CDGU** and/or **Aggregated Generating Unit**, the **CDGU** and/or **Aggregated Generating Unit** is capable of being synchronised to the **Transmission System** or **Distribution System** at that specified time or increasing its **MW Output** at that specified time as the case may be;

(ii) in the case of a **CDGU** which is an **Open Cycle Gas Turbine**, the **CDGU** is capable of being started at that specified time; or

(iii) in the case of a **Demand Side Unit**, the **Demand Side Unit** is capable of delivering a greater **Demand Side Unit MW Response** at that specified time.

(f) **Controllable PPM:** If a **Generator** or, where relevant a **Generator Aggregator**, in respect of a **Controllable PPM**, issues an **Availability Notice** or a **Re-declaration** increasing (from zero or otherwise) or decreasing the level of **Availability** from a specified time, such notice shall be effective from the **Imbalance Settlement Period** following the specified time.

(g) Decreasing Availability: When a **CDGU** and/or **Controllable PPM** is **Synchronised** to the **System** the **Generator** may have occasion to issue an **Availability Notice** or a **Re-declaration** decreasing the level of **Availability** of the **CDGU** and/or **Controllable PPM** from a specified time. Such notice shall be construed as meaning that the **CDGU** and/or **Controllable PPM** is capable of maintaining **Load** at the level of the

prevailing **Availability** until the time specified in the notice. Thereafter, the **CDGU** and/or **Controllable PPM** shall be capable of maintaining **Load** to the level which would have been achieved if a **Dispatch Instruction** had been given to reduce the **Load**. This would have occurred with effect from the specified time, at the maximum **De-Loading Rate** and/or **Ramp-Down Rate** declared for the **CDGU** and/or **Controllable PPM** as a **Technical Parameter** at such time down to the level of **Availability** specified in the new **Availability Notice** or a **Re-declaration**. When a **Demand Side Unit** is providing a **Demand Side Unit MW Response** the **Demand Side Unit** may have occasion to issue an **Availability Notice** or a **Re-declaration** decreasing the level of **Demand Side Unit MW Availability** of the **Demand Side Unit** from a specified time. Such notice shall be construed as meaning that the **Demand Side Unit** is capable of maintaining **Demand Side Unit MW Response** at the level of the prevailing **Demand Side Unit MW Availability** until the time specified in the notice. Thereafter, the **Demand Side Unit** shall be capable of maintaining **Demand Side Unit MW Response** to the level which would have been achieved if a **Dispatch Instruction** had been given to reduce the **Demand Side Unit MW Response.** This would have occurred with effect from the specified time, at the **Maximum Ramp Down Rate** declared for the **Demand Side Unit** as a **Technical Parameter** at such time down to the level of **Demand Side Unit MW Availability** specified in the new **Availability Notice** or a **Re-declaration.**

(h) If an **Interconnector Owner** in respect of an **Interconnector** issues an **Availability Notice** or a **Re-declaration** increasing (from zero or otherwise) or decreasing the level of available transfer capacity on the **Interconnector** as a whole from a specified time, such notice shall, subject to SDC1.4.5.1(a), be effective immediately following the specified time.

SDC1.4.3.7 **Default Availability**

(a) Insofar as any data submitted or deemed to have been submitted on any particular day in any **Availability Notice** or any revision thereto is inconsistent with any other data in any other such notice, then the most recently submitted data which, if substituted for the inconsistent data, would make the data in such notices consistent, shall apply for the next following **Trading Day**.

(b) Insofar as an **Availability Notice** is not submitted, the **User** shall be deemed to have submitted an **Availability Notice** by **Gate Closure 1** stating that the **Availability** of the relevant **CDGU**, **Controllable PPM**, **Demand Side Unit, Energy Storage Power Station** and/or the **Aggregated Generating Units** for the whole of the following **Trading Day** will be the level of **Availability** and **Operating Mode** declared in respect of the final **Imbalance Settlement Period** of the current **Trading Day**.

SDC1.4.3.8 **Outturn Availability**

Outturn Availability shall be set equal to the declared value of **Availability**.

SDC1.4.4 **Technical and Commercial Data Requirements**

SDC1.4.4.3(a) shall not apply in respect of **PPA Generation** and the provisions of SDC1.B.4 shall apply instead. The provisions of SDC1.4.4.2 and SDC1.4.4.4(b) shall, with respect to **PPA Generation**, be read in conjunction with the provisions of SDC1.B.3.1.

SDC1.4.4.1 **Technical Parameters**

(a) (i) By not later than the **Gate Closure 1**, each **User** shall in respect of each:

- **CDGU;**
- **Controllable PPM**;
- **Aggregated Generating Unit**,
- **Pumped Storage Plant Demand**
- **Energy Storage Power Station Demand**; and/or
- **Demand Side Unit**,

submit to the **TSO** a **Technical Parameters Notice** in such form as the **TSO** may reasonably notify to each **User** or in the form published on the **TSO** website from time to time, containing the **Technical Parameters** to apply for the relevant **Trading Day**.

(ii) A **User** may satisfy this obligation by submitting the data under the **TSC**, unless the **TSO** requires, by notice in writing to the **User**, the data to be submitted to it under the **Grid Code**.

(iii) Subsequent revisions to the **Technical Parameters Notice** may be submitted according to the technical offer data submission provisions as set out in the **TSC**. If there is a change to the data submitted under the **TSC**, the **User** shall notify the **TSO**.

(iv) As a general requirement, the **User** shall ensure that the data in any **Technical Parameters Notice,** or any revision thereto is consistent with its obligations under SDC1.4.3.2 and SDC1.4.3.4.

(b) Flexibility:

(i) In the case of any **Technical Parameters** as to which the **User** should, acting in accordance with **Prudent Operating Practice**, have some flexibility either in the revision itself or in the time at which the revision is to take effect the **TSO** may, acting reasonably, suggest an amended data figure and/or an amended time at which the data figure is to take effect.

(ii) Insofar as it is able to do so without breaching any obligations regarding confidentiality contained either in the **TSO Licence** or in any agreement, the **TSO** shall notify the **User** of the reasons for such flexibility request in such degree of detail as the **TSO** considers reasonable in the circumstances.

(iii) If the **User** agrees to such suggestion (such agreement not to be unreasonably withheld) the **User** shall use reasonable endeavours to accommodate such suggestion and submit a revised **Technical Parameters Notice** accordingly. In any event, the **TSO** may require such further information on the revision as is reasonable and the **User** shall give the **TSO** such information as soon as reasonably practicable.

A **User** shall notify the **TSO** as soon as it becomes aware, acting in accordance with **Prudent Operating Practice**, that any of the data submitted under SDC1.4.4.1 changes.

(c) Changes to **Technical Parameters**

A **User** must, as soon as reasonably practicable after it becomes aware of a change in its **Technical Parameters** in real time, submit, via **Electronic Interface** or in such other form as the **TSO** may reasonably notify each **User** from time to time, a declaration of its actual real time **Technical Parameters**.

If any of the data submitted to the **TSO** under SDC1.4.4.1, SDC1.4.4.3 and the relevant provisions of Appendix B to this SDC1 and SDC1.4.4.4 changes, a **User** shall, as soon as reasonably practicable after it becomes aware of a change to the information in a **Technical Parameters Notice** and subject to SDC1.4.3, (in the case of data submitted under SDC1.4.4.1 by means of a **Technical Parameters Notice**) submit a **Re-declaration** to that **Technical Parameters Notice** via **Electronic Interface** or in such other form as the **TSO** may reasonably notify to each **User** from time to time.

(d) **Energy Limits** for **Hydro Units**: A **Generator** in respect of its **Hydro Units** shall resubmit **Energy Limits** on the **Trading Day** regardless of whether the **Energy Limits** have changed since **Gate Closure 1**. Revised **Energy Limits** for **Hydro Units** may be submitted at any time up until 11.00 hours on the **Trading Day** in writing per unit basis.

(e) Default **Technical Parameters**:

Insofar as any data submitted or deemed to have been submitted on any particular day in any **Technical Parameters Notice** (such notice not being relevant to an **Interconnector Owner**) or any revision thereto is inconsistent with any other data in any other such notice, then the most recently submitted data which, if

substituted for the inconsistent data, would make the data in such notices consistent, shall apply for the next following **Trading Day**.

Insofar as not submitted or revised, the applicable **Standing Technical Offer Data** for **Technical Parameters** shall apply for the next following **Trading Day**.

Energy Limits for **Hydro Units**: In respect of **Hydro Units**, the **Energy Limit** that applied to the previous **Trading Day** will be used.

SDC1.4.4.2 **Additional Grid Code Characteristics Notice**

The following items are required to be submitted by each **User**, direct to the **TSO**:

(a) Individual **CCGT Module** data equivalent to the data required for a **CCGT Installation**. It shall also show any revisions to the **Technical Parameters** for each of the **CCGT Modules** within it.

(b) Different Fuels: In the case where a **CDGU** is capable of firing on different fuels, then the **Generator** shall submit an **Additional Grid Code Characteristics Notice** in respect of any additional fuel for the **CDGU**, each containing the information set out in SDC1.4.4.1 above for each fuel and each marked clearly to indicate to which fuel it applies.

(c) [Not used]

(d) In the case of **Interconnector Owners**, **Interconnector** data, including but not limited to the **Availability** of **Interconnector Filters**.

(e) In relation to each **Demand Side Unit**, the **Demand Side Unit Notice Time** and the **Demand Side Unit MW Response Time**.

(f) Where there is a **System Support Services Agreement** in place, the **System Support Services** which are **Available**.

(g) The parameters listed in Appendix A Part 2 of SDC1.

(h) [Not used]

(i) In the case of Kilroot **Power Station**, Ballylumford **Power Station** and Coolkeeragh **Power Station**, which configuration referred to in PC.A3.3.12 the **Power Station** is operating at for each **Imbalance Settlement Period**.

Data submitted under SDC1.4.4.2 shall, in respect of two shifting limitations, **Governor Droop**, reserve capability and MVAr capability, be submitted to the **TSO** in such form as the **TSO** may reasonably notify to each User or in the form published on the **TSO** website from time to time.

A **User** shall notify the **TSO** as soon as it becomes aware, acting in accordance with **Prudent Operating Practice**, that any of the data submitted under SDC1.4.4.2 is no longer correct.

Any changes to the MVAr capability shall be expressed as the maximum MVAr capability, for both leading and lagging MVAr, at the **Registered Capacity**.

Changes to **Additional Grid Code Characteristics**:

A User must, as soon as reasonably practicable after it becomes aware of a change in its Additional Grid Code Characteristics in real time, submit, via Electronic Interface or in such other form as the **TSO** may reasonably notify each User from time to time, a declaration of its actual real time Additional Grid Code Characteristics.

A User must, as soon as reasonably practicable after it becomes aware of any changes to the information in an Additional Grid Code Characteristics Notice submitted to the TSO under SDC1.4.4.2, submit a Re-declaration to such Additional Grid Code Characteristics Notice via Electronic Interface or in such other form as the TSO may reasonably notify to each User from time to time.

SDC1.4.4.3 Reserve capability:

(a) A **Generator** or **Generator Aggregator** shall notify the **TSO** as soon as it becomes aware, acting in accordance with **Prudent Operating Practice**, if any of its **CDGUs** and/or **Controllable PPMs** or **Aggregated Generating Units** (or associated **Power Station Equipment**) is unable to meet the reserve capability specified in the relevant **Sustained Load Diagrams**, whether that is due to a defect in the **CDGU** and/or **Controllable PPM** and/or **Aggregated Generating Units** or in its associated **Power Station Equipment.**

Any changes to the ability to meet the reserve capability specified in the relevant **Sustained Load Diagram(s)** shall be expressed as the maximum reserve capability for each category of reserve, as applicable to the relevant **CDGU**.

Such notification shall be made by submitting an **Additional Grid Code Characteristics Notice** in accordance with the **Generator's** obligations under SDC1.4.3.2 and paragraphs 1.B.1.1 and 1.B.1.2 of Appendix B to this SDC1, such **Reserve Characteristics** may only be amended (without the **TSO's** consent) in the event of a defect in or failure of a **CDGU** and/or **Controllable PPM** and/or **Aggregated Generating Units** or any associated **Power Station Equipment.**

(b) A change following such notification will only take effect for so long as it takes, acting in accordance with **Prudent Operating Practice**, for the relevant **CDGU** and/or **Controllable PPM** and/or **Aggregated Generating Units** or associated **Power Station Equipment** to be repaired and such repair shall re-instate the reserve capability to its previous level or to such other level as the **TSO** may, acting in accordance with **Prudent Operating Practice**, agree, taking into

account the provisions of SDC1.4.4.4(a), and the **Generator** shall then submit a **Technical Parameters Notice** re-declaring the reserve capability accordingly. The **Generator** shall advise the **TSO** of the nature of any such defect or failure and of the **Generator's** best estimate, acting as a reasonable and prudent **Generator**, of the time it will take to effect the repair to restore the **Reserve Characteristics** to their former level.

SDC1.4.4.4 **Other Relevant Data**

(a) By not later than **Gate Closure** 1each day, each **User** in respect of each of its **Plant**, shall in respect of the following **Trading Day** submit to the **TSO** in writing in the form set out on the **TSO** website or in such other form as the **TSO** may reasonably notify to each **User** from time to time), details in relation to the relevant **Trading Day** of any newly arisen special factors, including abnormal risk to loss, which in the reasonable opinion of the **User** may have a material effect on the likely **MW Output** or **Demand Side Unit MW Response** of such **Plant** (including, for a **CCGT Installation** in relation to each of the **CCGT Modules** therein). The notice shall be consistent with the **User's** obligations under SDC1.4.3.2. The provisions of this paragraph also apply to **Interconnector Owners** in relation to their **Interconnector Filters**.

(b) Where a **CDGU** is capable of firing on different fuels, then the **Generator** shall submit details in respect of each fuel for the **CDGU**. Each set of details shall contain the information set out in (a) above for each fuel and each shall be marked clearly to indicate to which fuel it applies.

(c) A **User**, acting in accordance with **Prudent Operating Practice**, shall notify the **TSO** as soon as it becomes aware that any of the data submitted under SDC1.4.4.4 has changed.

(d) Changes to **Other Relevant Data**

The **User** must notify the **TSO** via **Electronic Interface** of any new **Other Relevant Data** of which it becomes aware as soon as reasonably practicable after it becomes aware of such data.

(e) Default **Other Relevant Data**

Insofar as any data submitted or deemed to have been submitted on any particular day in any notice of **Other Relevant Data** or any revision thereto is inconsistent with any other data in any other such notice, then the most recently submitted data which, if substituted for the inconsistent data, would make the data in such notices consistent, shall apply for the next following **Trading Day**.

Insofar as not submitted or revised, the last notice relating to **Other Relevant Data** to have been submitted shall apply for the next following **Trading Day**.

(f) As a general requirement, the **User** shall ensure that the data in any notice of any **Other Relevant Data** or any revision thereto is consistent with its obligations under SDC1.4.3.2 and SDC1.4.3.4.

SDC1.4.4.5 **Commercial Offer Data**

(a) Each:

- **Generator**;
- **Energy Storage Generator;**
- **Pumped Storage Generator**;
- **Demand Side Unit Operator**; and
- **Generator Aggregator,**

shall in respect of:

- each of its **CDGUs**;
- each of its **Energy Storage Power Station Demand**;
- each of its **Pumped Storage Plant Demand**;
  - each of its **Interconnector Units**;
  - each of its **Demand Side Units**; and
  - its **Aggregated Generating Units**,

submit to the **TSO**, either directly or by means of an **Intermediary** on its behalf (if applicable), **Commercial Offer Data** in accordance with the **TSC**.

(b) The **TSO** may require, by notice to the relevant **User**, the data referred to at SDC1.4.4.5 (a) to (c) to be submitted to it directly under the **Grid Code.** All data items submitted under this SDC1.4.4.5 are to be at levels of **MW Output** at the **Connection Point**.

(c) Amendments to **Commercial Offer Data** shall be in accordance with the **TSC**.

(d) Default **Commercial Offer Data**:

Insofar as not submitted or revised , **Commercial Offer Data** shall be deemed in accordance with the **TSC**.

SDC1.4.4.6 **Physical Notifications** and **Interconnector Schedule Quantities**

(a) Each:

- **Generator**;
- **Energy Storage Generator;**
- **Pumped Storage Generator**;
- **Demand Side Unit Operator**; and
- **Generator Aggregator,**

shall in respect of:

Each of its **CDGUs**;
Each of its **Energy Storage Power Station Demand**;
Each of its **Pumped Storage Plant Demand**;
Each of its **Demand Side Units; an**d
Its **Aggregated Generating Units**,

submit to the **TSO,** either directly or by means of an **Intermediary** on its behalf (if applicable), **Physical Notifications** by **Gate Closure 1** for the corresponding **Trading Days** in accordance with the **TSC. Physical Notifications** shall be technically feasible. **Users** shall ensure that the accuracy of **Physical Notifications** is commensurate with **Prudent Operating Practice**.

(b) Prior to **Gate Closure 2**, **Physical Notifications** submitted in accordance with SDC1.4.4.6(a) shall be amended by the **User** (or **Intermediary** if applicable) to align with changes to their expected **Active Power Generation** or **Active Power Demand**. A new **Physical Notification** will supersede the previous one in relation to a **Physical Notification** for **Imbalance Settlement Periods** or parts thereof which are covered by the new one. At **Gate Closure 2**, **Physical Notifications** for the relevant **Imbalance Settlement Period** become **Final Physical Notifications** for that **Imbalance Settlement Period**. **Final Physical Notifications** may not be amended.

(c) Each **Generator** may, in respect of their **Controllable PPM** submit **Physical Notifications** in accordance with the provisions of SDC1.4.4.6(a) and SDC1.4.4.6(b).

(d) Each **Scheduling Agent** shall in respect of each **Interconnector** they have been nominated to schedule, submit to the **TSO**, **Interconnector Schedule Quantities** by **Gate Closure 1** for the corresponding **Trading Days** in accordance with the **TSC**. Prior to **Gate Closure 2** for each **Imbalance Settlement Period** (or an alternative later time advised from time to time by the TSO acting in accordance with **Prudent Operating Practice** but not later than the start of the **Imbalance Settlement Period**), **Scheduling Agents** shall submit further **Interconnector Schedule Quantities** in accordance with the TSC to reflect trading in intraday markets. At **Gate Closure 2** for an **Imbalance Settlement Period** (or an alternative later time advised from time to time by the **TSO** acting in

accordance with **Prudent Operating Practice** but not later than the start of the **Imbalance Settlement Period**), further **Interconnector Schedule Quantities** may not be submitted for that **Imbalance Settlement Period**.

(e) Notwithstanding the obligations in SDC1.4.4.6(a) and SDC1.4.4.6(b), a value of zero will be deemed in all **Imbalance Settlement Periods**, or parts thereof, for which **Physical Notifications** data or **Interconnector Schedule Quantities** data has not been submitted.

(f) If a **User** has submitted proposals for a test to the **TSO** and subsequently receives approval for the test from the **TSO**, the **User** (or their **Intermediary**, if applicable) shall submit **Physical Notifications** for the unit under test in accordance with the **TSC** to identify the time periods during which their units are under test. The **User** shall ensure that the **Physical Notifications** submitted in respect of a unit under test align with the approved test start time, test **MW Output** profile (or **Demand Unit MW Response** profile in the case of **Demand Side Units**) and test end time.

SDC1.4.7 Form of Submission

(a) Where this SDC1 requires a **User** to submit a notice, it may instead of submitting it in writing, submit the information required in such a notice (which information shall be supplied in full) by telephone subject to the **TSO**'s prior consent (identifying unambiguously the type of notice which is thereby being submitted).

(b) The individual who is giving the notice by telephone on behalf of the **User** shall firstly specify the time at which the notice is being given, then identify himself and ask the individual receiving the notice on behalf of the **TSO** also to identify himself. The information required by the notice shall then be given, including (without limitation) the identity of the **CDGU**, **Controllable PPM**, **Energy Storage Power Station Demand**, **Aggregated Generating Unit**, **Pumped Storage Plant** and **Demand Side Unit** to which the notice relates.

(c) The notice shall then be confirmed by facsimile transmission or by any electronic means as agreed with the **TSO** as soon as possible thereafter (and in any event be sent to the **TSO** within 2 hours). Where a facsimile is so sent by way of confirmation, it shall state clearly that it is in confirmation of a notice already given by telephone and shall state the exact time at which the notice was given by telephone.

SDC1.4.8 Compilation of **Indicative Operations Schedules**

The provisions of SDC1.4.8.2 and SDC1.4.8.8 shall, with respect to **PPA Generation**, be read in conjunction with the provisions of SDC1.B.3.2 and SDC1.B.3.3 respectively.

SDC1.4.8.1 **Indicative Operations Schedules** will be compiled by the **TSO** in conjunction with the **Other TSO** as further provided in this SDC1.4.8 as a statement of which **CDGUs** and/or **Controllable PPM** and/or transfers across any **Interconnector** and/or **Demand Side Units** and/or **Pumped Storage Plant Demand** and/or **Energy Storage Power Station Demand** and/or **Aggregated Generating Units** and equivalent units in the Republic of Ireland may be required to operate and their expected **MW Output**. The **TSO** in conjunction with the **Other TSO** will periodically update the **Indicative Operations Schedules**.

SDC1.4.8.2 **Merit Order**

Subject as provided below, a **Merit Order** will be compiled by the **TSO** (in conjunction with the **Other TSO**) for each **Imbalance Settlement Period** from the **Price Quantity Pairs**, **Start-Up Cost**, **Shutdown Cost** and **No-Load Cost** (which together shall be known as the "**Price Set**") and, subject as provided in this SDC1, used to determine which of the **CDGUs, Controllable PPMs**, **Pumped Storage Plant Demand**, **Energy Storage Power Station Demand**, **Demand Side Units**, **Aggregated Generating Units** or **Interconnector** power transfer to **Schedule** and **Dispatch** in relation to their **Price Sets** at values that differ from those indicated by **Physical Notifications** and **Interconnector Schedule Quantities**, as required to deliver the objectives set out in SDC1.2(a), SDC1.2(b) and SDC1.2(c). The **Merit Order** for increasing **MW Output** above the level indicated in **Physical Notifications** and **Interconnector Schedule Quantities** will be on the basis of ascending prices so that once committed the **CDGU, Controllable PPM**, **Pumped Storage Plant Demand**, **Energy Storage Power Station Demand, Demand Side Unit, Aggregated Generating Unit Price Set** or bid-offer data from an **External System Operator** at the head of the **Merit Order** will be that which has the lowest price per **MWh**, and that at the foot of the **Merit Order** shall be the one with the highest price per **MWh**. Each **CDGU, Controllable PPM**, **Pumped Storage Plant Demand**, **Energy Storage Power Station Demand**, **Demand Side Unit**, **Aggregated Generating Units** and/or bid-offer data from an **External System Operator** shall appear in the **Merit Order** for each **Price Set** submitted.

The **Merit Order** for dispatching **MW Output** to a level below that indicated in **Physical Notifications** and **Interconnector Schedule Quantities** will be on the basis of descending prices so that the **CDGU, Controllable PPM**, **Pumped Storage Plant Demand, Energy Storage Power Station Demand**, **Demand Side Unit, Aggregated Generating Unit Price Set** or bid-offer data from an **External System Operator** at the head of a **Merit Order** will be that which has the highest price per **MWh**, and that at the foot of a **Merit Order** shall be the one with the lowest price per **MWh**. Each **CDGU, Controllable PPM**, **Pumped Storage Plant Demand**, **Energy Storage Power Station Demand, Demand Side Unit**, **Aggregated Generating Units** or bid-offer data from an **External System Operator** shall appear in the **Merit Order** for each **Price Set** submitted.

SDC1.4.8.3 In compiling the **Indicative Operations Schedules** in conjunction with the **Other TSO**, the **TSO** will take account of the following factors (and the equivalent factors on the **Other Transmission System** will be so treated separately by the **Other TSO**):

(i) **Physical Notifications**, **Final Physical Notifications** or **Interconnector Schedule Quantities** (as the case may be) submitted in accordance with SDC1.4.4.6;

(ii) **Transmission System** constraints which may vary from time to time, as determined by the **TSO;**

(iii) Reserve constraints which may vary from time to time, as determined by the **TSO;**

(iv) the need to provide an **Operating Margin** (by using the various categories of reserve as specified in OC3 (as the case may be), as determined by the **TSO** acting in conjunction with the **Other TSO**;

(v) **Transmission System** stability considerations;

(vi) the level of **MW Output** and availability covered by **Non Centrally Dispatched Generating Units**, by **Plant** subject to **Priority Dispatch** and by **Controllable PPM**;

(vii) the **Energy Limits** for **Hydro Units**;

(viii) in respect of all **Plant**, the values of their **Technical Parameters** registered under this SDC1 and other information submitted under SDC1.4.4.4;

(ix) **Commercial Offer Data** for each **CDGU** and/or **Controllable PPM** and the **Shutdown Cost** of each **Demand Side Unit** and equivalent commercial data provided by an **External System Operator** in respect of **Interconnectors;**

(x) the requirements, as determined by the **TSO**, for **Voltage Control** and **Mvar** reserves;

(xi) **CDGU** and/or **Controllable PPM** stability, as determined by the **TSO**;

(xii) other matters to enable the **TSO** to meet its **Licence Standards** and the **Other TSO** to meet its equivalent;

(xiii) the requirements as determined by the **TSO,** for maintaining **Frequency Control**;

(xiv) **Monitoring** and/or **Testing** and/or **Investigations** to be carried out, or being carried out, under OC11 (as the case may be), testing to be carried out, or being carried out, at the request of a **Generator** in relation to a **PPA CDGU** under OC11.8, testing to be carried out at the request of a

User in respect of **User's Equipment** other than a **PPA CDGU** under OC11.13 and/or **Commissioning/Acceptance Testing** under the CC;

(xv) **System Tests**;

(xvi) the inability of any **CDGU** and/or **Controllable PPM** to meet its full reserve capability;

(xvii) **Inter-jurisdictional Tie Line** limits;

(xviii) other facts as may be reasonably considered by the **TSO** to be relevant to the **Indicative Operations Schedule**;

(xix) the inflexible characteristics as declared by the **Generator** and abnormal risks;

(xx) losses on the **Transmission System** and on the **Other Transmission System;**

(xxi) requirements within any **Constrained Group**;

(xxii) the requirements to manage gas flo*ws;*

(xxiii) fuel and emission constraints of a **Plant** as well as any other technical related factors which may constrain the **Output** or **Demand Reduction** of a **Plant** as the case may be both immediately and in the longer term.

(xxiv) any inter-unit dependencies notified to the **TSO** that restrict the number of **Generating Units** that can start up or shut down simultaneously**.**

(xxv) factors used by the **TSO** (and the **Other TSO**) in order to comply with Statutory Instruments, Statutory Regulations and/or the **Licence** which may impact **Scheduling** and **Dispatch**;

(xxvi) factors used by the **TSO** (and the **Other TSO**) to comply with the objectives in SDC1.2(g);

SDC1.4.8.4 Taking account of and applying the factors referred to in SDC1.4.8.3, **Indicative Operations Schedules** shall be compiled by the **TSO** in conjunction with the **Other TSO** to **Schedule** such **CDGUs, Controllable PPM, Pumped Storage Plant Demand**, **Demand Side Units**, **Aggregated Generating Units** and/or such **Interconnector** power transfers, and equivalent units or power transfers of equivalent units in the Republic of the Ireland, which have been declared **Available** in an **Availability Notice** (and the equivalents on the **Other Transmission System**):

(i) in accordance with the applicable **Merit Order**

(ii) as will in aggregate (after taking into account electricity delivered other than from **CDGUs**, **Controllable PPMs**, **Aggregated Generating Units**, and/or **Interconnector** power transfers and variation in **Demand** from **Pumped Storage Plant Demand, Energy Storage Power Station Demand** and **Demand Side Units**) be sufficient to match at all times (to the extent possible having regard to the **Availability** or **Demand Side Unit MW Availability** of **CDGUs, Controllable PPMs, Pumped Storage Plant Demand**, **Energy Storage Power Station Demand**, **Demand Side Units**, **Aggregated Generating Units** and **Interconnector** power transfers) the forecast aggregated **Demand** (derived under OC1 of the **Grid Code** and the **Other Grid Code**) together with such margin of reserve as the **TSO** working in conjunction with the **Other TSO** shall consider to be appropriate; and

(iii) as will in aggregate be sufficient to match minimum forecast **Demand** levels together with a sufficient **Minimum Demand Regulation**.

The taking account of and application of the factors in SDC1.4.8.3 will mean that, in general, strict adherence to **Merit Order** may not necessarily be feasible.

SDC1.4.8.5 The **TSO** will periodically rerun the **Scheduling** process and issue revised **Indicative Operating Schedules** to take account of any of the following factors (and the equivalent factors on the **Other Transmission System** which will be so dealt with separately by the **Other TSO**):

(a) changes to **Physical Notifications**;

(b) changes to **Interconnector Schedule Quantities**;

(c) changes to **Commercial Offer Data** [and bid-offer data from **External Transmission System Operators**];

(d) changes to **Availability** or **Demand Side Unit MW Availability** and/or **Technical Parameters** of **CDGUs** and/or **Controllable PPM** and/or **Aggregated Generating Units** and/or **Interconnectors** and/or **Demand Side Units** notified to the **TSO**;

(e) changes to **Demand** forecasts on the Island of Ireland;

(f) changes to **PPM** resource forecasts on the Island of Ireland;

(g) changes to **Transmission System** constraints, emerging from the necessarily iterative process of **Scheduling** and network security assessment;

(h) changes to **CDGU** and/or **Controllable PPM** requirements following notification to the **TSO** of the changes in capability of a **Generator** to provide a **Special Action** as described in SDC2;

(i) changes to **CDGU** and/or **Controllable PPM** requirements within **Constrained Groups**, following re-appraisal of **System Demand** forecasts on the Island of Ireland within that **Constrained Group**;

(j) changes to any conditions which in the reasonable opinion of the **TSO**, would impose increased risk to the **Transmission System** and would therefore require an increase in the **Operating Margin**;

(k) known (or emerging) limitations and/or deficiencies of the **Scheduling** process.

SDC1.4.8.6 When:

(a) adverse weather is anticipated;

(b) there is a high risk to the whole or part of the **Transmission System** and/or the **Other Transmission System**;

(c) **Demand Control** has been instructed by the **TSO**;

(d) a **Total** or **Partial Shutdown** exists; or

(e) the **Fuel Security Code** is invoked or is anticipated to be invoked;

these factors may mean that a **CDGU**, **Controllable PPM, Pumped Storage Plant Demand**, **Energy Storage Power Station Demand, Demand Side Unit**, **Aggregated Generating Unit** and/or **Interconnector** transfers is/are chosen other than in accordance with the profile described in **Physical Notifications** (the **Active Power** profile derived from **Interconnector Schedule Quantities** in respect of **Interconnectors**) and amended in line with **Merit Order** to a greater degree than would be the case when merely taking into account the factors listed in SDC1.4.8.3 in order to seek to maintain the integrity of the **Transmission System**.

SDC1.4.8.7 (a) The **Synchronising** and **De-Synchronising** times (and, in the case of **Pumped Storage Plant Demand** and **Energy Storage Power Station Demand**, the relevant effective time) shown in the **Indicative Operations Schedule** are indicative only and it should be borne in mind by **Users** that the **Dispatch Instructions** could reflect more or different **CDGU**, **Aggregated Generating Unit** and/or **Controllable PPM, Pumped Storage Plant Demand, Energy Storage Power Station Demand** and/or **Aggregate Generating Unit** requirements than in the **Indicative Operations Schedule**. The **TSO** may issue **Dispatch Instructions** in respect of any **CDGU** and/or **Aggregated Generating Unit**, **Controllable PPM, Pumped Storage Plant Demand, Energy Storage Power Station Demand** or **Aggregated Generating Unit** which has not declared an **Availability** or **Demand Side Unit MW Availability** of 0 **MW** in an **Availability Notice**. **Users** with **CDGUs** and/or **Aggregated Generating Units**, **Controllable PPM, Pumped Storage Plant Demand, Energy Storage Power Station Demand** shall ensure that their units are able to be **Synchronised**, or in the case of **Pumped Storage Plant Demand** and **Energy Storage Power Station Demand,** used at the times **Scheduled**, but only if so **Dispatched** by the **TSO** by issue of a **Dispatch Instruction**. **Users** shall, as part of a

revision to the **Technical Parameters**, indicate to the **TSO** the latest time at which a **Dispatch Instruction** is required to meet the scheduled **Synchronising** time or in the case of **Pumped Storage Plant Demand** and **Energy Storage Power Station Demand**, the **Scheduled** relevant effective time.

(b) The provisions of SDC1.4.8.7(a) shall apply to **Demand Side Units** with the exception that reference to relevant effective time shall be read as a reference to **Demand Side Unit Notice Time**.

SDC1.4.8.8 Content of **Indicative Operations Schedules**

The information contained in the **Indicative Operations Schedule** will indicate, where appropriate, on an individual **CDGU**, **Controllable PPM, Pumped Storage Plant Demand**, **Energy Storage Power Station Demand, Demand Side Unit, Aggregated Generating Units** and /or **Interconnector** basis, the period and **Loading** for which it is **Scheduled** during the relevant **Trading Day**. In the case of a **CDGU** which is capable of firing on two different fuels, it will also indicate the fuel for which it is **Scheduled**. If no fuel is contained in the **Indicative Operations Schedule**, then the most recently specified fuel shall be treated as having been indicated.

SDC1.4.8.9 Issue of **Indicative Operations Schedule**

(a) The initial **Indicative Operations Schedule** for a **Trading Day** will be published for access by **Users** (or where in relation to a **CDGU** the **User** does not have access to where it would be published, shall, subject to agreement with the **TSO** (such agreement not to be unreasonably withheld or delayed), be sent by the **TSO** to that **User**) by 1600 hours on the day preceding the relevant **Trading Day**. However, if on any occasion the **TSO** is unable to meet these times, the **TSO** also reserves the right to extend the timescale for the issue of the initial **Indicative Operations Schedules** to the extent necessary. Following the issue of the initial **Indicative Operations Schedule** preceding the relevant **Trading Day**, the **TSO** will issue revised **Indicative Operations Schedules** to reflect updated information from the **Scheduling** process.(b) **Indicative Operations Schedules** issued by the **TSO** may comprise several schedules covering short term, medium term or long term timeframes where long term covers the period up to 48 hours immediately following real time.

(c) The **TSO** may issue **Dispatch Instructions** to **Users** in respect of **CDGUs, Controllable PPMs, Pumped Storage Plant Demand** and/or **Energy Storage Power Station Demand** and/or **Demand Side Units** and/or **Aggregated Generating Units** and/or **Interconnector** transfers before the issue of the **Indicative Operations Schedule** for the **Trading Day** to which the **Dispatch** instruction relates if the **Synchronous Start Up Time** for the relevant **CDGUs** and/or **Controllable PPMs, Pumped Storage Plant Demand** and/or **Energy Storage Power Station Demand** and/or **Demand Side Unit** and/or **Aggregated Generating Unit** requires the **Dispatch** instruction to be given at that time. When the length of the time required for **Notice to Synchronise** is within 30 minutes of causing the **CDGU** and/or **Controllable PPMs** and/or **Pumped Storage Plant Demand** and/or

Energy Storage Power Station Demand to be unable to meet the indicative **Synchronising** time in the **Indicative Operations Schedule** or a subsequent indicative **Synchronising** time and no **Dispatch Instruction** has been received, the **Generator** shall inform the **TSO** without delay.

SDC1.4.8.10 Regulation

It is a requirement for running the **Transmission System** that all **Synchronised CDGUs** and/or **Controllable PPMs** shall at all times be capable of reducing **MW Output** sufficient to allow a sufficient **Regulating Margin** for adequate **Frequency Control**. The **TSO** will monitor the **MW Output** data of the **Indicative Operations Schedule** against forecast of **System Demand** on the Island of Ireland to see whether the level of regulation for any period is sufficient, and may take any shortfall into account in **Scheduling** and **Dispatch**.

SDC1.4.8.11 Data Requirements

SDC1 Appendix A Part 1 sets out the **Technical Parameters** for which values are to be supplied by a **User** in respect of each of its **CDGUs** and/or **Controllable PPMs** and/or **Pumped Storage Plant Demand** and/or **Energy Storage Power Station Demand** and/or **Demand Side Units** and/or **Aggregated Generating Units** by not later than **Gate Closure 1** for the relevant **Trading Day**.

SDC1 Appendix A Part 2 sets out the additional data items required in respect of an **Additional Grid Code Characteristics Notice**.

SDC1 – APPENDIX A

Part 1. Technical Parameters

Technical Parameter	CDGU				Control PPM	DSU		Agg. Gen		ESPS Demand	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. PPM	Pump S Gen	-	Indiv. Demand Site	Agg. Demand Sites			-	-
Block Load Cold	✓	✓	✓	✓	✓						
Block Load Hot	✓										
Block Load Warm	✓										
Charging Capacity			✓ ESPS Gen Only							✓	
Cycle Efficiency			✓ ESPS Gen Only	✓						✓	
Demand Side Unit =Notice						✓	✓				
Deload Break Point	✓	✓	✓	✓	✓						
Demand Side Unit MW Availability						✓	✓				
Demand Side Unit MW Response Time						✓	✓				
De-Loading Rate 1	✓	✓	✓	✓	✓						
De-Loading Rate 2	✓	✓	✓	✓	✓						
Dwell Time Up 1	✓	✓	✓	✓	✓						
Dwell Time Up 2	✓	✓	✓	✓	✓						
Dwell Time Up 3	✓	✓	✓	✓	✓						
Dwell Time Down 1	✓	✓	✓	✓	✓						
Dwell Time Down 2	✓	✓	✓	✓	✓						
Dwell Time Down 3	✓	✓	✓	✓	✓						
Dwell Time Up Trigger Point 1	✓	✓	✓	✓	✓						
Dwell Time Up Trigger Point 2	✓	✓	✓	✓	✓						
Dwell Time Up Trigger Point 3	✓	✓	✓	✓	✓						
Dwell Time Down Trigger Point 1	✓	✓	✓	✓	✓						
Dwell Time Down Trigger Point 2	✓	✓	✓	✓	✓						
Dwell Time Down Trigger Point 3	✓	✓	✓	✓	✓						
End Point of Start Up Period	✓	✓	✓	✓	✓						
Energy Limit		✓									
Forecast Minimum Output Profile			✓ ESPS Gen Only	✓						✓	✓
Forecast Minimum Generation Profile	✓	✓	✓	✓							
Load Up Break Point Cold (1)	✓	✓	✓	✓	✓						
Load Up Break Point Cold (2)	✓	✓	✓	✓	✓						
Load Up Break Point	✓										

Technical Parameter	CDGU				Control PPM	DSU		Agg. Gen		ESPS Demand	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. PPM	Pump S Gen	-	Indiv. Demand Site	Agg. Demand Sites			-	-
Hot (1)											
Load Up Break Point Hot (2)	✓										
Load Up Break Point Warm (1)	✓										
Load Up Break Point Warm (2)	✓										
Loading Rate Cold (1)	✓	✓	✓	✓	✓						
Loading Rate Cold (2)	✓	✓	✓	✓	✓						
Loading Rate Cold (3)	✓	✓	✓	✓	✓						
Loading Rate Hot (1)	✓										
Loading Rate Hot (2)	✓										
Loading Rate Hot (3)	✓										
Loading Rate Warm (1)	✓										
Loading Rate Warm (2)	✓										
Loading Rate Warm (3)	✓										
Max Ramp Down Rate (shall be a number greater than zero)						✓	✓				
Max Ramp Up Rate (shall be a number greater than zero)						✓	✓				
Maximum Charge Capacity			✓ ESPS Gen Only							✓	
Maximum Down Time						✓	✓				
Maximum Generation / Registered Capacity	✓	✓	✓	✓	✓						
Maximum On Time	✓	✓	✓	✓	✓						
Maximum Storage Capacity				✓							
Minimum Charge Capacity			✓ ESPS Gen Only							✓	
Minimum Down Time						✓	✓				
Minimum Generation	✓	✓	✓	✓	✓						
Minimum Off Time	✓	✓	✓	✓	✓	✓	✓				
Minimum On Time	✓	✓	✓	✓	✓						
Minimum Storage Capacity				✓							✓✓
Off to Generating Time			✓								
Off to Spin Pump Time										✓	
(Other relevant technical parameters)	✓	✓	✓	✓	✓			✓			
Pumping capacity				✓							✓
Ramp Down Break Point 1	✓	✓	✓	✓	✓			✓			
Ramp Down Break Point 2	✓	✓	✓	✓	✓			✓			
Ramp Down Break Point 3	✓	✓	✓	✓	✓			✓			
Ramp Down Break Point	✓	✓	✓	✓	✓			✓			

Technical Parameter	CDGU				Control PPM	DSU		Agg. Gen		ESPS Demand	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. PPM	Pump S Gen	-	Indiv. Demand Site	Agg. Demand Sites			-	-
4											
Ramp Down Rate 1	✓	✓	✓	✓	✓			✓			
Ramp Down Rate 2	✓	✓	✓	✓	✓			✓			
Ramp Down Rate 3		✓	✓	✓	✓			✓			
Ramp Down Rate 4	✓	✓	✓	✓	✓			✓			
Ramp Down Rate 5	✓	✓	✓	✓	✓			✓			
Ramp Up Break Point 1	✓	✓	✓	✓	✓			✓			
Ramp Up Break Point 2	✓	✓	✓	✓	✓			✓			
Ramp Up Break Point 3	✓	✓	✓	✓	✓			✓			
Ramp Up Break Point 4	✓	✓	✓	✓	✓			✓			
Ramp Up Rate 1	✓	✓	✓	✓	✓			✓			
Ramp Up Rate 2	✓	✓	✓	✓	✓			✓			
Ramp Up Rate 3	✓	✓	✓	✓	✓			✓			
Ramp Up Rate 4	✓	✓	✓	✓	✓			✓			
Ramp Up Rate 5	✓	✓	✓	✓	✓			✓			
Short Term Maximisation Capability	✓	✓	✓	✓	✓						
Short Term Maximisation Time	✓	✓	✓	✓	✓						
Soak Time Cold (1)	✓	✓	✓	✓	✓						
Soak Time Cold (2)	✓	✓	✓	✓	✓						
Soak Time Hot (1)	✓										
Soak Time Hot (2)	✓										
Soak Time Trigger Point Cold (1)	✓	✓	✓	✓	✓						
Soak Time Trigger Point Cold (2)	✓	✓	✓	✓	✓						
Soak Time Trigger Point Hot (1)	✓										
Soak Time Trigger Point Hot (2)	✓										
Soak Time Trigger Point Warm (1)	✓										
Soak Time Trigger Point Warm (2)	✓										
Soak Time Warm (1)	✓										
Soak Time Warm (2)	✓										
Spin Pump to Pumping Energy Time											✓
Synchronous Start-Up Time Cold	✓	✓	✓	✓	✓						
Synchronous Start-Up Time Hot	✓	✓	✓	✓	✓						
Synchronous Start-Up Time Warm	✓										
~~Target Charge Level Percentage~~			~~✓ ESPS Gen Only~~							~~✓~~	
Start of Restricted Range 1	✓	✓	✓	✓	✓						
End of Restricted Range	✓	✓	✓	✓	✓						

Technical Parameter	CDGU				Control PPM	DSU		Agg. Gen		ESPS Demand	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. PPM	Pump S Gen	-	Indiv. Demand Site	Agg. Demand Sites			-	-
1											
Start of Restricted Range 2	✓	✓	✓	✓	✓						
End of Restricted Range 2	✓	✓	✓	✓	✓						

Part 2. Additional data items required in an Additional Grid Code Characteristics Notice

Variable	**Applies to**
Time from initiation of a start to achieving **Dispatched Load**	**CDGUs** which are **Open Cycle Gas Turbines** or **CCGTs**
Governor Droop	All **CDGUs**, except **Aggregated Generating Units**
Sustained Response Capability	All **PPA CDGUs**
The maximum reserve capability for each category of reserve	All non-**PPA CDGUs**, except **Aggregated Generating Units**
Two shifting limitation (limitation on the number of **Start-ups** per **Trading Day**)	All **CDGUs**, except **Aggregated Generating Units**
The **MW** and **Mvar** capability limits within which the **CDGU** is able to operate as shown in the relevant **Generator Performance Chart**	All **CDGUs**, except **Aggregated Generating Units**
Maximum number of on **Load** cycles per 24 hour period, together with the maximum **Load** increases involved	All **CDGUs**, except **Aggregated Generating Units**
^Maximum number of changes to the **Dispatched Fuel** per 24 hour period	All **CDGUs**, except **Aggregated Generating Units**
Maximum quantity of oil in "ready-use tanks" and associated pipework	All **CDGUs**, except **Aggregated Generating Units**
^Maximum number of changes to the **Designated Fuel** per 24 hour period	All **CDGUs**, except **Aggregated Generating Units**
^Minimum notice to change the **Designated Fuel**.	All **CDGUs**, except **Aggregated Generating Units**

Variable	**Applies to**
Settings of the **Unit Load Controller** for each **CDGU** for which a **Unit Load Controller** is required under CCS1.5.5 of the **SONI Grid Code**	All **CDGUs**, except **Aggregated Generating Units**
Time between **De-Synchronising** different **CDGUs** in a Power Station which, in the case of Coolkeeragh Power Station only, shall be stated for both paired and single **CDGUs**.	All **CDGUs**, except **Aggregated Generating Units**

SDC1 - APPENDIX B

SDC1.B.1 The following paragraphs apply in relation to **PPA Generation** in place of SDC1.4.3.1 to SDC1.4.3.3.

SDC1.B.1.1 In relation to **PPA Generation**, each **Generator** shall subject always to the terms and conditions of any applicable **Generating Unit Agreement** throughout the term of the **Generating Unit Agreement** relating to a particular **PPA CDGU**, maintain, repair, operate and fuel the **CDGU** as required by **Prudent Operating Practice** and any legal requirements with a view to providing the **Contracted Capacity** and the **Contracted Technical Parameters**, provided that in determining when so to maintain or repair the **CDGU**, the **Generator** may have regard to the amount of **Availability Payments** (including reductions in and rebates of **Availability Payments**) which may at any time be earned (or suffered) by it under the relevant **Generating Unit Agreement** and to its obligations under clause 5.1 of the relevant **Power Station Agreement**.

SDC1.B.1.2 In relation to **PPA Generation**, the **Generator** shall use reasonable endeavours to ensure that it does not at any time declare by issuing or allowing to remain outstanding an **Availability Notice**, or a **Technical Parameter Notice** which declares the **Availability** or **Technical Parameters** of the **CDGU,** (including, in the case of a **CCGT Installation**, its **Operating Mode**) at levels or values different from those that the **PPA CDGU** could achieve at the relevant time except:

(a) during periods of **Planned Outage** or **Short Term Planned Maintenance Outage** or otherwise with the consent of the **TSO**;

(b) while repairing or maintaining the **PPA CDGU** or equipment necessary to the operation of the **PPA CDGU** where such repair or maintenance cannot reasonably, in accordance with **Prudent Operating Practice**, be deferred to a period of **Planned Outage** or **Short Term Planned Maintenance Outage**;

(c) where necessary to avoid an imminent risk of injury to persons or material damage to property (including the **PPA CDGU**);

(d) if it is not lawful for the **Generator** to operate the **PPA CDGU**; or

(e) to the extent that the **Generator** is affected by **Force Majeure** under the **Generating Unit Agreement**;

provided that nothing in the **Grid Code** shall require the **Generator** to declare levels or values better than **Contracted Capacity** and **Contracted Technical Parameters** in respect of a **PPA CDGU.**

SDC1.B.1.3 The **Generator** shall provide the **TSO** with all information necessary to enable the **TSO** to implement and apply the above provisions.

SDC1.B.3 **References to fuel**

The following paragraphs apply in relation to **PPA Generation** and the interpretation of this SDC1.

SDC1.B.3.1 References to "fuel" at SDC1.4.2.1, SDC1.4.4.2 and SDC1.4.4.4(b) shall be read as references to "**Designated Fuel**".

SDC1.B.3.2 The final two sentences of SDC1.4.8.8 shall be read as follows:.

In the case of a **CDGU** which is capable of firing on two different **Designated Fuels**, it will also indicate the **Designated Fuel** for which it is scheduled during the following **Trading Day**. If no **Declared Fuel** and/or, where relevant **Designated Fuel** is contained in the **Indicative Operations Schedule**, then the most recently specified **Declared Fuel** and/or, where relevant, **Designated Fuel** shall be treated as having been indicated.

SDC1.B.3.3 References to the **Price Set** in SDC1.4.8.2 shall be construed as in relation to each **Designated Fuel** or **Declared Fuel**, as the case may be.

SDC1.B.4 **Technical Parameters**

SDC1.B.4.1 The following paragraph applies in relation to **PPA Generation** in place of the equivalent provisions of SDC 1.4.4.3.(a).

SDC1.B.4.2 A **Generator** must notify the **TSO** as soon as it becomes aware, acting in accordance with **Prudent Operating Practice** if (whether due to a defect in the **CDGU** or in its associated **Power Station Equipment**) any of its **CDGUs** is unable to meet the **Spinning Reserve Capability** set out in the **Sustained Load Diagram** attached to Schedule 8 of the relevant **Generating Unit Agreement** and submitted pursuant to the PC.

Such notification shall be made by submitting an **Additional Grid Code Characteristics Notice** in accordance with the **Generator**'s obligations under SDC1.4.3.2 and paragraphs 1.B.1.1 and 1.B.1.2 of Appendix B to this SDC1, such **Spinning Reserve Capability** may only be amended (without the TSO's consent) in the event of a defect in or failure of a **CDGU** or any associated **Power Station Equipment.**

SDC1.B.4.3 In SDC1.4.4.3(a) and (b) the term "reserve capability" shall be construed as "**Spinning Reserve Capability**".

SDC1.B.4.4 In relation to **PPA Generation** the **User** shall provide in the **Technical Parameters Notice** any revisions to the **Technical Parameters** compared to the **Contracted Technical Parameters**.

ANNEX I

Explanatory Note of differences between SDC1 in the SONI Grid Code and EirGrid Grid Code

This annex is an explanatory note only and does not form part of the Grid Code.

1. General Differences in wording

The table below summarises the general differences in wording between the form of SDC1 in the SONI Grid Code and the form of SDC1 in the EirGrid Grid Code, which appear repeatedly throughout SDC1.

Terms used in SONI Grid Code	**Equivalent terms used in EirGrid Grid Code (where different)**	**Reason**
System Support Services	Ancillary Service(s)	The existing arrangements for Ancillary Services and System Support Services are continuing until further notice.
System Support Services Agreement	Ancillary Service(s) Agreement	These agreements will continue to stay in place with their existing names
CCGT Module	CCGT Unit	This is the phrase currently used to describe the individual parts of a Combined Cycle Plant CCGT Module is an important concept in Northern Ireland and is reflected in many other agreements. EirGrid is keeping the phrase CCGT Unit, as it more closely describes the concept of an individual unit and EirGrid has formerly used CCGT Module to describe the whole CCGT Installation.
Prudent Operating Practice	Prudent Utility Practice	Each Code uses a different phrase for this concept.
Planned Outage	Schedule Outage	Each Code uses a different phrase for this concept.
Planned Maintenance Outage	Short Term Scheduled Outage	Each Code uses a different phrase for this concept.

2. Specific differences in wording between equivalent provisions in both Grid Codes

The table below provides a list of the other specific differences in wording between equivalent provisions of SDC1 in both Grid Codes.

Provision	SONI Grid Code	EirGrid Grid Code	Reason
SDC1.4.2.1	An additional sentence states at the end of SDC1.4.2.1 that these provisions have to be read in conjunction with SDC1.B.3.1 in respect of PPA Generation.	No such reference is made.	The provisions of Appendix B are specific to PPA Generation in Northern Ireland.
SDC1.4.2.2(b)	Reference is made to "PCA2.3.4"	Reference is made to "PCA.4.3 of the Planning Code Appendix"	These are the respective requirements for the provision of the CCGT Installation data.
SDC1.4.4.2	The following paragraphs are contained at the end of SDC 1.4.4.2: "Data submitted under SDC1.4.4.2 shall, in respect of two shifting limitations, Governor Droop, reserve capability and MVAr capability, be submitted to the TSO in such form as the TSO may reasonably notify to each User or in the form published on the TSO website from time to time." "Any changes to the MVAr capability shall be expressed as the maximum MVAr capability, for both leading and lagging MVAr, at the Registered Capacity."	No such reference is made.	These provisions are specific to the way Users are required to declare reserve characteristics in Northern Ireland.
SDC1.4.3.6(b)	Reference is made to "OC11"	Reference is made to "OC10"	These are the respective requirements for Testing Monitoring and Investigation
SDC1.4.3.6(d)	Reference is made to a User acting in accordance with its obligations under "SDC1.4.3 and Appendix B to this SDC1"	Reference is made to a User acting in accordance with its obligations under "SDC1.4.3" only	SONI has separate requirements for Availability and Technical Parameter related issues in respect of PPA Generation.

SDC1.4.3.7		The EirGrid Grid Code contains the following additional words at the end of the paragraph: "*or any other values that the **TSO** may reasonably deem appropriate"*	Difference is due to different requirements in both jurisdictions.
SDC1.4.8.1	Reference is made to "the Republic of Ireland".	Reference is made to "Northern Ireland".	Reference is being made in each Grid Code to the other jurisdiction.
SDC1.4.8.3(ii)	Reference is made to the "Transmission System and Distribution System constraints"	Reference is made to the "Transmission System constraints" only.	EirGrid will not be in a position to take Distribution Constraints into account in determining the IOS.
SDC1.4.8.3(iv)	Reference is made to "OC3"	Reference is made to "OC4.6 and CC7.3.1.1"	These are the respective references to Operating Margin.
SDC1.4.8.3(xv)	Reference is made to "OC11" and then to "OC11.8 and OC11.13". Reference is also made to (i) "Generator in relation to a PPA CDGU" and "User in respect of User's Equipment other than a PPA CDGU".	Reference is made to "OC10" and then to "OC8". Reference is made to "Users" only.	These are the respective references to Testing Monitoring and Investigation and Operational Testing.
SDC1.4.8.3(xv)	Reference is made to "Commissioning/Acceptance Testing"	Reference is made to "Commissioning/Testing"	These are the respective terms used in each Grid Code
SDC1.4.8.3(xvi)	Reference is made to "System Tests" only	Reference is made to "System Tests, Operational Tests and Commissioning Tests"	The EirGrid Grid Code definition of System Tests excludes Operational and Commissioning Tests whereas the SONI definition includes them.
SDC1.4.8.4	Reference is made to "the Republic of Ireland".	Reference is made to "Northern Ireland".	Reference is being made in each Grid Code to the other

			jurisdiction.
SDC1.4.8.9(a)	Reference is made after the word User to "(or where in relation to a **CDGU** the **User** does not have access to where it would be published, shall, subject to agreement with the TSO, be sent by the **TSO** to that **User**)"	No such reference is made.	This additional wording in the SONI Code is to reflect the fact that Generators with Intermediaries will not have access to the published IOS.
SDC1 Appendix A Part 2	Part 2 refers to factors applicable to the SONI Grid Code only	Part 2 refers to factors applicable to the EirGrid Grid Code only	The two System Operators require some data items specific to that system and they are detailed here.

3. Provisions applicable to one Grid Code only

The table below provides a list of the provisions of SDC1 which exist in one Grid Code only.

Provisions used in SONI Grid Code only	**Reason**
SDC1.1.4	SONI has extra requirements due to the presence of PPA Generation in Northern Ireland.
SDC1.4.3: Introductory sentence	
SDC1.4.4: Introductory sentence	
SDC1.4.8: Introductory Sentence	
SDC1.4.8.3(xxiv)	
SDC1 Appendix B	
SDC1.4.2.2(f)	The CCGT Matrix can be amended in the SONI Grid Code as per a specific requirement in the Planning Code Appendix, whereas the EirGrid Code can be amended as per any Planning Code data.
SDC1.4.2.3/SDC1.4.8.3(xvi)	For reasons associated with the management of the Transmission System in Northern Ireland - especially relating to emission and fuel constraints on certain CDGUs - it is important that the TSO is given fuel and emission constraint related information by a Generator so that it can take these into account when preparing the IOS.
SDC1.4.4.2(i)	This provision is necessary to deal with conversion factors applicable to PPA Generators in Northern Ireland.
SDC1.4.4.3	There are differences in how Reserve capabilities are notified to both SONI and EirGrid.

Provisions used in EirGrid Grid Code only	
SDC1.4.4.2 (h)	There are differences in how Operating Reserve capabilities are notified to both SONI and EirGrid.
SDC1.4.4.2(c)	The SONI Grid Code addresses the issue of conversion factors in a different way by cross-referring to the Planning Code.

SCHEDULING AND DISPATCH CODE NO. 2

CONTROL SCHEDULING AND DISPATCH

SDC2.1 INTRODUCTION

SDC2.1.1 **SEM** Provisions

(a) This Scheduling and Dispatch Code No. 2 ("SDC2") forms part of the **Sections under Common Governance** of the **Grid Code**. The **Sections under Common Governance** are those parts of the **Grid Code** which are under common governance in both the **Grid Code** and the **Other Grid Code**.

(b) The form of this SDC2 is similar to the SDC2 in the **Other Grid Code.** Differences relate to references to relevant power systems and related terms. Where there is a difference between a provision in this **Grid Code** and an equivalent provision in the **Other Grid Code**, the wording in question is shaded in grey. In addition, those parts of this SDC2 that are not part of the **Other Grid Code** are shaded in grey in this SDC2. Differences between the form of this SDC2 and the SDC2 in the **Other Grid Code** are summarised in Annex 1 to this SDC2.

(c) This SDC2 is intended to work in conjunction with other documents, including the **Trading and Settlement Code ("TSC")**. The provisions of the **Grid Code** and the **Other Grid Code** will take precedence over the **TSC**.

(d) Where stated in this SDC2, the obligation to submit data in relation to some of the information required to be provided to the **TSO** may be fulfilled by **Users** where such information submitted under the **TSC** by a **User** or by an **Intermediary** on behalf of **Users** is then provided to the **TSO** by the **Market Operator** in accordance with the **TSC**, as further provided in this SDC2. The **TSO** may require **Users** to verify or update data received by it via the **Market Operator**.

(e) **Dispatch Instructions** issued pursuant to this SDC2 may be utilised for settlement in respect of **SEM** generator units which have been registered in accordance with the **TSC**.

(f) Further provisions dealing with the **Sections under Common Governance** are contained in the **General Conditions**.

SDC2.1.2 SDC2 sets out the procedure for the **TSO** to issue **Dispatch Instructions** to:

(a) **Generators** in respect of their **CDGUs** (which for the avoidance of doubt comprise, **Generating Units** subject to **Central Dispatch**, **CCGT Installations**, **Hydro Units**, **Pumped Storage Generation** (but not **Pumped Storage Demand**) and **Dispatchable PPMs**);

(b) **Pumped Storage Generators** in respect of their **Pumped Storage Plant Demand**;

(c) **Energy Storage Generators** in respect of their **Energy Storage Power Station Demand**;

(d) **Interconnector Owners** in respect of their **Interconnectors**;

(e) **Demand Side Unit Operators** in respect of their **Demand Side Units**; and

(f) **Generator Aggregators** in respect of their **Aggregated Generating Units**.

Controllable PPMs are not currently subject to **Dispatch Instructions.** However, remote signals sent by the **TSO** to **Controllable PPMs** in order to limit **Active Power** output may be utilised by the **MO** as **Dispatch Instructions** in accordance with the **TSC.**

SDC2.1.3 Certain provisions relating to **PPA Generation** are included in Appendix C and Appendix D and prevail, supplement and/or replace as the case may be the provisions of SDC2 in relation to such **PPA Generation**.

SDC2.2 OBJECTIVE

The procedure for the issue of **Dispatch Instructions** by the **TSO**, is intended to enable (as far as possible) the **TSO** to match continuously **CDGU**, **Demand Side Unit**, **Aggregated Generating Units** output (or reduction as the case may be) and/or **Interconnector** transfers to **Demand**, and thereby in conjunction with the **Other TSO**, the **Demand** on the Island of Ireland, by utilising the **Physical Notifications** and **Merit Order** derived pursuant to SDC1 and the factors to be taken into account listed there and by taking into account any **NCDGU MW Output** in both cases together with an appropriate margin of reserve, whilst maintaining (so far as possible) the integrity of the **Transmission System** together with the security and quality of supply (with the **Other TSO** having a similar objective with regard to its **Transmission System**).

SDC2.3 SCOPE

SDC2.3.1 SDC2 applies to the **TSO**, and:

(a) **Generators** with regard to their **CDGUs**;

(b) **Pumped Storage Generators** with regard to their **Pumped Storage Plant Demand**;

(c) **Energy Storage Generators** with regard to their **Energy Storage Power Station Demand**;

(d) **Interconnector Owners** with regard to their **Interconnectors**;

(e) **Demand Side Unit Operators** in relation to their **Demand Side Units**; and

(f) **Generator Aggregators** in respect of their **Aggregated Generating Units**.

Each of which (other than the **TSO**) is a "**User**" under this SDC2.

SDC2.3.2 In this SDC2, the term "**User**" shall include users of the **Distribution System** that fall under one of the above categories and are subject to **Central Dispatch**.

SDC2.4 PROCEDURE

SDC2.4.1 Information Used

SDC2.4.1.1 The information which the **TSO** shall use in assessing which **CDGU**, **Demand Side Unit**, **Interconnector** transfers, **Pumped Storage Plant Demand** and/or **Energy Storage Power Station Demand** and/or **Aggregated Generating Units** to **Dispatch**, will be:

(a) **Interconnector Schedule Quantities**, **Final Physical Notifications** (or **Physical Notifications** in circumstances where **Dispatch Instructions** must be issued before **Gate Closure 2**);

(b) the **Availability Notices**;

(c) the **Merit Order** as derived under SDC1;

(d) the other factors to be taken into account under SDC1 and which were used by the **TSO** to compile the **Indicative Operations Schedule**; and

(e) the:

(i) **Technical Parameters**;

(ii) **Additional Grid Code Characteristics Notices**;

(iii) **Reserve Characteristics**; and

(iv) **Other Relevant Data**,

in respect of that **CDGU**, **Demand Side Unit**, **Interconnector** transfers**,** **Pumped Storage Plant Demand** and/or **Energy Storage Power Station Demand** and/or **Aggregated Generating Units** subject to any subsequent revisions to the data under SDC1 and SDC2.

SDC2.4.1.2 Additional factors which the **TSO** will also take into account are:

(a) those **Generators** or **Demand Side Unit Operators** who have not complied with **Dispatch Instructions** or **Special Actions**;

(b) real time variation requests; and

(c) the need to **Dispatch CDGUs**, **Aggregated Generating Units, Demand Side Units**, **Interconnector** transfers, **Pumped Storage Plant Demand** and **Energy Storage Power Station Demand** for **Monitoring, Testing** or **Investigation** purposes (and/or for other trading purposes whether at the request of a **User**, for **Commissioning** or **Acceptance**, **System Tests** or otherwise).

SDC2.4.1.3 In the event of two or more **CDGUs**, **Demand Side Units**, **Pumped Storage Plant Demand** and/or **Energy Storage Power Station Demand** and/or **Aggregated Generating Units** having the same **Price Set** and the **TSO** not being able to differentiate on the basis of the factors identified in SDC1.4.8.2, SDC1.4.8.3 and SDC1.4.8.4, then the **TSO** will select first for **Dispatch** the one which in the **TSO**'s reasonable judgement is most appropriate in all the circumstances.

SDC2.4.1.4 Following **Gate Closure 2**, **Users** may no longer amend **Interconnector Schedule Quantities**, **Physical Notifications** or **Commercial Offer Data** in respect of **Imbalance Settlement Periods** for which the **Gate Closure 2** has occurred (subject to SDC1.4.4.6(d)). Notwithstanding SDC1.4.8, the **TSO** will continue to rerun the **Scheduling** process and issue **Indicative Operations Schedules**.

SDC2.4.1.5 In this SDC2, where the provisions relating to **CCGTs** differ from the explicit requirements contained in a **Generating Unit Agreement**, a **Power Station Agreement** and/or a **System Support Services Agreement** in Northern Ireland, the provisions of that agreement will prevail.

SDC2.4.2 **Dispatch Instructions**

SDC2.4.2.1 Introduction

As far as is reasonably practicable, **Dispatch Instructions** will normally be issued at any time following **Gate Closure 2** in respect of the relevant **Imbalance Settlement Periods**. The **TSO** may, however, at its discretion, issue **Dispatch Instructions** in relation to a **CDGU**, **Demand Side Unit**, **Interconnector** transfers, **Pumped Storage Plant Demand** and/or **Energy Storage Power Station Demand** and/or **Aggregated Generating Units** prior to **Gate Closure 2**.

SDC2.4.2.2 Issue of **Dispatch Instructions**

The **TSO** will issue **Dispatch Instructions** direct to:

(a) the **Generator** for the **Dispatch** of each of its **CDGUs**.

(b) the **Generator Aggregator** for the **Dispatch** of its **Aggregated Generating Units**.

(c) the **Energy Storage Generator** for the **Dispatch** of its **Energy Storage Power Station Demand**.

(d) the **Demand Side Unit Operator** and the **Pumped Storage Demand User** in respect of each of their **Demand Side Units** and **Pumped Storage Plant Demand** respectively.

(e) the **Interconnector Owner** for the **Dispatch** of the **Interconnector** transfers.

(f) The **TSO** may issue **Dispatch Instructions** for any **CDGU**, **Demand Side Unit**, **Interconnector** transfers, **Pumped Storage Plant Demand** and/or **Energy Storage Power Station Demand** and/or **Aggregated Generating Units** which has been declared **Available** in an **Availability Notice** even if that **CDGU**, **Demand Side Unit**, **Interconnector** transfers, **Pumped Storage Plant Demand** and/or **Energy Storage Power Station** and/or **Aggregated Generating Units** was not included in an **Indicative Operations Schedule**.

SDC2.4.2.3 Scope of **Dispatch Instructions**

In addition to instructions relating to the **Dispatch** of **Active Power**, **Dispatch Instructions** (unless otherwise specified by the **TSO** at the time of giving the **Dispatch Instructions**) shall be deemed to include an automatic instruction of **Spinning Reserve**, the level of which is to be provided in accordance with the **Sustained Load Diagram** set out in Schedule 8 of the relevant **Generating Unit Agreement** (or in the **System Support Services Agreement**, as the case may be), and submitted pursuant to the PC.

SDC2.4.2.4 In addition to instructions relating to the **Dispatch** of **Active Power**, **Dispatch Instructions** in relation to **CDGUs** and, **Demand Side Units** and/or **Pumped Storage Plant Demand** and/or **Energy Storage Power Station Demand** may include:

(a) a **Dispatch Instruction** to provide a **System Support Service**;

(b) (i) **Mvars:** the individual **Reactive Power** output from **CDGUs** at the **Generator Terminals** or voltage levels (at instructed **MW** level) at the **Connection Point** which will be maintained by the **CDGU**.

(ii) The issue of **Dispatch Instructions** for **Active Power** will be as at the **Connection Point** and will be made with due regard to any resulting change in **Reactive Power** capability and may include

instruction for reduction in **Active Power** generation to increase **Reactive Power** capability.

(iii) In the event of a sudden change in **System** voltage a **Generator** must not take any action in respect of any of its **CDGUs** to override automatic **Mvar** response unless instructed otherwise by the **TSO** or unless immediate action is necessary to comply with stability limits. A **Generator** may take such action as is in its reasonable opinion necessary to avoid an imminent risk of injury to persons or material damage to property (including the **CDGU**).

(iv) [not used]

(c) Fuels: **Fuels** to be used by the **Generator** in operating the **CDGU**. The **Generator** shall only be permitted to change **Fuels** with the **TSO's** prior consent. Appendix C provides further detail on **Dispatch Instructions** for different fuels.

(d) **Special Protection Scheme**: an instruction to switch into or out of service a **Special Protection Scheme** or other **Intertripping Scheme**;

(e) Time to **Synchronise**/react: a time to **Synchronise** or **De-Synchronise CDGUs** and, where appropriate **Demand Side Units** and/or **Energy Storage Power Stations** in relation to **Energy Storage Power Station Demand** and/or **Pumped Storage Plants** in relation to **Pumped Storage Plant Demand** and time to react for **Demand Side Units**;

(f) **Synchronous Compensation**: an instruction, (where contracted, where that is necessary), for a **CDGU** to operate in **Synchronous Compensation** mode;

(g) **Testing** etc: an instruction in relation to the carrying out of **Testing, Monitoring** or **Investigations** as required under OC11, or testing at the request of a **Generator** in relation to a **PPA CDGU** under OC11.8, testing at the request of a **User** in relation to **User's Equipment** other than a **PPA CDGU** under OC11.13 or **Commissioning/Acceptance Testing** under the CC;

(h) **System Tests**: an instruction in relation to the carrying out of a **System Test** as required under OC10;

(i) **Maximisation**: in the case of a **CDGU** which is subject to an agreement with the **TSO** for the provision of **Maximisation** (or where it is otherwise agreed) an instruction requiring it to generate at a level in excess of its **Availability** but not exceeding its **Short Term Maximisation Capability** which may only be given if, at the time of issue of the instruction, the **CDGU** is **Dispatched** to a **MW Output** equal to its **Availability** and provided that the limit on the number of hours for which such instructions may be given in any year, as set out in any arrangement relating to the relevant agreement is not thereby exceeded. Such an instruction shall be identified as a "**Maximisation Instruction**". When the **TSO** gives a **Dispatch Instruction** which is in excess of the **Availability** of the **CDGU**

which is not designated a "**Maximisation Instruction**", the **Generator** must inform the **TSO** immediately that the **Dispatch Instruction** is so in excess in order that the **TSO** can so designate the **Dispatch Instruction** as a **Maximisation Instruction** or withdraw the instruction. The **Generator** shall not then be obliged to comply with the **Dispatch Instruction** unless and until the **TSO** notifies it that the instruction is designated a "**Maximisation Instruction**";

(j) **Cycle Operating Mode**: in the case of a **CCGT Installation**, an instruction specifying the **Cycle Operating Mode** and/or an instruction to **Dispatch** a **CCGT Installation** in **Open Cycle Mode**. The **Generator** must then ensure that the **CCGT Installation** achieves the new **Dispatched Operating Mode**, without undue delay, in accordance with the **CCGT Installation's** declared **Availability** and declared **Technical Parameters. Dispatch Instructions** in relation to **Cycle Operating Modes** issued by the **TSO** shall reflect the applicable **Availability Notice** and **Technical Parameters**;

(k) **Pumped Storage**: mode changes for **Pumped Storage Plants**, where contracted, in relation to **Pumped Storage Plant Demand**;

(l) **Energy Storage Power Station:** mode changes for **ESPS**, where contracted, in relation to **Energy Storage Power Station Demand**;

(m) **Dispatch Instruction Test Flags**: **Dispatch Instruction Test Flags** shall be applied to **Dispatch Instructions** in respect of new or amended test proposals submitted by a **Generator** after **Gate Closure 2** has already occurred for the relevant **Imbalance Settlement Periods** (since **Final Physical Notifications** cannot be amended) and the **Generator** could not have reasonably foreseen the need for the new or amended test request before **Gate Closure 2** for the relevant **Imbalance Settlement Period**. The **Dispatch Instruction Test Flag** shall be applied to the portion of the **Dispatch Instruction** which diverges from **Physical Notifications** submitted by a **Generator** in respect of a test proposal which has been approved by the **TSO**. The part of a **Dispatch Instruction** subject to the flag will not be deemed to be a **Dispatch Instruction** for settlement purposes;

(n) Gas supply emergency: instructions relating to gas supply emergencies, where the ordinary **Dispatch** process may not be followed;

(o) Tap Positions: an instruction for a change in **Generator Transformer** tap positions;

(p) **Fuel Security Code**: in relation to **CDGUs**, an instruction given by the **TSO** pursuant to the **Fuel Security Code,** with which document all **Generators** are required under the Grid Code to comply.

SDC2.4.2.5 Form of Instruction

(a) Instructions may normally be given via **Electronic Interface** but can be given by telephone, by facsimile transmission *or* by radio telephone. In the case of a **Special Protection Scheme**, a **Low Frequency Relay** initiated

response from a **CDGU**, **Demand Side Unit**, and/or **Pumped Storage Plant** in relation to **Pumped Storage Plant Demand,** and/or **Energy Storage Power Stations** in relation to **Energy Storage Power Station Demand**, the instruction will be given for the effective time which is consistent with the time at which the **Low Frequency Relay** operation occurred. This **Dispatch Instruction** will be issued retrospectively.

(b) The reduction by a **Generator** of the **MW Output** of one of its **CDGUs** under SDC3.6.1 shall be deemed to have followed a **Dispatch Instruction** issued by the **TSO**.

(c) (i) In the event of a temporary loss of the ***TSO Control Centre*** as described under OC7, each **Generator** shall, subject to the provisions of SDC2.4.2.5(c)(ii), continue to operate its **CDGUs** in accordance with the last **Dispatch Instructions** to have been issued by the **TSO** but shall use all reasonable endeavours to maintain **System Frequency** at the indicated **Target Frequency** by monitoring **Frequency** and increasing/decreasing the **MW Output** of its **CDGUs** as necessary until such time as new **Dispatch Instructions** are received from the **TSO**.

(ii) When operating its **CDGUs** in the circumstances described under SDC2.4.2.5(c)(i), a **Generator** shall never be required to **Dispatch** these units in a manner in which the **TSO** would not be entitled to require such units to be **Dispatched** by means of a **Dispatch Instruction** issued in accordance with this SDC2.

(d) The **De-Synchronisation** of a **CDGU** following the operation of a **Special Protection Scheme** selected by the **TSO** shall be deemed to have happened as a result of a **Dispatch Instruction** issued by the **TSO**.

SDC2.4.2.6 **Target Frequency**

(a) **Dispatch Instructions** to **Generators** will generally indicate the target **MW** (at **Target Frequency**) to be provided at the **Connection Point** to be achieved in accordance with the respective **CDGU's Technical Parameters** and/or parameters as provided in the **Additional Grid Code Characteristics Notices** provided under SDC1 or this SDC2, or such rate within those parameters as is specified by the **TSO** in the **Dispatch Instructions**.

(b) **Dispatch Instructions** deemed to be given upon the operation of an agreed **Low Frequency Relay** will be deemed to indicate the target **MW** (at **Target Frequency**), which may either be at maximum **MW Output** or at some lower **MW Output** (as previously specified by the **TSO**), to be provided at the **Connection Point** which reflects and is in accordance with the **CDGU's Technical Parameters** and/or parameters as provided in the **Additional Grid Code Characteristics Notice** data given under (or as revised in accordance with) SDC1 or this SDC2.

SDC2.4.2.7 To aid clarity, the form of and terms to be used by the **TSO** in issuing instructions together with their meanings are set out in the Appendices to this SDC2.

SDC2.4.2.8 (a) Subject only to SDC2.4.2.9 and as provided below in this SDC2.4.2.8**,** **Dispatch Instructions** will not be inconsistent with the **Availability** and/or **Technical Parameters** and/or **Additional Grid Code Characteristics Notice** data and **Other Relevant Data** notified to the **TSO** under SDC1 (and any revisions under SDC1 or this SDC2 to that data).

(b) A new **Dispatch Instruction** may be subsequently given (including an instruction for a **Cancelled Start**) at any time.

(c) **Dispatch Instructions** may however be inconsistent with the **Availability** and/or **Technical Parameters** and/or **Additional Grid Code Characteristics Notice** data and/or **Other Relevant Data** so notified to the **TSO** for the purposes of carrying out a test at the request of the relevant **Generator** under OC11.8, a test at the request of a **User** under OC11.13 or a **System Test** at the request of the relevant **Generator** under OC10.4, to the extent that such **Dispatch Instructions** are consistent with the procedure agreed (or otherwise determined) for conducting the test or **System Test** (as the case may be). **Dispatch Instructions** may also be inconsistent with the **Availability** and/or **Technical Parameters** and/or **Additional Grid Code Characteristics Notice** data and/or **Other Relevant Data** so notified to the **TSO** in circumstances where the **TSO** issues a **Dispatch Instruction** to a **Generator** in relation to its **CDGUs** pursuant to the **Fuel Security Code.**

(d) For the avoidance of doubt, any **Dispatch Instructions** issued by the **TSO** for the purposes of carrying out a test at the request of the relevant **Generator** under OC11.8, a test at the request of a **User** under OC11.13 or a **System Test** at the request of the relevant **Generator** under OC10.4 shall not be deemed to be **Dispatch Instructions** given pursuant to SDC2.4.2.9.

SDC2.4.2.9 (a) To preserve **System** integrity under emergency circumstances where, for example, **Licence Standards** cannot be met the **TSO** may, however, issue **Dispatch Instructions** to change **CDGU**, **Aggregated Generating Units**, **Demand Side Unit, Interconnector** transfers and/or **Pumped Storage Plant Demand MW Output** and/or **Energy Storage Power Station Demand MW Output** or **Demand Side Unit MW Response** even when this is outside parameters so registered or so amended. This may, for example, be an instruction to trip or partially load a **CDGU**. The instruction will be stated by the **TSO** to be one in relation to emergency circumstances under SDC2.4.2.9.

(b) A **User** may refuse to comply or continue to comply with instructions referred to in this SDC2.4.2.9 but only in order to avoid, in the **Generator's** reasonable opinion, an imminent risk of injury to persons or material damage to property (including in the case of a **Generator**, the **CDGU**).

SDC2.4.2.10 Communication with **Users**

(a) **Dispatch Instructions** whether given via **Electronic Interface**, by telephone, by facsimile transmission or by radio telephone must be formally acknowledged immediately by the **User** at the **Control Facility** by **Electronic Interface** or, with the **TSO's** prior consent, by telephone, by return facsimile transmission or by radio telephone, in the manner agreed between the **User** and the **TSO** or a reason must be given as soon as possible for non-acceptance, which may (subject to SDC2.4.2.9) only be to avoid, in the **User's** reasonable opinion, an imminent risk of injury to persons or material damage to property (including the **CDGU**) or because they are not in accordance with the applicable **Availability Notice,** or **Technical Parameters**, or **Additional Grid Code Characteristics Notices** or do not reflect **Other Relevant Data** submitted by the **User** pursuant to SDC1.

(b) In the event that in carrying out the **Dispatch Instructions**, an unforeseen problem arises, giving rise, in the **User's** reasonable opinion, to an imminent risk of injury to persons or material damage to property (including the **CDGU**) the **TSO** must be notified as soon as possible by telephone.

(c) The applicable synchronous start up time shall be based on the prevailing heat state at the time when the **TSO** issues a **Notice to Synchronise** in respect of their relevant **Generating Unit**.

SDC2.4.2.11 Action Required from **Users**

(a) Each **User** will comply in accordance with SDC2.4.2.12 with all **Dispatch Instructions** given by the **TSO** unless the **User** has given notice to the **TSO** under the provisions of SDC2.4.2.10 regarding non-acceptance of **Dispatch Instructions**.

(b) When complying with **Dispatch Instructions** for a **CCGT Installation** a **Generator** will operate its **CCGT Modules** in accordance with the applicable **CCGT Installation Matrix**.

(c) Where the **TSO** issues a **Synchronising** time to a **Generator** for a specific **CDGU** and the **Generator** identifies that such **CDGU** will not be **Synchronised** within +15/-5 minutes of the instructed time, the **Generator** must immediately (at the time the discrepancy is identified) inform the **TSO** of the situation and estimate the new **Synchronising** time.

(d) If the **CDGU** has not synchronised within 15 minutes of the **Synchronising** time in the original **Notice to Synchronise** the **TSO** will issue **a Failure to Follow Notice to Synchronise** and the **Generator** shall re-declare, by **Electronic Interface** or by other form as the TSO may reasonably notify to each **User** from time to time, its **Availability** to 0MW for the **CDGU** effective at the **Synchronising** time in the original **Notice to Synchronise.**

SDC2.4.2.12 Implementation of Instructions by **Users**

When a **User** has received a **Dispatch Instruction** given by the **TSO**, it will react by responding to that **Dispatch Instruction** given by the **TSO** without undue delay, and, in any event, within one minute in accordance with the instruction, including those **Dispatch Instructions** issued pursuant to SDC2.4.2.9. Instructions indicating a target **MW Output** at the **Target Frequency** will be complied with by **Users** notwithstanding any tolerance bands set out in any **Testing** requirement or elsewhere in the **Grid Code**.

SDC2.4.2.13 (a) Subject to the exception set out below in this SDC2.4.2.13, **Generators** will only **Synchronise** or **de-Synchronise CDGUs** when they have received these **Dispatch Instructions** from the **TSO** or unless it occurs automatically as a result of **Special Protection Schemes** or **Low Frequency Relay** operations. Subject to the exception set out below in this SDC2.4.2.13, **Demand Side Unit Operators** will only reduce or increase their **Demand Side Unit MW Response** to the **Dispatch Instructions** of the **TSO** or unless it occurs automatically as a result of **Special Protection Schemes** or **Low Frequency Relay** operations.

(b) **De-Synchronisation** may otherwise only take place without the **TSO's** prior agreement if it is to avoid, in the **Generator's** reasonable opinion, an imminent risk of injury to persons or material damage to property (including the **CDGU**). **Demand Side Units**, who can not maintain the provision of any **Demand Side Unit MW Response,** may otherwise only take place without the **TSO's** prior agreement if it is to avoid, in the **Demand Side Unit Operator**'s reasonable opinion, an imminent risk of injury to persons or material damage to property (including the **Demand Side Unit**).

(c) If one of these exceptions occur, then the **TSO** must be informed that it has taken place as soon as possible.

SDC2.4.2.14 The **TSO** may suspend the issue of **Dispatch Instructions** to **User's Plant** in accordance with the **Merit Order** (having taken account of and applied the factors referred to in SDC1.4.8.3) to the extent that the conditions in SDC1.4.8.6 or SDC2.4.2.4(m) arise. When necessary the **TSO** will issue **Dispatch Instructions** for a **Black Start**.

SDC2.4.2.15 **User Plant** Changes

Each **User** at its **Control Facility** will, without delay, notify the **TSO** by **Electronic Interface**, telephone or by facsimile transmission of any change or loss (temporary or otherwise) to the operational capability of its **Plant** including any changes to the **Technical Parameters** and/or **Additional Grid Code Characteristics Notice** data of each of the **User's Plant** (in the case of **Technical Parameters**, by the submission of a **Technical Parameters Revision Notice**) indicating (where possible) the magnitude and the duration of the change. In the case of **CDGUs** already **Synchronised** to the **System**, each **Generator**, in respect of its **Generating Units**, must also state whether or not the loss was instantaneous.

SDC2.4.2.16 Each **Generator**, in respect of its **Generating Units**, will operate its **Synchronised CDGUs** with **AVRs** and **Var** limiters in service at all times (where required pursuant to CC.S1.5) unless released from this obligation in respect of a particular **CDGU** by the **TSO**.

SDC2.4.2.17 Each **Generator**, in respect of its **Generating Units**, shall request the **TSO's** agreement for one of its **CDGUs** at that **Generating Plant** to be operated without the **AVR** or **Var** limiter in service. The agreement of the **TSO** will be dependent on the risk that would be imposed on the **System**. However, a **Generator** may, in any event, take such action in relation to that **CDGU** as is reasonably necessary to avoid, in the **Generator's** reasonable opinion, an imminent risk of injury to persons or material damage to property (including the **CDGU**). When a **Generator** operates one of its **CDGU**s without the AVR or Var limiter in service, whether or not the **TSO** has agreed to such action, the **Generator** shall notify the **TSO** in such form as the **TSO** may reasonably notify to each **User** or in the form published on the **TSO** website from time to time.

SDC2.4.2.18 **Minimum Demand Regulation ("MDR")**

Synchronised CDGUs must at all times be capable of reducing **MW Output** sufficient to allow a sufficient **Regulating Margin** for adequate **Frequency Control**. The **TSO** will monitor the **MW Output** data of the **Indicative Operations Schedule** against the forecast **Demand** to see whether the level of **MDR** for any period is insufficient, and may take any shortfall into account in **Dispatch**.

SDC2.4.3 **Special Actions**

The **TSO** may also issue **Dispatch Instructions** for **Special Actions** (either pre- or post-fault) to a **User** in respect of any of its **Plant** in the event that the **TSO** in its reasonable opinion believes that such instructions are necessary in order to ensure that the **Licence Standards** are met. **Special Actions** will generally involve a **Load** change, a **Load** reduction change or a change in required **Notice to Synchronise** (or, in the case of a **Demand Side Unit** or **Pumped Storage Plant Demand** or **Energy Storage Power Station Demand**, a change in the relevant effective time) in a specific timescale on individual or groups of **CDGUs**. They may also include selection of **Special Protection Scheme** for stability or thermal

reasons. Instructions for **Special Actions** will always be within **Technical Parameters**.

SDC2 - APPENDIX A

DISPATCH INSTRUCTIONS FOR CDGUS AND DEMAND SIDE UNITS

SDC2.A.1 General

This Appendix A to SDC2 provides further information on the form of a **Dispatch Instruction** as well as an example of a **Dispatch Instruction** for **CDGUs** and **Demand Side Units**.

In this **SDC2**, where the provisions relating to **CCGT Modules** and **CCGT Installations** differ from the explicit requirements contained in a **Generating Unit Agreement**, a **Power Station Agreement** and/or a **System Support Services Agreement**, the provisions of that agreement will prevail.

SDC2.A.2 Form of **Dispatch Instruction**

SDC2.A.2.1 All **Loading/De-Loading Rates** will be assumed to be in accordance with **Technical Parameters** and **Additional Grid Code Characteristics Notice** data. Each **Dispatch Instruction** will, wherever possible, be kept simple, drawing as necessary from the following forms and SDC2.4.2**.**

SDC2.A.2.2 The **Dispatch Instruction** given by **Electronic Interface**, telephone, or facsimile transmission will normally follow the form:

(a) where appropriate, the specific **CDGU** or **User's Plant** to which the instruction applies;

(b)

(i) the **MW Output** (or **Demand Side Unit MW Response**) to which it is instructed or;

(ii) the **MW Output** (or **Demand Side Unit MW Response**) to which it is instructed until, a specified time, in which case the instructed **MW Output** shall be followed until a further **Dispatch Instruction** is issued;

(c) if the start time is different from the time the instruction is issued, the start time will be included;

(d) where specific **Loading/De-Loading Rates** are concerned, a specific target time;

(e) the issue time of the instruction;

(f) the **Designated Fuel**, **Declared Fuel** or fuel as the case may be;

(g) in the case of **CDGUs** , if the instruction is designated as a "**Maximisation Instruction**", this will be stated; and

(h) in the case of a **CCGT Installation**, the **Operating Mode** to which it is instructed.

SDC2.A.2.3 Where the **MW Output** (or **Demand Side Unit MW Response**) is instructed until a specified time, that time shall normally be within the **Trading Days** for which **Gate Closure 1** has passed. The **TSO** may, however, at its discretion, specify a time beyond the end of the **Trading Days** for which **Gate Closure 1** has passed.

SDC2.A.3 **Dispatching** a **Synchronised CDGU** to increase or decrease **MW Output**

SDC2.A.3.1 If the time of the **Dispatch Instruction** is 1400 hours, the Unit is Unit 1 and the **MW Output** to be achieved is 205 **MW**, the relevant part of the instruction would be, for example:

"Time 1400 hours. Unit 1 to 205 **MW** until further notice"

or

"Time 1400 hours. Unit 1 to 205 **MW** effective until 1500 hours"

SDC2.A.3.2 If the start time is 1415 hours, it would be, for example:

"Time 1400 hours. Unit 1 to 205 **MW** until further notice, start at 1415 hours"

or

"Time 1400 hours. Unit 1 to 205 **MW** effective until 1500 hours, start at 1415 hours"

SDC2.A.3.3 **Loading** and **De-Loading Rates** are assumed to be in accordance with **Technical Parameters** and **Additional Grid Code Characteristics Notice** data unless otherwise stated. If different **Loading** or **De-Loading Rates** are required, the time to be achieved will be stated, for example:

"Time 1400 hours. Unit 1 to 205 **MW** by 1420 hours until further notice"

or

"Time 1400 hours. Unit 1 to 205 **MW** by 1420 hours, effective until 1500 hours"

SDC2.A.4 **Dispatching** a **CDGU** to **Synchronise/de-Synchronise**

SDC2.A.4.1 **CDGU Synchronising**

SDC2.A.4.1.1 In this instance, for **CDGUs**, the **Dispatch Instruction** issue time will always have due regard for the **Synchronous Start-Up Time** (for cold, hot, warm states)

declared to the **TSO** by the **Generator** as a **Technical Parameters** or as part of **Additional Grid Code Characteristics Notice** data.

The instruction will follow the form, for example:

"Time 1300 hours. Unit 1, **Synchronise** at 1600 hours"

In relation to an instruction to **Synchronise**, the - **Synchronising** time referred to in SDC2.A.2.2 will be deemed to be the time at which **Synchronisation** is to take place.

SDC2.A.4.1.2 Unless a **Loading** programme is also given at the same time it will be assumed that the **CDGU(s)** are to be brought to **Minimum Generation** and on the **Generator** reporting that the unit has **Synchronised** a further **Dispatch Instruction** will be issued.

SDC2.A.4.1.3 When a **Dispatch Instruction** for a **CDGU** to **Synchronise** is cancelled (i.e. a **Cancelled Start**) before the unit is **Synchronised**, the instruction will follow the form, for example:

"Time 1400 hours. Unit 1, cancel **Synchronising** instruction"

SDC2.A.4.1.4 If a **CDGU** fails to **Synchronise** more than 15 minutes after the **Synchronising** time specified in a **Notice to Synchronise**, the **TSO** will issue a **Failure to Follow Notice to Synchronise Instruction**. If a **Generator** requests to **Synchronise** a **CDGU** more than 15 minutes before the **Synchronising** time set out in the **Notice to Synchronise**, the **TSO** may agree to the **CDGU** being **Synchronised** at that time or request that the **CDGU** be **Synchronised** at the original **Synchronising** time. If the **TSO** accepts the request to **Synchronise** more than 15 minutes before the original **Synchronising** time, the **TSO** will not amend the original **Synchronising** time but the **Generator** shall be entitled to **Synchronise** the **CDGU**, and the **CDGU** shall be deemed to have met the original **Synchronising** time.

SDC2.A.4.1.5 When in respect of a **CDGU** a **Generator** receives a **Failure to Follow Notice to Synchronise Instruction** the original **Notice to Synchronise** is deemed never to have been issued and the **CDGU** is not entitled to **Synchronise**. The **TSO** will then decide whether or not to instruct again the **Generator** to **Synchronise** the **CDGU**, and will notify the **Generator** in relation to the **CDGU** accordingly.

SDC2.A.4.1.6 When a **CDGU** trips before reaching **Minimum Generation** a **Failure to Reach Minimum Generation Instruction** will be issued. The **Failure to Reach Minimum Generation Instruction** will negate the **Notice to Synchronise** received by the **CDGU**. The **TSO** will then decide whether or not to instruct the **CDGU** to **Synchronise** again, and will notify the **Generator** in relation to that **CDGU** accordingly.

SDC2.A.4.1.7 The **TSO** may request a **CDGU** to endeavour to **Synchronise** earlier than the declared **Synchronous Start Up Time** (for cold, hot, warm states). In this event the **TSO** will issue the **Dispatch Instruction** with a **Synchronising** time that reflects the **CDGU** declared **Synchronous Start Up Time** (for cold, hot, warm

states) accompanied by a written or verbal request that the unit **Synchronise** as soon as possible. If the **CDGU Synchronises** ahead of the **Synchronising** time in the **Dispatch Instruction** the **TSO** will cancel that **Dispatch Instruction** and issue a new **Dispatch Instruction** with a **Synchronising** time equal to the actual time the unit **Synchronised**.

○

SDC2.A.4.1.7 With regard to synchronisation of **CDGU** above 10 MW:

(a) when starting a **CDGU**, **synchronisation** shall be performed by the **Generator** only after authorisation by the **TSO**;

(b) the **CDGU** shall be equipped with the necessary **synchronisation** facilities;

(c) **synchronisation** of **CDGU's** shall be possible at frequencies within the ranges set out in CC8.8.6.1;

(d) the **TSO** and the **Generator** shall agree on the settings of **synchronisation** devices to be concluded prior to operation of the **CDGU**. This agreement shall cover:

(i) voltage;

(ii) frequency;

(iii) phase angle range;

(iv) phase sequence;

(v) deviation of voltage and frequency.

SDC2.A.4.2 **CDGUs De-Synchronising**

SDC2.A.4.2.1 The **Dispatch Instruction** will normally follow the form, for example:

"Time 1300 hours. Unit 1, **Shutdown**"

If the instruction start time is for 1400 hours the form will be, for example:

"Time 1300 hours. Unit 1, **Shutdown**, start at 1400 hours"

Both the above assume **De-Loading Rate** at declared **Technical Parameters**. Otherwise the message will conclude with, for example:

"... and **De-Synchronise** at 1500 hours"

SDC2.A.5 **Frequency Control**

SDC2.A.5.1 All the above **Dispatch Instructions** will be deemed to be at the instructed **Target Frequency**, i.e. where a **CDGU** is in the **Frequency Sensitive Mode** instructions refer to target **MW Output** at **Target Frequency**. **Target Frequency** changes will always be given to the **Generator** by telephone or **Electronic Interface** and will normally only be 49.95, 50.00, 50.05Hz.

SDC2.A.5.2 **CDGUs** required to be **Frequency** insensitive will be specifically instructed as such. The **Dispatch Instruction** will be of the form for example:

"Time 2100 hours. Unit 1, to **Frequency** insensitive mode"

SDC2.A.5.3 **Frequency Control** instructions may be issued in conjunction with, or separate from, a **Dispatch Instruction** relating to **MW Output**.

SDC2.A.6 Emergency **Load** Drop

The **Dispatch Instruction** will be in a pre-arranged format and normally follow the form, for example:

"Time 2000 hours. Emergency **Load** drop of "X"**MW** in "Y" minutes"

SDC2.A.7 **Voltage Control** Instruction

In order that adequate **System** voltage profiles are maintained under normal and fault conditions a range of **Voltage Control** instructions will be utilised from time to time, for example:

(a) Operate to target voltage of 117 kV;

(b) Maximum production or absorption of **Reactive Power** (at current instructed **MW Output)**;

(c) Increase reactive output by 10 **Mvar** (at current instructed **MW Output**).

SDC2.A.8 Instruction to change fuel

When the **TSO** wishes to instruct a **Generator** to change the fuel being burned in the operation of one of its **CDGUs** from one **Dispatched Fuel** (or fuel) to another (for example from 1% sulphur oil to 3% sulphur oil), the **Dispatch Instruction** will follow the form, for example:

"Time 1500 hours. Unit 2 change to 3% fuel at 1700 hours".

SDC2.A.9 Instruction to change fuel for a dual firing **CDGU**

When the **TSO** wishes to instruct a **Generator** to change the fuel being burned in the operation of one of its **CDGUs** which is capable of firing on two different fuels (for example, coal or oil), from one **Designated Fuel** (or fuel) to another (for example, from coal to oil), the instruction will follow the form, for example:

"Time 1500 hours. Unit 1 generate using oil at 1800 hours".

SDC2.A.10 **Maximisation Instruction** to **CDGUs**

When the **TSO** wishes to instruct a **Generator** to operate a **CDGU** at a level in excess of its **Availability** in accordance with SDC2.4.2.4(i), the instruction will follow the form, for example:

"**Maximisation Instruction**. Time 1800 hours. Unit GT2 to 58 **MW**."

SDC2.A.11 [not used]

SDC2.A.12 **Dispatching** a **Demand Side Unit** to a **Demand Side Unit MW Response**

SDC2.A.12.1 For **Demand Side Units**, the **Dispatch Instruction** issue time will always have due regard for the **Demand Side Unit Notice Time** declared to the **TSO** by the **Demand Side Unit Operator** as a **Technical Parameter** or as part of **Additional Grid Code Characteristics Notice** data.

SDC2.A.12.2 If the time of the **Dispatch Instruction** is 1400 hours, the **Demand Side Unit** is XX1, the **Demand Side Unit Notice Time** is 10 minutes and the **Demand Side Unit MW Response** to be achieved is 20 **MW**, the relevant part of the instruction would be for example :

"Time 1400 hours. Unit XX1 to 20 **MW** until further notice**,** start at 1410 hours"

or

"Time 1400 hours. Unit XX1 to 20 **MW** until 1500 hours**,** start at 1410 hours"

SDC2 - APPENDIX B

[Not Used]

SDC2 - APPENDIX C

DISPATCH INSTRUCTIONS FOR DIFFERENT FUELS

SDC2.C.1 In addition to instructions relating to the **Dispatch** of **Active Power, Dispatch Instructions** in relation to **CDGUs** may include:

(a) the **Declared Fuel** (or fuel) to be used by the **Generator** in operating the **CDGU**. In the case of a **CDGU** capable of firing on different fuels, the **Dispatch Instruction** may also specify the **Designated fuel** (or fuel) to be used by the **Generator**. If no **Declared Fuel** (or fuel) and/or, where relevant, fuel is contained in the **Dispatch Instruction**, then the most recently instructed fuel will apply. The part of a **Dispatch Instruction** which specifies a change in the fuel to be burned by the **Generator** shall be known as a "**Dispatched** fuel **Notice**". The **TSO** may, however, use a separate **Dispatched** fuel **Notice** and which may be issued separately from any **Dispatch Instruction**, containing the above information. These provisions apply to a **PPA CDGU**. If a fuel has been notified for a **CDGU** other than a **PPA CDGU**, the fuel may be specified;

(b) in the case of a **PPA CDGU** only, the **Generator** may (subject to the following provisions of this paragraph (b)), in complying with a **Dispatch Instruction** burn a fuel other than the fuel specified in the **Dispatch Instruction**.

SDC2 - APPENDIX D

PPA GENERATION PROVISION

SDC2.A.D.1 In relation to SDC2.4.2.9(b), in the case of **PPA Generation**, the provision of GC13.5 shall be imported into (and for the purposes of the **TSO Licence** and the **NIE Licence**, requested as forming part of SDC2.4.2.9(b)).

SDC2.A.D.2 In the case of **PPA Generation**, references to "**Maximisation**" in the Grid Code shall be read as being references to "Peak" or "Peaking" in the **Power Station Agreements** and the **Generating Unit Agreements**.

ANNEX I

Explanatory Note of differences between SDC2 in the SONI Grid Code and EirGrid Grid Code

This annex is an explanatory note only and does not form part of the Grid Code.

1. General Differences in wording

The table below summarises the general differences in wording between the form of SDC2 in the SONI Grid Code and the form of SDC2 in the EirGrid Grid Code, which appear repeatedly throughout SDC2.

Terms used in SONI Grid Code	**Equivalent terms used in EirGrid Grid Code (where different)**	**Reason**
System Support Services	Ancillary Service(s)	The existing arrangements for Ancillary Services and System Support Services are continuing until further notice.
CCGT Module	CCGT Unit	This is the phrase currently used to describe the individual parts of a Combined Cycle Plant CCGT Module is an important concept in Northern Ireland and is reflected in many other agreements. EirGrid is keeping the phrase CCGT Unit, as it more closely describes the concept of an individual unit and EirGrid has formerly used CCGT Module to describe the whole CCGT Installation.
voltage	Voltage	"Voltage" is a defined term in the EirGrid Grid Code but not in the SONI Grid Code.
emergency	Emergency	"Emergency" is a defined term in the EirGrid Grid Code but not in the SONI Grid Code.

2. Specific differences in wording between equivalent provisions in both Grid Codes

The table below provides a list of the other specific differences in wording between equivalent provisions of SDC1 in both Grid Codes.

Provision	**SONI Grid Code**	**EirGrid Grid Code**	**Reason**
SDC2.1.2(a)	Reference is made to "but not Pumped Storage Demand" after the words "Pumped Storage Generation".		Reference to these words in the SONI Grid Code is made for clarity

			reasons.
SDC2.4.2.4(g)	Reference is made to “OC11” and “OC11.8 and “OC11.13”. Reference is also made to (i) “Generator in relation to a PPA CDGU” and “in relation to User’s Equipment other than a PPA CDGU”. The word “Acceptance” appears before “Commissioning”.	Reference is made to “OC10” and “OC8.5”.	These are the respective requirements in relation to testing, monitoring and investigations
SDC2.4.2.4(h)	Reference is made to “OC10”	Reference is made to “OC8.4”	These are the respective System Tests requirements
SDC2.4.2.5	Reference is made to “radio telephones” in the list of means of communications of a Dispatch Instruction	No reference is made to “radio telephones” and in addition, after the words “Frequency Relay” the EirGrid Grid Code also refers to “or any other automatic Primary Frequency Control Scheme (excluding governor response)”.	These are respective requirements regarding the form of a Dispatch Instruction
SDC2.4.2.5(b)	Reference is made to “SDC3.6.1”	Reference is made to “OC4.3”	These are the respective requirements in relation to actions required in response to high frequency
SDC2.4.2.5(c)(i)	Reference is made to “OC7”	Reference is made to “OC9”	These are the respective references in respective of temporary losses at the TSOs’ Control Centres
SDC2.4.2.8(c)	Reference is made to “OC11.8”, “OC11.13” and “OC10.4”. Reference is also made to “a test at the request of a User under OC11.13”.	Reference is made to “OC8.5” and “OC8.6”	These are the respective requirements in respect of testing and System Tests
SDC2.4.2.8(d)	Reference is made to “OC11.8”, “OC11.13” and “OC10.4”. Reference is also made to “a test at the request of a User under OC11.13”.	Reference is made to “OC8.5” and “OC8.6”	These are the respective requirements in respect of testing and System Tests
SDC2.4.2.10(a)	Reference is made to “radio telephones” in the list of means of communication	No reference is made to “Radio telephones”	The reference to “radio telephones” is

			specific to the means of communication under the SONI Grid Code.
SDC2.4.2.11(c)	Reference is made to "+15/-5 minutes"	Reference is made to "+/-10 minutes"	These are the respective delays in synchronising times which trigger an obligation on a Generator to notify the TSO of the delay in synchronising times.
SDC2.4.2.12	No reference is made to Dispatch Instructions for Mvars	Reference is made to "or in the case of a Dispatch Instruction for Mvars within two minutes of the instruction" after the words "in accordance with the instruction"	The EirGrid Grid Code has several specific requirements for the dispatch of Generator Reactive Power.
SDC2.4.2.16	Reference is made to "CC.S1.5"	Reference is made to "CC7.3 and SDC2.B.7"	These are the respective requirements for Generating Unit Control arrangements
SDC2.4.2.17	There is a requirement for a Generator to notify the TSO where one of its CDGUs operates without the AVR of Var limiter in service.	No such reference is made.	This is a Northern Ireland specific declaration.
SDC2.A.2.2	Reference is made to "Designated Fuel" and "Declared Fuel"	Reference is only made to "fuel"	This is due to the PPA specific fuel terminology in the SONI Grid Code

3. Provisions applicable to one Grid Code only

The table below provides a list of the provisions of SDC1 which exist in one Grid Code only.

Provisions used in SONI Grid Code only	**Reason**
SDC2.1.3	This paragraph cross-refers to Appendices C and D which both deal with specific issues applicable to PPA Generation only.
SDC2.4.1.4	This provision is necessary in the SONI Grid Code to specify that specific CCGT requirements

	contained in the Generating Unit Agreements, Power Station Agreements and System Support Services Agreements prevail over the requirements of the Grid Code in case of inconsistency.
SDC2.4.2.3	This paragraph is necessary to deal with issues specific to PPA Generation, and in particular the fact that for PPA Generation, a Dispatch Instruction may include an automatic instruction of Spinning Reserve.
SDC2.4.2.4(c) – final sentence	This final sentence is specific to the SONI Grid Code as it cross-refers to Appendix C that sets out the different terminology and requirements relating to fuel for PPA Generation.
SDC2.4.2.4(n)	This is a SONI Grid Code only requirement in respect of instructions to change Generator Transformer tap positions
SDC2.A.1 – second paragraph	This is a SONI Grid Code only provision which provides that for PPA CCGT Modules and Units, provisions in the Power Purchase Arrangements and SSSAs prevail over Grid Code requirements where there is an inconsistency.
SDC2 Appendix C	This appendix deals with fuel provisions which apply to PPA Generation only.
SDC2 Appendix D	This appendix deals with additional provisions which apply to PPA Generation only.

Provisions used in EirGrid Grid Code only	
SDC2.4.2.3	This paragraph is necessary in order to deal with the EirGrid specific requirement that a Dispatch Instruction may include an automatic instruction of Operating Reserve.
SDC2.4.2.4(b)(iv)	This paragraph is EirGrid specific as it cross-refers to Appendix B which sets out EirGrid specific requirements for Generator Reactive Power Dispatch.
SDC2.A.5.1 – second paragraph	This provision deals with EirGrid specific requirements in respect of **MW** Output adjustment of a CDGU for System Frequency.
SDC2.A.7 (d) to (h) and final 2 paragraphs	These additional paragraphs deal with EirGrid specific Generator Reactive Power dispatch requirements
SDC2.A.11	This additional paragraph deals with EirGrid specific Dispatch Instructions in relation to emergencies.
SDC2 Appendix B	This appendix deals with the EirGrid specific requirements for the Dispatch of Generator

	Reactive Power

SCHEDULING AND DISPATCH CODE NO. 3

FREQUENCY CONTROL

SDC3.1 INTRODUCTION

SDC3.1.1 SDC3 sets out the procedure which the **TSO** will use to direct **Frequency Control. NI System Frequency** will be controlled by:

(a) automatic response from **CDGUs** and **Controllable PPMs** operating in **Frequency Sensitive Mode**, including **Unit Load Controller** operation;

(b) the **Dispatch** of **CDGUs** and **Controllable PPMs**;

(c) response from an **Interconnector**; and

(d) **Demand Control**.

SDC3.1.2 The requirements for **Frequency Control** are determined by the consequences and effectiveness of **Scheduling** and **Dispatch** and by the effect of transfers across any **Interconnector** and therefore SDC3 is complementary to SDC1 and SDC2**.**

SDC3.2 OBJECTIVE

The procedure for the **TSO** to direct **Frequency Control** is intended to enable (as far as possible) the **TSO** to meet the statutory requirements of **Frequency Control**.

SDC3.3 SCOPE

SDC3 applies to the **TSO, Suppliers**, **Generators** (in respect of all **Generating Units** connected to the **Transmission System** and in respect of **CDGUs** and **Controllable PPMs** connected to the **Distribution System**) and **Interconnector Owners**.

SDC3.4 PROCEDURE

SDC3.4.1 Automatic Response from **Generating Plant**

SDC3.4.1.1 (a) All **CDGUs** and **Controllable PPMs** must be capable of operating at all times in **Frequency Sensitive Mode** (including, where applicable, with the **Unit Load Controller** in operation) which term means an automatic incremental or decremental generation response (**Primary Operating Reserve**) to contain the initial **NI System Frequency** change together with a sustained generation response (**Secondary Operating Reserve**) which can contribute to containing and correcting the **NI System Frequency** within the statutory requirements for **Frequency Control**.

(b) All **Synchronised CDGUs** and **Controllable PPMs** must, unless relieved of the requirement by the **TSO**, operate at all times in **Frequency Sensitive Mode** (including, where applicable, with the **Unit Load Controller** in operation)

except where, in the **Generator's** reasonable opinion, it is necessary to cease operation in **Frequency Sensitive Mode** in order to avoid an imminent risk of injury to persons or material damage to property (including the **CDGU**).

SDC3.4.1.2 A **System Frequency** induced change in the **Active Power** output of **CDGUs** and **Controllable PPMs** which assists the recovery to target **NI System Frequency** must not be manually overridden by a **Generator** except where it is necessary, in the **Generator's** reasonable opinion, to avoid an imminent risk of injury to persons or material damage to property (including the **CDGU**).

SDC3.4.2 **TSO Dispatch Instructions**

SDC3.4.2.1 When the **TSO** determines it is necessary by having monitored the **NI System Frequency** it will, as part of the procedure set out in SDC2, issue **Dispatch Instructions** in order to seek to regulate **NI System Frequency** to meet the statutory requirements for **Frequency Control**. **CDGUs** and **Controllable PPMs** will be instructed by the **TSO** to operate at target **NI System Frequency** which will normally be 50.00 Hz plus or minus 0.05 Hz, except in exceptional circumstances as determined by the **TSO.**

SDC3.4.2.2 Any **Dispatch Instruction** to **CDGUs** and remote signals sent by the **TSO** to **Controllable PPMs** will refer to the required output at the target **NI System Frequency.**

SDC3.4.3 **Low Frequency Relay** Initiated Response from **Open Cycle Gas Turbine CDGUs**

SDC3.4.3.1 The **TSO** may allocate part of its requirements for **Operating Reserve** to **CDGUs** which are **Open Cycle Gas Turbines** with the capability of **Low Frequency Relay** initiated response for **Start-Up** to a pre-determined output level which have not been **Scheduled** for **Dispatch** in accordance with SDC1, although the **TSO** may, in the event, decide to issue a **Dispatch Instruction** in respect of any such **CDGU** in accordance with SDC2. Alternatively, **CDGUs** which are **Open Cycle Gas Turbines** of this type may be **Scheduled** for **Dispatch** by the **TSO** in accordance with SDC1.

SDC3.4.3.2 The **TSO** will periodically specify, within the range established pursuant to the **Connection Agreement, Low Frequency Relay** settings to be applied to the **CDGUs** pursuant to SDC3.4.3.1 and will instruct the **Low Frequency Relay** initiated response to be placed in and out of service.

SDC3.4.3.3 **Generators** will comply with the **TSO's** instructions issued under SDC3.4.3.2 for **Low Frequency Relay** settings and low **Frequency** initiated response to be placed in or out of service. **Generators** may not alter such **Low Frequency Relay** settings or take low **Frequency** initiated response out of service without the **TSO's** agreement, except where necessary, in the **Generator's** reasonable opinion, to avoid an imminent risk of injury to persons or material damage to property (including the **CDGU**).

SDC3.4.4 **Low Frequency Relay** Initiated Response from **Demand**

Suppliers should note that in allocating its requirements for **Operating Reserve** the **TSO** may take into account **Low Frequency Relay** initiated **Demand Reduction**.

SDC3.5 ACTION REQUIRED BY **GENERATORS** IN RESPONSE TO LOW **FREQUENCY**

SDC3.5.1 (a) If the **NI System Frequency** falls to or below 49.8 Hz, each **Generator** at its **Generating Plant** will be required to check that each of its **CDGUs** and **Controllable PPMs** is achieving the required levels of response including that required from the **Unit Load Controller**, where applicable, in order to contribute to containing and correcting the low **System Frequency.**

(b) Where the required levels of response are not being achieved appropriate action should be taken by the **Generator** without delay and without receipt of instructions from the **TSO** to achieve the required levels of response, provided local security and safety conditions permit namely, in relation to safety conditions, where this will not, in the **Generator's** reasonable opinion, cause an imminent risk of injury to persons or material damage to property (including the **CDGU**).

(c) In the case of **Gas Turbine Units** instructed for **Low Frequency Relay** initiated response, manual **Start-Up** and/or **Synchronisation** shall be attempted if automatic **Start-Up** and/or **Synchronisation** has failed.

SDC3.5.2 In order that the **TSO** can deal with emergency conditions effectively, it needs as much up to date information as possible and accordingly, the **TSO** will be informed of the action taken as soon as possible after the fall in **NI System Frequency** directly by telephone from the **Generating Plant.**

SDC3.6 ACTION REQUIRED BY **GENERATORS** IN RESPONSE TO HIGH **FREQUENCY**

SDC3.6.1 If **NI System Frequency** rises to or above 50.2 Hz, each **Generator** at its **Generating Plant** will be required to ensure that each of its **CDGUs** and **Controllable PPMs** has responded in order to contribute to containing and correcting the high **System Frequency** by automatically or manually reducing output by a minimum amount of 2% and by a maximum amount of 5% of **Generating Plant** output per 0.1 Hz deviation of **NI System Frequency** from target **NI System Frequency.**

SDC3.6.2 This reduction will have to be made without reference to the **TSO** and must be maintained until the **NI System Frequency** has returned to **Target Frequency** or receipt of revised **Dispatch Instructions** from the **TSO** under SDC2. In order that the **TSO** can deal with the emergency conditions effectively, it needs as much up to date information as possible and accordingly, the **TSO** must be informed of the action taken as soon as possible after the rise in **System Frequency** directly by telephone from the **Generating Plant.**

SDC3.7 ACTION REQUIRED BY **INTERCONNECTOR OWNERS** IN RESPONSE TO HIGH OR LOW **FREQUENCY**

SDC3.7.1 The **TSO** will make separate arrangements with **Interconnector Owners** to specify the response to be provided by **Interconnector Owners** in the event of high or low **Frequency** in order for the **Interconnector Owners** to contribute to containing and correcting the high or low **System Frequency** as the case may be.

SDC3.8 ELECTRIC TIME

SDC3.8.1 The **TSO** will endeavour (in so far as it is able) to control electric clock time to within plus or minus 10 seconds of **Standard Time** by specifying changes to target **NI System Frequency** and by **Dispatch** taking into account **Merit Order** and forecast **Generating Plant/Demand** margins. Errors greater than plus or minus 10 seconds may be temporarily accepted at the **TSO's** reasonable discretion. The **TSO** will give 15 minutes' notice to each **Generator** of variation in target **NI System Frequency.**

DATA REGISTRATION CODE

DRC1 INTRODUCTION

DRC1.1 The Data Registration Code ("DRC") presents a unified listing of all data required by the **TSO** from **Users** and by **Users** from the **TSO**, 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.

DRC1.2 The DRC identifies the section of the **Grid Code** under which each item of data is required.

DRC1.3 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

DRC1.4 Various sections of the **Grid Code** also specify information which the **Users** will receive from the **TSO**. This information is summarised in a single schedule in the DRC (Schedule 8).

DRC2 OBJECTIVE

The objective of the DRC is to:

(a) list and collate all the data to be provided by each category of **User** to the **TSO** under the **Grid Code**; and

(b) list all the data to be provided by the **TSO** to each category of **User** under the **Grid Code**.

DRC3 SCOPE

The **Users** to which the DRC applies are:

(a) **Generators**;

(b) **Pumped Storage Generators** in respect of **Pumped Storage Plant Demand**;

(c) **Energy Storage Generators** in respect of **Energy Storage Power Station Demand**;

(d) **Interconnector Users**;

(e) **Interconnector Owners**;

(f) **Demand Side Unit Operators**;

(g) **Generator Aggregators;**

(h) **Suppliers**; and

(i) **Large Demand Customers**.

DRC4 DATA CATEGORIES AND STAGES IN REGISTRATION

DRC4.1 Within the DRC each data item is allocated to one of the following three categories:

(a) **Standard Planning Data (SPD)**

(b) **Detailed Planning Data (DPD)**

(c) **Operational Data**

DRC4.2 **Standard Planning Data (SPD)**

DRC4.2.1 **The Standard Planning Data listed and collated in this DRC** is that data listed in Part 1 of the Appendix to the PC.

DRC4.2.2 **Standard Planning Data** will be provided to the **TSO** in accordance with PC6.3.

DRC4.3 **Detailed Planning Data (DPD)**

DRC4.3.1 The **Detailed Planning Data** listed and collated in this DRC is that data listed in Part 2 of the Appendix to the PC.

DRC4.3.2 **Detailed Planning Data** will be provided to the **TSO** in accordance with PC6.3.

DRC4.4 **Operational Data**

DRC4.4.1 **Operational Data** is data which is required by the Operating Codes and the **Scheduling** and **Dispatch** Codes. Within the DRC, **Operational Data** is sub-categorised according to the **Code** under which it is required.

DRC4.4.2 **Operational Data** is to be supplied in accordance with timetables set down in the relevant **Operating Codes** and **Scheduling** and **Dispatch** Codes and repeated in tabular form in the schedules to the DRC.

DRC5 **PROCEDURES AND RESPONSIBILITIES**

DRC5.1 Responsibility for Submission and Updating of Data

In accordance with the provisions of the various sections of the **Grid Code**, each **User** must submit data as summarised in DRC6 and listed and collated in the attached schedules.

DRC5.2 Methods of Submitting Data

DRC5.2.1 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 **TSO**.

DCR5.2.2 All data to be submitted under Schedule(s) in the **DRC** must be submitted to the **TSO** System Operations Manager at Castlereagh House or to such other department and/or address as the **TSO** may from time to time notify to **Users**. The name of the person at the **User** who is submitting each schedule of data must be included.

DRC5.2.3 Where both the **TSO** and a **User** agree that a computer data link should be used, the method of use of the link shall be agreed at the time, including what data can be submitted by the link.

DRC5.2.4 Other modes of data transfer, such as magnetic tape, may be utilised if the **TSO** gives its prior written consent.

DRC5.3 Changes to **Users' Data**

Whenever a **User** becomes aware of a change to an item of data which is registered with the **TSO**, the **User** must notify the **TSO** in accordance with the relevant section of the **Grid Code**. The method and timing of the notification to the **TSO** is set out in the relevant section of the **Grid Code**.

DRC5.4 Data not Supplied

DRC5.4.1 **Users** 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 **TSO** will (unless the default position is dealt with specifically in the relevant part of the **Grid Code**) estimate such data, acting reasonably, if and when, in the **TSO'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 **TSO** considers to be appropriate.

DRC5.4.2 The **TSO** will advise a **User** in writing of any estimated data it intends to use pursuant to DRC5.4.1 relating directly to that **User's Plant** or **Apparatus** in the event of data not being supplied.

DRC6 DATA TO BE REGISTERED

DRC6.1 Schedules 1 to 8 attached cover the following data areas:

DRC6.1.1 SCHEDULE 1 - **GENERATING UNIT** AND **POWER STATION** TECHNICAL DATA.

Comprising **Generating Unit** and **Power Station** fixed electrical parameters.

DRC6.1.2 SCHEDULE 2 - **GENERATION PLANNING PARAMETERS,** RESPONSE CAPABILITY DATA, AND SDC1 DATA. Comprising the **Generating Plant**, **Controllable PPM** and **Dispatchable PPM** parameters required for **Operational Planning** studies, response capability data in connection with **Operating Reserve** and certain data required under SDC1 in respect of **CDGUs**, **Pumped Storage Plant Demand**, **Energy Storage Power Station Demand**, **Interconnectors**, **Interconnector Units**, **Demand Side Units**, **Aggregated Generating Units** and **Controllable PPM**.

DRC6.1.3 SCHEDULE 3 - **GENERATING UNIT/POWER STATION EQUIPMENT/INTERCONNECTOR OUTAGES**.
Comprising **Generating Unit**, **Power Station Equipment** and **Interconnector Outage** planning.

DRC6.1.4 SCHEDULE 4 - **GENERATOR OUTPUT/LOADING DATA AND ENERGY SALES DATA**.
Output data and estimated loading profiles for **Power Stations** not subject to **Central Dispatch** and **Energy** sales data from **Suppliers**.

DRC6.1.5 SCHEDULE 5 - **USER'S SYSTEM** DATA.
Comprising electrical parameters relating to **Plant** and **Apparatus** connected to the **NI System**.

DRC6.1.6 SCHEDULE 6 - **LOAD** CHARACTERISTICS.
Comprising the estimated parameters of **Load** groups in respect of, for example, harmonic content and response to **Frequency**.

DRC6.1.7 SCHEDULE 7 - **DEMAND CONTROL** AND GENERAL DATA.
Comprising information relating to **Demand Control** on the **NI System** and requirements for additional data for **System** operations purposes.

DR6.1.8 SCHEDULE 8 - DATA SUPPLIED BY THE **TSO** TO **USERS**.

DRC6.2 The **Schedules** applicable to the following categories of **User** are as follows:

Generators with **Generating Plant**:	Sched 1,2,3,5,7 & 8
Generators with **Independent Generating Plant**:	Sched 1,3,4,5,7 & 8
Generators with **Controllable PPMs** or **Dispatchable PPMs**:	Sched 1, 2, 3, 5, 7 & 8
All **Users** connected directly to the **NI System**:	Sched 5,7 & 8
All **Users** connected directly	

to the **NI System** with **Demand** (including **Generators** with respect to **Demand** at directly connected **Power Stations** and **Demand Side Unit Operators** in respect of **Demand Side Units**):	Sched 2,5,6,7 & 8
Suppliers:	Sched 4 & 7
Interconnector Owners:	Sched 2 & 3
Interconnector Users:	Sched 2 (Para 6 only)

DRC6.3 As stated in DRC1, the data listed in the Schedules to this DRC are required to be submitted by **Users** to the **TSO** in other parts of the **Grid Code** and consequently the schedules should reflect accurately the requirements of other parts of the Code relating to the submission of data. If at any time the **TSO** considers that the Schedules do not so reflect the operative provisions relating to the submission of data, the **TSO** may, by notice in writing to all affected **Users** amend the Schedules to this DRC. The **TSO** may also vary the format of the Schedules in this way. No changes may be made in accordance with this DRC6.3 which would affect the substantive obligations of **Users**. Changes of this latter nature can only be achieved by means of the usual procedure for **Grid Code** changes and will require the approval of the **Authority**.

SCHEDULE 1

DATA REGISTRATION CODE

GENERATING UNIT AND POWER STATION TECHNICAL DATA

POWER STATION NAME: DATE:

DATA DESCRIPTION	UNITS	DATA CAT.	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
GENERAL **POWER STATION** DATA Point of connection to the **NI System** in terms of geographical and electrical location and **System** voltage	-	**SPD**	-	-	-	-	-	-	-	
Capacity of **Power Station** in **MW** sent out for **R.C., Min. Gen.** (assumed to be zero in the case of **PPMs** unless a different value is notified by the User) and, where relevant **Max. Gen.**	**MW**	**SPD**	-	-	-	-	-	-	-	
In the case of **Wind Farm Power Stations**, a diagram that shows for the **Wind Farm Power Station** wind speed and direction against electrical output in **MW**, in "rose" format.		**SPD**								
In the case of **PPM** that are not **WFPS**, an equivalent diagram relating to the input resource of that **PPM**.										
Maximum auxiliary **Demand (Active Power** and **Reactive Power)**	**MW** **Mvar**	**SPD** **SPD**	- -	- -	- -	- -	- -	- -	- -	
Where **Generating Units** form part of a **User's System**, the number of such **Units** together with their total capacity. If required by the **TSO**, details of the **Generating Units** together with their energy output profile.		**SPD**								
Operating regime of **Generating Units** not subject to **Central Dispatch** (e.g. continuous, intermittent, peak lopping).		**SPD**								
GENERAL **GENERATING UNIT** DATA Prime mover type		**SPD**								-
Generating Unit type	MVA	**SPD**								
Generating Unit rating and terminal voltage	KV									-
Generating Unit rated power factor		**SPD**								-
Registered Capacity sent out	**MW**	**SPD**								-
Max.Gen. and **Min.Gen.** capability sent out	**MW**	**SPD**								-
Reactive Power capability (both leading and lagging) at the lower voltage terminals of the **Generator Transformer** for **Max.Gen.,** normal **Full Load** and normal minimum **Load**.	**Mvar**	**SPD**								-
Maximum Auxiliary **Demand**	**MW** **Mvar**	**SPD**								
Inertia constant	**MW** sec MVA	**SPD**								

ABBREVIATIONS:
SPD = **Standard Planning Data** **DPD** = **Detailed Planning Data**

Min Gen =	**Minimum Generation**	**Max Gen** =	**Maximum Generation**
% on MVA =	& on Rated MVA	**RC** =	**Registered Capacity**
% on 100 =	% on 100 MVA	**OC1,SDC1,**etc=	**Grid Code** for which data is required

DATA DESCRIPTION	UNITS	DATA CAT	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
Short circuit ratio		**SPD**								-
Direct axis transient reactance	% on MVA	**SPD**								-
Direct axis sub-transient time constant	S	**SPD**								-
Generator Transformer rated MVA, positive sequence reactance and tap change range	MVA % on MVA +%/-%	**SPD**								-
Sustained Load Diagram	Diagram	**SPD**								-
In relation to the generators comprised within a **PPM**, such General **Generating Unit** Data equivalent to that listed above as the **TSO** shall reasonably require.		**SPD**								
A list of the **CCGT Modules** in the **CCGT Installation** identifying each **CCGT Module**, and the **CCGT Installation** of which it forms part unambiguously, together with other relevant information.	List	**SPD**								
Auxiliary Demand The normal **Generating Unit**-supplied auxiliary **Load** for each **Generating Unit** at rated **MW** output	**MW**	**DPD**								-
The **Power Station** auxiliary **Load**, if any, additional to the **Generating Unit** supplied auxiliary **Load** where the **Power Station** auxiliary **Load** is supplied from the **NI System**	**MW**	**DPD**	-	-	-	-	-	-	-	
Generating Unit parameters Rated terminal voltage	kV	**DPD**								-
Rated MVA	MVA	**DPD**								-
Rated **MW**	**MW**	**DPD**								-
Min.Gen.	**MW**	**DPD**								-
Short circuit ratio		**DPD**								-
Direct axis synchronous reactance	% on MVA	**DPD**								-
Direct axis transient reactance	% on MVA	**DPD**								-
Direct axis sub-transient reactance	% on MVA	**DPD**								-
Direct axis transient time constant	S	**DPD**								-
Direct axis sub-transient time constant	S	**DPD**								-

DATA DESCRIPTION	UNITS	DATA CAT	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
Quadrature axis synchronous reactance	% on MVA	**DPD**								-
Quadrature axis transient reactance	% on MVA	**DPD**								-
Quadrature axis sub-transient reactance	% on MVA	**DPD**								-
Quadrature axis transient time constant	S	**DPD**								-
Quadrature axis sub-transient time constant	S	**DPD**								-
Stator time constant	S	**DPD**								-
Stator resistance		**DPD**								-
Stator leakage reactance	% on MVA	**DPD**								-
Turbogenerator inertia constant, or, for generators comprised within a **PPM**, Plant inertia constant	**MW**sec/ MVA	**DPD**								-
Other than for generators comprised within a **PPM**, rated field current	A	**DPD**								-
Other than for generators comprised within a **PPM**, field current (amps) open circuit saturation curve for **Generating Unit** terminal voltages ranged from 50% to 120% of rated value in 10% steps as derived from appropriate manufacturers' certificates	A	**DPD**								-
Parameters for **Generating Unit** Step-Up Transformers										
Rated MVA	MVA	**DPD**								-
Voltage ratio		**DPD**								-
Positive sequence reactance (at max., min. & nominal tap)	% on MVA	**DPD**								-
Positive sequence resistance (at max., min. & nominal tap)	% on MVA	**DPD**								-
Zero phase sequence reactance	% on MVA	**DPD**								-
Tap changer range	+%/ -%	**DPD**								-
Tap changer step size	%	**DPD**								-
Tap changer type: on **Load** or off circuit	on/off	**DPD**								-
Power Station Transformer Parameters										
Rated MVA	MVA	**DPD**								-
Voltage ratio		**DPD**								-
Zero sequence reactance as seen from the higher voltage side	% on MVA	**DPD**								-
Excitation control system parameters (not for **PPMs**)										
DC gain of excitation loop		**DPD**								-

Rated field voltage		**DPD**								-
Maximum field voltage		**DPD**								-

DATA DESCRIPTION	UNITS	DATA CAT.	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G 4	G5	G 6	G7	STN
Minimum Field Voltage		**DPD**								
Max. rate of change of field voltage (rising)	V/sec	**DPD**								-
Max. rate of change of field voltage (falling)	V/sec	**DPD**								-
Details of excitation loop described in block diagram form showing transfer functions of individual elements	Diagram	**DPD**								-
Dynamic characteristics of over-excitation limiter		**DPD**								-
Dynamic characteristics of under-excitation limiter		**DPD**								-
Governor Parameters (for Reheat Steam Turbine Units)										
H.P. governor average gain	**MW**/Hz	**DPD**								-
Speeder motor setting range	Hz	**DPD**								-
H.P. governor valve time constant	S	**DPD**								-
H.P. governor valve opening limits		**DPD**								-
H.P. governor valve rate limits		**DPD**								-
Reheater time constant (active energy stored in reheater)	S	**DPD**								-
IP governor average gain	**MW**/Hz	**DPD**								-
IP governor setting range	Hz	**DPD**								-
IP governor valve time constant	S	**DPD**								-
IP governor valve opening limits		**DPD**								-
IP governor valve rate limits		**DPD**								-
Details of acceleration sensitive elements in HP and IP governor loop		**DPD**								-
Governor block diagram showing transfer functions of individual elements	Diagram	**DPD**								-
Governor Parameters (for Non-Reheat Steam Turbine Units and Gas Turbine Units										
Governor average gain	**MW**/Hz	**DPD**								-
Speeder motor setting range		**DPD**								-
Time constant of steam or fuel governor valve		**DPD**								-

DATA DESCRIPTION	UNITS	DATA CAT.	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
Governor value opening limits		**DPD**								
Governor valve rate limits		**DPD**								-
Time constant of turbine	S	**DPD**								-
Governor block diagram	Diagram	**DPD**								-
Governor parameters (for **PPMs**)										
Generator torque/speed controller(s) (if any)		**DPD**								
Generator blade angle controller(s) (if any)		**DPD**								
Generator power limitation function(s) (if any)		**DPD**								
Plant Flexibility Performance										
Rate of **Loading** following weekend shutdown (**Generating Unit** and **Power Station**)	**MW**/m	**DPD**								
Rate of **Loading** following overnight shutdown (**Generating Unit** and **Power Station**)	**MW**/m	**DPD**								
Block **Load** following **Synchronising**, or, in the case of **PPMs**, generating whilst connected to the **NI System**	**MW**	**DPD**								
Rate of **Deloading** from normal rated **MW**	**MW**/m	**DPD**								
Regulating range	**MW**	**DPD**								
Load rejection capability while still **Synchronised**, or, in the case of **PPMs**, generating whilst still connected to the **NI System** and generating, and able to supply **Load**	**MW**	**DPD**								

NOTE:
Users are referred to Schedule 5 which sets down data required for all **Users** directly connected to the **NI System**, including **Power Stations.**

SCHEDULE 2

DATA REGISTRATION CODE

GENERATION PLANNING PARAMETERS, RESPONSE CAPABILITY DATA AND SDC1 DATA

Part 1 of this schedule contains the **CDGU and Controllable PPM** or **Dispatchable PPMs Generation Planning Parameters** required by the **TSO** to facilitate studies in **Operational Planning** timescales. It also contains the response capability data for **CDGUs.**

Part 2 of this schedule contains the data required with respect to **CDGUs**, **Pumped Storage Plant Demand, Energy Storage Power Station Demand, Interconnectors**, **Interconnector Units**, **Demand Side Units**, **Aggregated Generating Units** and/or **Controllable PPM** to be supplied by **Users** by **Gate Closure** pursuant to SDC1. Many of these parameters are the same as those required in Part 1, but the data supplied under Part 1 will not be used for real time operation.

Power Station: _____

Part 1 - **Generation Planning Parameters**

DATA DESCRIPTION	UNITS	DATA CAT.	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
Generation Planning Parameters for **CDGUs**										
The minimum notice required to **Synchronise** a **Generating Unit** from **De-synchronisation**	Mins	OC2								-
The minimum time between **Synchronising** different **Generating Units** in a **Power Station**	Mins	OC2								
The minimum block **Load** requirements on **Synchronising**		OC2								
Maximum **Generating Unit Loading** rates from **Synchronising** for the following conditions:										
hot	**MW**/ min	OC2								-
Warm	**MW**/ min	OC2								-
cold	**MW**/ min	OC2								-
Minimum time off **Load**		OC2								
Maximum **Generating Unit Deloading** rates for the following conditions:										
Hot	**MW**/ min	OC2								-
warm	**MW**/ min	OC2								-
cold	**MW**/ min	OC2								-
Maximum allowable starts per year:										
hot		OC2								-

DATA DESCRIPTION	UNITS	DATA CAT.	**GENERATING UNIT** OR **POWER STATION** DATA							
			G1	G2	G3	G4	G5	G6	G7	STN
warm		OC2								-
cold		OC2								
Generation Planning Parameters for **Controllable PPMs** or **Dispatchable PPMs**										
The minimum time to connect/reconnect the **Controllable PPM** or **Dispatchable PPM** (or part thereof) to the **NI System** following a **Dispatch** instruction		OC2								
The minimum time to connect/reconnect the **Controllable PPM** or **Dispatchable PPM** (or part thereof) to the **NI System** automatically following a trip of the **Controllable PPM** or **Dispatchable PPM** (or part thereof) that does not cause damage to the **Controllable PPM** or **Dispatchable PPM** (or part thereof)		OC2								
The maximum rate at which Load can be increased following connection of the **Controllable PPM** or **Dispatchable PPM** (or part thereof) to the **NI System**		OC2								
The minimum fault level or voltage at the **Connection Point** below which the **Controllable PPM** or **Dispatchable PPM** cannot be connected		OC2								
Operating Reserve to Frequency change										-
Operating Reserve to **Frequency** change to be given in a tabular form, describing **Primary Operating Reserve, Secondary Operating Reserve, Tertiary Operating Reserve band 1**, **Tertiary Operating Reserve band 2** at different levels of **Load**, ranging from **Minimum Generation** to **Registered Capacity**	Table	OC3								
Governor Droop Characteristics										
Governor Droop										
Unit Control Options	%	OC3								
Maximum Droop										
Normal Droop	%	OC3								
Minimum Droop	%	OC3								
	%	OC3								

Part 2: **Availability**, **Technical Parameters** Data and other data required under SDC1

The following information is required daily by not later than **Gate Closure** to cover the next following **Trading Day** in relation to each **CDGU**, **Pumped Storage Plant Demand, Energy Storage Power Station Demand, Interconnector**, **Interconnector Units** (only in relation to paragraph 6 below), **Demand Side Unit**, **Aggregated Generating Unit** and/or **Controllable PPM**. In so far as the **Availability**

data is not so submitted, the data to have been submitted in respect of the last **Imbalance Settlement Period** of the current **Trading Day** will be deemed to have been resubmitted. Any further revisions to this data are required to be notified to the **TSO** when they become known.

1 **Availability**

Each **User** must notify the **TSO** by means of an **Availability Notice** of the **Availability** of each of its **CDGUs** (and in the case of a **CCGT Installation**, the **CCGT Modules** within it), **Pumped Storage Plant Demand, Energy Storage Power Station Demand, Interconnectors**, **Demand Side Units**, **Aggregated Generating Units** and/or **Controllable PPM**.

The **Availability Notice** shall state the **Availability** of the relevant **CDGU** for each **Imbalance Settlement Period** in the following **Trading Day** (subject to revision under SDC1.4.5.1 (a)).

In addition, **Users** other than **Aggregators** and **Demand Side Unit Operators** must submit an **Additional Grid Code Availability Notice** under SDC1.4.2 by no later than **Gate Closure** each day. The information contained in an **Additional Grid Code Availability Notice** broadly relates to a **CDGU**'s different **Availabilities** depending on which fuel a **CDGU** is firing on (for a **CDGU** that is capable of firing on different fuels), the **Availability** of each **CCGT Module** within a **CCGT Installation** and to the various long-term constraints (such as fuel and emissions constraints) which can affect the **Availability** of a **CDGU**.

2. **Technical Parameters**

For each **CDGU**, **Controllable PPM**, **Dispatchable PPM**, **Demand Side Unit**, **Aggregated Generating Unit, Energy Storage Power Station Demand** and **Pumped Storage Plant Demand**, the **Technical Parameters** listed in the table set out in Appendix A to SDC1 and copied below. The factors applicable to a particular **Plant** are indicated with a tick.

Technical Parameter	**CDGU**				**Control PPM**	**DSU**		**Agg. Gen**		**ESPS Demand**	**Pump Storage Demand**
	Thermal	**Hydr/ En Ltd**	**Disp. PPM**	**Pump S Gen**	**-**	**Indiv. Demand Site**	**Agg. Demand Sites**			**-**	**-**
Block Load Cold	✓	✓	✓	✓	✓						
Block Load Hot	✓										
Block Load Warm	✓										
Charging Capacity			✓ ESPS Gen Only							✓	
Cycle Efficiency			✓ ESPS Gen Only	✓						✓	
Demand Side Unit =Notice						✓	✓				
Deload Break Point	✓	✓	✓	✓	✓						
Demand Side Unit MW Availability						✓	✓				
Demand Side Unit MW Response Time						✓	✓				
De-Loading Rate 1	✓	✓	✓	✓	✓						
De-Loading Rate 2	✓	✓	✓	✓	✓						
Dwell Time Up 1	✓	✓	✓	✓	✓						
Dwell Time Up 2	✓	✓	✓	✓	✓						
Dwell Time Up 3	✓	✓	✓	✓	✓						
Dwell Time Down 1	✓	✓	✓	✓	✓						
Dwell Time Down 2	✓	✓	✓	✓	✓						
Dwell Time Down 3	✓	✓	✓	✓	✓						
Dwell Time Up Trigger Point 1	✓	✓	✓	✓	✓						
Dwell Time Up Trigger Point 2	✓	✓	✓	✓	✓						
Dwell Time Up Trigger Point 3	✓	✓	✓	✓	✓						
Dwell Time Down	✓	✓	✓	✓	✓						

Technical Parameter	CDGU				Control PPM	DSU		Agg. Gen		ESPS Demand	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. PPM	Pump S Gen	-	Indiv. Demand Site	Agg. Demand Sites			-	-
Trigger Point 1											
Dwell Time Down Trigger Point 2	✓	✓	✓	✓	✓						
Dwell Time Down Trigger Point 3	✓	✓	✓	✓	✓						
End Point of Start Up Period	✓	✓	✓	✓	✓						
Energy Limit		✓									
Forecast Minimum Output Profile			✓ ESPS Gen Only	✓						✓	✓
Forecast Minimum Generation Profile	✓	✓	✓	✓							
Load Up Break Point Cold (1)	✓	✓	✓	✓	✓						
Load Up Break Point Cold (2)	✓	✓	✓	✓	✓						
Load Up Break Point Hot (1)	✓										
Load Up Break Point Hot (2)	✓										
Load Up Break Point Warm (1)	✓										
Load Up Break Point Warm (2)	✓										
Loading Rate Cold (1)	✓	✓	✓	✓	✓						
Loading Rate Cold (2)	✓	✓	✓	✓	✓						
Loading Rate Cold (3)	✓	✓	✓	✓	✓						
Loading Rate Hot (1)	✓										
Loading Rate Hot (2)	✓										
Loading Rate Hot (3)	✓										
Loading Rate Warm (1)	✓										
Loading Rate Warm (2)	✓										
Loading Rate Warm (3)	✓										
Max Ramp Down Rate (shall be a number greater than zero)						✓	✓				
Max Ramp Up Rate (shall be a number greater than zero)						✓	✓				
Maximum Charge Capacity			✓ ESPS Gen Only							✓	
Maximum Down Time						✓	✓				
Maximum Generation / Registered Capacity	✓	✓	✓	✓	✓						
Maximum On Time	✓	✓	✓	✓	✓						
Maximum Storage Capacity				✓							
Minimum Charge Capacity			✓ ESPS Gen Only							✓	
Minimum Down Time						✓	✓				
Minimum Generation	✓	✓	✓	✓	✓						

Technical Parameter	CDGU				Control PPM	DSU		Agg. Gen		ESPS Demand	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. PPM	Pump S Gen	-	Indiv. Demand Site	Agg. Demand Sites			-	-
Minimum Off Time	✓	✓	✓	✓	✓	✓	✓				
Minimum On Time	✓	✓	✓	✓	✓						
Minimum Storage Capacity				✓							✓✓
Off to Generating Time			✓								
Off to Spin Pump Time										✓	
(Other relevant technical parameters)	✓	✓	✓	✓	✓			✓			
Pumping capacity				✓							✓
Ramp Down Break Point 1	✓	✓	✓	✓	✓			✓			
Ramp Down Break Point 2	✓	✓	✓	✓	✓			✓			
Ramp Down Break Point 3	✓	✓	✓	✓	✓			✓			
Ramp Down Break Point 4	✓	✓	✓	✓	✓			✓			
Ramp Down Rate 1	✓	✓	✓	✓	✓			✓			
Ramp Down Rate 2	✓	✓	✓	✓	✓			✓			
Ramp Down Rate 3		✓	✓	✓	✓			✓			
Ramp Down Rate 4	✓	✓	✓	✓	✓			✓			
Ramp Down Rate 5	✓	✓	✓	✓	✓			✓			
Ramp Up Break Point 1	✓	✓	✓	✓	✓			✓			
Ramp Up Break Point 2	✓	✓	✓	✓	✓			✓			
Ramp Up Break Point 3	✓	✓	✓	✓	✓			✓			
Ramp Up Break Point 4	✓	✓	✓	✓	✓			✓			
Ramp Up Rate 1	✓	✓	✓	✓	✓			✓			
Ramp Up Rate 2	✓	✓	✓	✓	✓			✓			
Ramp Up Rate 3	✓	✓	✓	✓	✓			✓			
Ramp Up Rate 4	✓	✓	✓	✓	✓			✓			
Ramp Up Rate 5	✓	✓	✓	✓	✓			✓			
Short Term Maximisation Capability	✓	✓	✓	✓	✓						
Short Term Maximisation Time	✓	✓	✓	✓	✓						
Soak Time Cold (1)	✓	✓	✓	✓	✓						
Soak Time Cold (2)	✓	✓	✓	✓	✓						
Soak Time Hot (1)	✓										
Soak Time Hot (2)	✓										
Soak Time Trigger Point Cold (1)	✓	✓	✓	✓	✓						
Soak Time Trigger Point Cold (2)	✓	✓	✓	✓	✓						
Soak Time Trigger Point Hot (1)	✓										
Soak Time Trigger Point Hot (2)	✓										
Soak Time Trigger Point Warm (1)	✓										
Soak Time Trigger Point Warm (2)	✓										

Technical Parameter	CDGU				Control PPM	DSU		Agg. Gen		ESPS Demand	Pump Storage Demand
	Thermal	Hydr/ En Ltd	Disp. PPM	Pump S Gen	-	Indiv. Demand Site	Agg. Demand Sites			-	-
Soak Time Warm (1)	✓										
Soak Time Warm (2)	✓										
Spin Pump to Pumping Energy Time											✓
Synchronous Start-Up Time Cold	✓	✓	✓	✓	✓						
Synchronous Start-Up Time Hot	✓	✓	✓	✓	✓						
Synchronous Start-Up Time Warm	✓										
~~Target Charge Level Percentage~~			~~✓ ESPS Gen Only~~							~~✓~~	
Start of Restricted Range 1	✓	✓	✓	✓	✓						
End of Restricted Range 1	✓	✓	✓	✓	✓						
Start of Restricted Range 2	✓	✓	✓	✓	✓						
End of Restricted Range 2	✓	✓	✓	✓	✓						

Users should also refer to SDC1.4.5.2 for the submission of revised **Technical Parameters** data.

3. **Additional Grid Code Characteristics**

The following data are required to be submitted by each **User**, with the exception of **Aggregators**, direct to the **TSO**:

1. Individual **CCGT Module** data equivalent to the data required for a **CCGT Installation**. It shall also show any revisions to the **Technical Parameters** for each of the **CCGT Modules** within it.

2. In the case of a **CDGU** capable of firing on different fuels, an **Additional Grid Code Characteristics Notice** in respect of any additional fuel for the **CDGU**, each containing the information set out in the **Technical Parameters** for each fuel and each marked clearly to indicate to which fuel it applies.

3. In the case of **Interconnector Owners**, **Interconnector** data, including but not limited to the **Availability** of **Interconnector Filters**.

4. In relation to each **Demand Side Unit**, the **Demand Profile** and the **Initial Demand Reduction Time**.

5. Where there is a **System Support Services Agreement** in place, the **System Support Services** which are **Available**.

6. The parameters listed in the table in Part 2 of Appendix A to SDC 1 and copied below, where relevant to a **User**.

7. In the case of Kilroot **Power Station** and Ballylumford **Power Station**, which configuration referred to in PC.A3.3.12 the **Power Station** is operating at for each **Imbalance Settlement Period** .

The table contained in Part 2 of Appendix A to SDC1 and referred to at paragraph 6 above is copied below:

Variable	Applies to

Variable	**Applies to**
Time from initiation of a start to achieving **Dispatched Load**	**CDGUs** which are **Open Cycle Gas Turbines** or **CCGTs**
Governor Droop	All **CDGUs**, except **Aggregated Generating Units**
Sustained Response Capability	All **CDGUs**, except **Aggregated Generating Units**
Two shifting limitation (limitation on the number of **Start-ups** per **Trading Day**)	All **CDGUs**, except **Aggregated Generating Units**
The **MW** and **Mvar** capability limits within which the **CDGU** is able to operate as shown in the relevant **Generator Performance Chart**	All **CDGUs**, except **Aggregated Generating Units**
Maximum number of on **Load** cycles per 24 hour period, together with the maximum **Load** increases involved	All **CDGUs**, except **Aggregated Generating Units**
^Maximum number of changes to the **Dispatched Fuel** per 24 hour period	All **CDGUs**, except **Aggregated Generating Units**
Maximum quantity of oil in "ready-use tanks" and associated pipework	All **CDGUs**, except **Aggregated Generating Units**
^Maximum number of changes to the **Designated Fuel** per 24 hour period	All **CDGUs**, except **Aggregated Generating Units**
^Minimum notice to change the **Designated Fuel**.	All **CDGUs**, except **Aggregated Generating Units**
Settings of the **Unit Load Controller** for each **CDGU** for which a **Unit Load Controller** is required under CCS1.5.5 of the **SONI Grid Code**	All **CDGUs**, except **Aggregated Generating Units**
Declared Maximisation Capacity	All **CDGUs**, except **Aggregated Generating Units**
Time between **De-Synchronising** different **CDGUs** in a Power Station which, in the case of Coolkeeragh Power Station only, shall be stated for both paired and single **CDGUs**.	All **CDGUs**, except **Aggregated Generating Units**

Users should also refer to SDC1.4.5.2 for the submission of revised **Additional Grid Code Characteristics** data.

4. Reserve capability

Each **Generator** and **Generator Aggregator** shall submit reserve capability data in accordance with SDC1.4.4.3 and, in the case of **PPA Generation**, Appendix B to SDC1.

5. **Other Relevant Data**

For each **Plant** which has been declared **Available** in an **Availability Notice** (and, in the case of a **CCGT Installation**, **CCGT Modules** within):

(i) any newly arisen special factors which in the reasonable opinion of the **User** may have a material effect on the likely **Output** or **Demand Reduction** of such **Plant** (and, in the case of a **CCGT Installation**, **CCGT Modules** therein) or, in the case of an **Interconnector**, the **Availability** of the **Interconnector Filters**; and

(ii) any temporary changes, and their likely duration, to the Registered Data of such **Plant** (and, in the case of a **CCGT Installation**, **CCGT Modules** therein) (other than those already notified under the foregoing provisions of this Part II of Schedule 2).

6. **Commercial Offer Data**

Each **Generator**, **Pumped Storage Generator** (in respect of **Pumped Storage Plant Demand**), **Energy Storage Generator** (in respect of **Energy Storage Power Station Demand**), **Interconnector User** (in respect of an **Interconnector Unit**), **Demand Side Unit Operator** and **Generator Aggregator** shall submit **Commercial Offer Data** to the **TSO** (either directly or by means of an **Intermediary**) by **Gate Closure** for the following **Trading Day** in accordance with the **TSC**. Specific requirements for **Energy Limited Generating Units** and **Pumped Storage Plants** are listed in SDC1.4.4.5.

SCHEDULE 3

DATA REGISTRATION CODE

GENERATING UNIT/POWER STATION EQUIPMENT/INTERCONNECTOR OUTAGES

Power Station/Interconnector name .....
Generating Unit number .....
Registered Capacity .....

PART 1 - GENERATING PLANT/POWER STATION EQUIPMENT/INTERCONNECTOR OUTAGE PROGRAMMES

CDGU (AND/OR CCGT MODULE, AS PROVIDED IN OC2)/ CONTROLLABLE PPM/ DISPATCHABLE PPM/ POWER STATION EQUIPMENT/ INTERCONNECTOR OUTAGE PROGRAMMES	UNITS	TIME COVERED	UPDATE TIME	DATA CAT.
(**Note:** References to **CCGT Installations** include **CCGT Modules** as provided in OC2) Indicative Term Operational Planning: Planning for years 4 to 7 ahead				
Suggested **Indicative Outage Programme** containing:		Year 7	By end March	OC2
(i) identity of the **CDGUs** (or, in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs, Dispatchable PPM** (or **Generating Unit(s)** therein) **Power Station Equipment** and/or **Interconnector** concerned;				
(ii) **MW** concerned (i.e. which will not be **Available** as a result of the **Outage** and that which will still be **Available**);	**MW**			
(iii) duration of **Outage**;	weeks			
(iv) preferred **Start Date** and **Start Time**;	date/ time			
(v) whether **Flexible** or **Inflexible**;				
(vi) if **Flexible**:				
(a) period by which **Outage** may be deferred;	days			
(b) period by which **Outage** may be advanced; (vii) if the **Outage** is required to enable the **Generator** or **Interconnector Owner** to comply with statutory obligations and, in such case, the latest date by which the **Outage** must be taken.	days			
(**Note:** References to **CCGT Installations** include **CCGT Modules** as provided in OC2) Long Term Operational Planning: Planning for years 2 & 3 ahead Suggested **Provisional Outage Programme** containing: (i) identity of the **CDGUs** (or, in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMS** or **Dispatchable PPMs** (or **Generating Unit(s)** therein) **Power Station Equipment** and/or **Interconnector** concerned; (ii) **MW** concerned (i.e. which will not be **Available** as a result of the **Outage** and that which will still be **Available**); (iii) duration of **Outage**; (iv) preferred **Start Date** and **Start Time**;	 **MW** weeks date/	 Year 3	 By end March	 OC2

CDGU (AND/OR CCGT MODULE, AS PROVIDED IN OC2)/ CONTROLLABLE PPM/ DISPATCHABLE PPM/ POWER STATION EQUIPMENT/ INTERCONNECTOR OUTAGE PROGRAMMES	UNITS	TIME COVERED	UPDATE TIME	DATA CAT.
	time			
(v) whether **Flexible** or **Inflexible**;				
(vi) if **Flexible**:				
(a) period by which **Outage** may be deferred;	days			
(b) period by which **Outage** may be advanced;	days			
(vii) if the **Outage** is required to enable the **Generator** or **Interconnector Owner** to comply with statutory obligations and, in such case, the latest date by which the **Outage** must be taken.				
(The **TSO's** response as detailed in OC2		Year 3	By end Sept.	OC2)
(**Generators'** responses to changes suggested by the **TSO** and resolution of any disputes as set out in OC2		Year 3	By end Oct.	OC2)
Up-dated suggested **Provisional Outage Programme** containing:		Year 2	By end March	OC2
(i) identity of the **CDGUs** (or, in the case of a **CCGT Installation**, **CCGT Module(s)** therein),**Controllable PPMs** or **Dispatchable PPMs** (or **Generating Unit(s)** therein) **Power Station Equipment** and/or **Interconnector** concerned;				
(ii) **MW** concerned (i.e. which will not be **Available** as a result of the **Outage** and that which will still be **Available**);	**MW**			
(iii) duration of **Outage**;	weeks			
(iv) preferred **Start Date** and **Start Time**;	date/ time			
(v) whether **Flexible** or **Inflexible**;				
(vi) if **Flexible**:				
(a) period by which **Outage** may be deferred;	days			
(b) period by which **Outage** may be advanced.	days			
(vii) if the **Outage** is required to enable the **Generator** or **Interconnector Owner** to comply with statutory obligations and, in such case, the latest date by which the **Outage** must be taken.				
(the **TSO's** response as detailed in OC2		Year 2	By end Sept.	OC2)
(**Generators'** and **Interconnector Owner's** responses to the **TSO's** changes and resolution of any disputes as set out in OC2		Year 2	By end Oct	OC2)
<u>Medium Term Operational Planning: Planning for Year 1 ahead</u>				
Suggested **Final Outage Programme** containing:		Year 1	By end March	OC2
(i) identity of the **CDGUs** (or, in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** or **Dispatchable PPMs** (or **Generating Unit(s)** therein) **Power Station Equipment** and/or **Interconnector** concerned;	**MW**			
(ii) **MW** concerned (i.e. which will not be **Available** as a result of the **Outage** and that which will still be **Available**);				
(iii) duration of **Outage**;	weeks			
(iv) preferred **Start Date** and **Start Time**;	date/			

CDGU (AND/OR CCGT MODULE, AS PROVIDED IN OC2)/ CONTROLLABLE PPM/ DISPATCHABLE PPM/ POWER STATION EQUIPMENT/ INTERCONNECTOR OUTAGE PROGRAMMES	UNITS	TIME COVERED	UPDATE TIME	DATA CAT.
	time			
(v) whether **Flexible** or **Inflexible**;				
(vi) if **Flexible**:				
(a) period by which **Outage** may be deferred;	days			
(b) period by which **Outage** may be advanced.	days			
(vii) if the **Outage** is required to enable the **Generator** or **Interconnector Owner** to comply with statutory obligations and, in such case, the latest date by which the **Outage** must be taken.				
(the **TSO's** response as detailed in OC2			By end June	OC2)
(**Generators'** or **Interconnector Owners'** responses to the **TSO's** changes and resolution of any disputes as set out in OC2			By end July	OC2)
(The **TSO** to notify **Generators** of any further changes required as detailed in OC2			By end Sept.	OC2)
Short Term Operational Planning : Planning for Year 0				
During Year 0, OC2 requires notices to be given in respect of the following (the details of which can be found in OC2):	-	Year 0	-	OC2
(i) movements of **Flexible Planned Outages** - on not less than 7 days' notice by the **TSO**;				
(ii) amendments to **Planned Outages** - request to be made by the **TSO** by notice in writing;				
(iii) substitution of a different **CDGU** and/or **Generating Unit(s)** within a **Controllable PPM**, **Dispatchable PPM** for an **Outage** - request to be made by the **Generator** by notice in writing;				
(iv) **Short Term Planned Maintenance Outages** - to be requested by **Generators** or **Interconnector Owners** by not less than 7 days' notice in writing, containing the following information:				
(a) identity of the **CDGU(s),** (or, in the case of a **CCGT Installation**, **CCGT Module(s)** therein), **Controllable PPMs** or **Dispatchable PPMs** (or **Generating Unit(s)** therein) **Power Station Equipment** and/or **Interconnector** concerned;				
(b) **MW** concerned (i.e. **MW** which would not be **Available** as a result of the **Outage** and that which would still be **Available**);	**MW**			
(c) duration of **Outage** (not exceeding 72 hours);	hours			
(d) preferred **Start Date** & **Start Time**;	date/time			
(e) if the **Outage** is required for maintaining the brush gear of a **CDGU** (or, in the case of a **CCGT Installation**, **CCGT Module(s)** therein) and/or a **Controllable PPM** or **Dispatchable PPM** (or **Generating Unit(s)** therein)				
(The **TSO** will respond to a request for a **STPMO** in accordance with OC2)				
(v) **Notified Unplanned Outages** - to be notified by a **Generator** as early as possible;				OC2

CDGU (AND/OR CCGT MODULE, AS PROVIDED IN OC2)/ CONTROLLABLE PPM/ DISPATCHABLE PPM/ POWER STATION EQUIPMENT/ INTERCONNECTOR OUTAGE PROGRAMMES	UNITS	TIME COVERED	UPDATE TIME	DATA CAT.
(vi) **24 Hour Recall** (in relation to a **Notified Unplanned Outage**) to be requested by the **TSO** and, if agreed to by the **Generator** or **Interconnector Owner**, acknowledged by the **Generator** or **Interconnector Owner** by notice in writing;				OC2
(vii) **Forced Outages -** to be notified by the **Generator** or **Interconnector Owner** in writing, not later than 48 hours after the event, such notice to include the **Generator's** best estimate of the date and time by which the **CDGU/Controllable PPM/Dispatchable PPM/Power Station Equipment/Interconnector** is likely to have been repaired and restored to its full level of **Availability**;	date & time			OC2
(viii) Release of **CDGUs/Controllable PPM/Dispatchable PPM/Power Station Equipment/Interconnector** for **Outage** – the **TSO**'s express formal consent required (see Schedule 8);				OC2
(ix) Return to service from **Outage** to be notified by the **Generator** or **Interconnector Owner** to the **TSO**;				OC2
(x) Overruns of **Outages** to be notified by the **Generator** or **Interconnector Owner** to the **TSO** immediately the **Generator** or **Interconnector Owner** becomes aware of the situation in writing, such notice to include:				OC2
(a) the reason for the delay; and				
(b) the **Generator's** or **Interconnector Owner's** best estimate of the date and time of return to service.	date & time			

Part 2: **Independent Generating Plant Outages**

Each **Generator** with **Independent Generating Plant** shall be obliged to submit such information in relation to that **Independent Generating Plant** for the purposes of **Operation Planning** as the **TSO** may reasonably require pursuant to OC2.4.1**.**

SCHEDULE 4

DATA REGISTRATION CODE

GENERATOR OUTPUT/LOADING DATA AND ENERGY SALES DATA

DATA DESCRIPTION	UNITS	TIMESCALE COVERED	UPDATE TIME	DATA CATEGORY
GENERATION OUTPUT				
Where requested by the **TSO**, the **Generator** at each **Power Station** with a **Registered Capacity** of 2**MW**, but not exceeding 5**MW** must provide to the **TSO** a half-hourly printout of metered output in respect of such **Power Station** for: (i) **Active Power**; and (ii) **Reactive Power**	**MW** **MVAr**	The preceding **Schedule Day**	Daily at 10.00	OC1
LOADING PROFILES				
Where requested by the **TSO**, each **Generator** with **Independent Generating Plant** with a **Registered Capacity** of 2**MW** and above and in respect of each of its **CDGUs** other than **PPA CDGUs** in relation to **Predicted Output** shall provide the **TSO** with estimated **Loading** profiles for such Units for a period of 3 years ahead, beginning in week 1 of the following year.	**MW**	Years 1-3 ahead	By end of week 45	OC1
Where requested by the **TSO,** each **Generator** with **Independent Generating Plant** other than **PPMs** with a **Registered Capacity** of 2**MW** and above shall submit an estimate of **Loading** profiles including the half hourly output.	**MW**	Following **Schedule Day** (Following 3/2 **Schedule Days** where given as Friday/Saturday and for longer periods at holiday times)	Daily at 10.00	OC1
Where requested by the **TSO**, each **Generator** with **Independent Generating Plant** that is a **PPM** with a **Registered Capacity** of **2MW** and above shall submit to the **TSO** an estimate of **Loading** profiles	**MW**	Following **Schedule Week**	By 06.00 on Friday	OC1
ENERGY SALES				
Each **Supplier** must provide to the **TSO** in writing details of its anticipated aggregate annual sales of **Energy** in respect of each of the three following years in accordance with OC1.4.1.1.	**GW/h**	Years 1 - 3 ahead	By end of week 48	OC1

SCHEDULE 5

DATA REGISTRATION CODE

USERS SYSTEM DATA

The data listed in this Schedule 5 is required to be provided by:
(i) a **User** (and by proposed **Users** applying for a **Connection Agreement**) in connection with applications for new or modified arrangements for connections to or use of the **NI System**;
(ii) a **User** who has requested a **Statement of System Capacity** as referred to in PC5.2;
(iii) a **User** at the time it notifies the **TSO** of any significant changes to its **System** or operating regime; and
(iv) the categories of **User** specified in PC6.3.3 on a routine annual basis by the end of calendar week 52 of each year.

DATA DESCRIPTION	UNITS	DATA CATEGORY
Modelling Data Modelling data of the **Users Plant** and **Apparatus** at the **Connection Point** in accordance with PC.A2.1.4 and PC.B2.1.3		SPD
User System layout Single line diagrams of existing and proposed arrangements of main **Plant** and **Apparatus** including: (i) busbar layouts (ii) electrical circuitry (i.e. lines, cables, transformers, switchgear etc) (iii) phasing arrangements (iv) earthing arrangements (v) switching facilities (vi) operating voltages (vii) numbering and nomenclature Reactive Compensation Equipment For all independently switched reactive compensation equipment on the **User's System** at 11kV and above, other than power factor correction equipment associated directly with the **User's Plant** and **Apparatus**, the following information is required:		**SPD/DPD**
(i) type of equipment		**DPD**
(ii) capacitive and/or inductive rating or its operating range in **MVAr**	**Mvar**	**DPD**
(iii) details of any automatic control logic to enable operating characteristics to be determined		**DPD**
(iv) the point of connection to the **User's System** in terms of electrical location and voltage		**DPD**
Short Circuit Infeed to the **NI System** The total short circuit infeeds calculated in accordance with good industry practice into the **NI System** from the **User System** at the **Connection Point** as follows:		
(i) maximum 3-phase short circuit infeed including infeeds from any **Generating Plant** forming part of the **User's System**	MVA	**SPD/DPD**
(ii) additional maximum 3-phase short circuit infeed from induction motors via the **User's System**	MVA	**DPD**
(iii) minimum zero sequence impedance of the **User's System** at the **Connection Point**	% on 100	**SPD/DPD**
Lumped System Susceptance Details of equivalent lumped network susceptance of the **User's System** at nominal **Frequency** back to the connection with the **NI System**. This should include any shunt reactors which are an integrated part of a cable system and which are not normally in or out of service independently of the cable (i.e. they are regarded as part of the cable). It should not include: (i) independent reactive compensation plant connected to the **User's System**; or (ii) any susceptance of the **User's System** inherent in the **Active** and **Reactive Power Demand**	% on 100	**DPD**

data given under PC.A.3.2

Interconnection Impedance		
For **User** interconnections which operate in parallel with the **NI System** and equivalent single impedance (resistance, reactance and shunt susceptance) of the parallel **User System**. If the impedance is, in the reasonable opinion of the **TSO**, low, the more detailed information in the equivalent or active part of the parallel **User System** may be requested.	% on 100	**DPD**
Demand Transfer Capacity		
Where the same **Demand** may be supplied from alternative **NI System** points of supply, the proportion of **Demand** normally fed from each **NI System** supply point and the arrangements (manual or automatic) for transfer under planned /fault **Outage** conditions shall be provided. Where the same **Demand** is supplied from different **User** supply points, then this information should be provided to all parties.		**DPD**
System Data		
Each **User** with an existing or proposed **User System** connected at **High Voltage** shall provide the following details relating to that **High Voltage System:**		
(i) circuit parameters for all circuits:		
rated voltage	kV	**DPD**
operating voltage	kV	**DPD**
positive phase sequence reactance	% on 100	**DPD**
positive phase sequence resistance	% on 100	**DPD**
positive phase sequence susceptance	% on 100	**DPD**
zero phase sequence reactance	% on 100	**DPD**
zero phase sequence resistance	% on 100	**DPD**
zero phase sequence susceptance	% on 100	**DPD**
(ii) Interconnecting transformers between the **User's** higher voltage system and the **User's** primary voltage system:		
rated MVA	MVA	**DPD**
voltage ratio		**DPD**
winding arrangement		**DPD**
positive sequence reactance (max, min, and nominal tap)	% on MVA	**DPD**
positive sequence resistance (max, min, and nominal tap)	% on MVA	**DPD**
zero sequence reactance	% on MVA	**DPD**
tap changer range	+% to -%	**DPD**
tap changer step size	%	**DPD**
tap changer type: on **Load** or off circuit		**DPD**
(iii) Switchgear, including circuit breakers, switch disconnectors and isolators on all circuits connected to the **Connection Point** including those at **Power Stations**:		
rated voltage	kV	**DPD**
operating voltage	kV	**DPD**
rated short circuit breaking current, 3-phase	kA	**DPD**
rated short-circuit breaking current, 1-phase	kV	**DPD**
rated load-breaking current, 3-phase	kA	**DPD**

DATA DESCRIPTION	UNITS	DATA CATEGORY

rated load-breaking current, 1-phase	kA	**DPD**
rated short-circuit marking current, 3-phase	kA	**DPD**
rated short-circuit making current, 1-phase	kA	**DPD**
Protection Data		
The following information relates only to **Protection** which can trip or intertrip or close any **Connection Point** circuit breaker or any the **TSO** circuit breaker:		
(i) a full description, including estimated settings, for all relays and **Protection** systems installed or to be installed on the **User's System**;		**DPD**
(ii) a full description of any auto-reclose facilities installed or to be installed on the **User's System**, including type and time delays;		**DPD**
(iii) a full description, including estimated settings, for all relays and **Protection** systems installed or to be installed on the **Generating Unit Generator Transformer,** station transformer and their associated connections:		**DPD**
(iv) for **Generating Units** having (or intended to have) a circuit breaker on the circuit leading to the **Generator Terminals,** at the same voltage, clearance times for electrical faults within the **Generating Unit** zone; and		**DPD**
(v) the most probable fault clearance time for electrical faults on the **User's System**	m/Sec	**DPD**
Earthing Arrangements		
Full details of the means of permanently connecting the **User System** to each, including impedance values.		**DPD**
Transient Overvoltage Assessment Data		
When requested by the **TSO**, each **User** is required to submit estimates of the surge impedance parameters present and forecast of its **User System** with respect to the **Connection Point** and to give details of the calculations carried out. The **TSO** may further request information on physical dimensions of electrical equipment and details of the specification of **Apparatus** directly connected to the **Connection Point** and its means of **Protection**.		**DPD**
User's System Demand (Active and **Reactive Power)**		
Forecast daily **Demand** profiles net of the output profile of all **Generating Plant** directly connected to the **User's System** in time marked half hours throughout the day as follows:		
(a) peak day on the **User's System**	**MW/Mvar**	**SPD/DPD**
(b) day of peak **Demand (Active Power)**	**MW**	**DPD**
(c) day of minimum **Demand (Active Power)**	**MW**	**DPD**
User Customer Demand Management Data		
The potential reduction in **Demand** available from the **User** in **MW** and **MVAr**, the notice required to put such reduction into effect, the maximum acceptable duration of the reduction in hours and the permissible number of reductions per annum.	**MW/Mvar** + text	**DPD**
Conversion Factor Data		
The figures described as "fixed unit load" and "unit load scalar" under the **TSC**, which are the figures submitted by a **Generator** or an **Intermediary** on its behalf pursuant to the "net output function" provisions of the **TSC**.		
Additional Conversion Factor Data		
For Kilroot and Ballylumford **Power Stations**, the different configurations at which the **Power Stations** may operate and which can affect the **Conversion Factors**, such configurations being submitted in the form set out at PC.A3.3.12.		

SCHEDULE 6

DATA REGISTRATION CODE
LOAD CHARACTERISTICS AT GRID SUPPLY POINTS

All data in this Schedule 6 is categorised as **Standard Planning Data (SPD)** and is required for existing and agreed future connections. This data is to be updated annually by the end of week 52 for each of the next 7 financial years.

DATA DESCRIPTION	UNITS	DATA FOR FUTURE YEARS						
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7
For all types of **Demand**								
(i) Type and electrical loading of equipment to be connected: number and size of motors; types of drive and control arrangements.								
(ii) The sensitivity of the **Demand** to variations in voltage and **Frequency** on the **NI System**.	**MW**/kV **Mvar**/kV **MW**/Hz **Mvar**/Hz							
(iii) The maximum harmonic content which the **User** would expect its **Demand** to impose on the **NI System**	%							
(iv) The average and maximum phase unbalance which the **User** would expect it's **Demand** to impose on the **NI System**.	%							
For Fluctuating **Loads** > 5 MVA								
(i) Details of the cyclic variation of **Demand** (**Active** and **Reactive Power**)								
(ii) The rates of change of **Demand** (**Active** and **Reactive Power**) both increasing and decreasing.								
(iii) The shortest repetitive time interval between fluctuations in **Demand** (**Active** and **Reactive Power**)								
(iv) The magnitude of the largest step changes in **Demand** (**Active** and **Reactive Power**) both increasing and decreasing.								
(v) Maximum energy demanded per half hour by the fluctuating **Load** cycle								
(vi) Steady state residual **Demand** (**Active Power**) occurring between **Demand** fluctuations								
For **User's** Abnormal **Loads**								
Details should be provided on any individual **Loads** which have characteristics differing from the normal typical range of **Loads** in the domestic, commercial or industrial fields. In particular, details on arc furnaces, rolling mills, traction installations etc. which are								

DATA DESCRIPTION	UNITS	DATA FOR FUTURE YEARS						
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7
liable to cause flicker problems								

SCHEDULE 7

DATA REGISTRATION CODE

DEMAND CONTROL AND GENERAL DATA

PART 1 - DEMAND CONTROL DATA

DATA DESCRIPTION	UNITS	TIME COVERED	UPDATE TIME	DATA CAT.
Customer Demand Management Initiated by a **Supplier**				
A **Supplier** which enters into (or amends) an agreement or other arrangement with a **Customer** allowing **Customer Demand Management** must notify the **TSO** in writing in accordance with OC4.4.2.2 of its best estimate of the following (on an aggregated basis) when the aggregate of its possible **Customer Demand Management** pursuant to all such agreements or arrangements it has effected can equal or exceed 2**MW** at any point in time:		End of current year to 30th April and/or for following year commencing 1st May	By end of March	OC4
(i) the level of expected and possible **Demand Control**	**MW**			OC4
(ii) the circumstances in which the **Customer Demand Management** is expected to be and may be utilised				OC4
(iii) the expected duration of **Demand Control** and the maximum permitted				OC4
(iv) the expected and possible frequency of initiation				OC4
(v) the locations at which it is expected that **Demand Control** will be exercised				OC4
A **Supplier** must notify the **TSO** in writing on each occasion that any **Customer Demand Management** of which it has notified the **TSO** under OC4.4.2.1 and OC4.4.2.2**,** is planned to be instructed (or has been instructed) by that **Supplier** and which will in aggregate equal or exceed (or has equalled or exceeded) 2**MW** at any point in time other than following an instruction by the **TSO**. Such notification must be given in accordance with the timing requirements of OC4.4.2.4 and will contain:		The following **Schedule Day** (where the **Customer Demand Management** is planned sufficiently far in advance).		OC4
(a) the amount of **Customer Demand Management** planned to be instructed, or which had been instructed;	**MW**			OC4
(b) the length of time which the **Customer Demand Management** is anticipated to be in force and the time at which it is to commence, or commenced; and	hours/minutes			OC4
(c) the location on the **Total System** at which the **Customer Demand Management** is to be, or has been, implemented.	location			OC4
The **Supplier** must, in addition, notify the **Customer Demand Management** actually achieved (to the extent it differs from the data already supplied) within 2 weeks of initiation, including **MW** profiles on a half hourly basis and the amount of **Demand** reduction	**MW**			OC4

achieved.				

DATA DESCRIPTION	UNITS	TIME COVERED	UPDATE TIME	DATA CAT.
Where a **Supplier** wishes to utilise voltage reduction as **Customer Demand Management** on the **User System** of any of its **Customers,** the **Supplier** must notify the **TSO** of such details as the **TSO** reasonably requires as far in advance as reasonably practicable.				OC4
Customer Demand Management Initiated by the **TSO**				
Where a **Supplier** wishes to make arrangements with the **TSO** whereby the **TSO** would be given the ability to use **Customer Demand Management** for the purposes of **Demand Control**, it must notify the **TSO** in writing of the following:		Year commencing 1st May	By end of March each year	OC4
(i) the amount of the **Demand Control** reduction available;	**MW**			OC4
(ii) how often it can be used;				OC4
(iii) the length of time that **Demand Control** can be used;	hours/mins			OC4
(iv) the notice required to be given to the **Supplier** by the **TSO;**	hours/mins			OC4
(v) any situations under which the available **Customer Demand Management** may be varied or cannot be instructed by the **TSO**;				OC4
(vi) the duration of the arrangement with the **Customer**; and				OC4
(vii) any other information which the **Supplier** reasonably considers would be relevant to the **TSO.**				OC4

1. All forecast maximum **Demand** levels submitted to the **TSO** by **Users** shall be on the basis of **ACS Conditions**.

2. All **Users** with **Demand** are obliged to provide such additional forecast **Demand** data as the **TSO** may reasonably request to enable the **TSO** to estimate the diversified total **Demand** at various times throughout the year.

Part 2 - General Data

The **TSO** may, by notice in writing, require **Users,** pursuant to OC8.4.2 to supply to it information of a technical (but not commercial) nature to enable the **TSO** to fulfil its obligations relating to the operation of the **NI System** (examples of the type of information which may be required are set out in Appendix 2 to OC8 but that is not an exhaustive list).

SCHEDULE 8

DATA REGISTRATION CODE

DATA SUPPLIED BY THE TSO TO USERS

GRID CODE PROVISION	DATA DESCRIPTION
	Site Responsibility Schedules/Ownership Diagrams
CC9.1.3/CC9.1.4	The **TSO** shall, in respect of each connection to the **NI System** for which a **Connection Agreement** is required and those covered by Regulation 26 and Parts 1 and 2 of Schedule 3 of the Electricity Supply Regulations (NI) 1991, prepare: (i) a **Site Responsibility Schedule**; and (ii) an **Ownership Diagram**.
	Operational Planning
OC2.6.2(c)(i)	The **TSO** shall, by the end of September in each calendar year, provide each **Generator** in writing with a **Provisional Outage Programme** showing the **CDGUs**, **Controllable PPMs** or **Dispatchable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment** it may potentially withdraw from service during each week of **Years 2** and **3** for a **Planned Outage.**
OC2.6.3(c)(i)/ OC2.6.3(f)(i)	The **TSO** shall, by the end of June in **Year 1,** provide each **Generator** in writing with a draft **Final Outage Programme** showing the **CDGUs**, **Controllable PPMs** or **Dispatchable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment** it may potentially withdraw from service during each week of Year 1 for a **Planned Outage** and shall, by the end of September, notify any further changes by the issue of a **Final Outage Programme.**
OC2.6.7.3	The **TSO's** express formal permission must be obtained by a **Generator** prior to withdrawing a **CDGU**, **Controllable PPMs** or **Dispatchable PPMs** (or **Generating Unit(s)** therein) or item of **Power Station Equipment** for a **Planned Outage,** which permission shall specify: (i) the identity of the **CDGU**, **Controllable PPMs** or **Dispatchable PPMs** (or **Generating Unit(s)** therein) and/or **Power Station Equipment** and **MW** concerned; (ii) the duration of the **Outage**; and (iii) the **Start Date** and **Start Time.**
0C2.7.1	If there is a deficit indicated in any week, the **TSO** and the **Other TSO** shall jointly issue a System Capacity Shortfall Warning.
OC2.7.2	If there is a deficit indicated in any day, the **TSO** and the **Other TSO** shall jointly issue a System Capacity Shortfall Warning.
OC2.8.2	The **TSO** will, by the end of September in each calendar year, notify each **Generator** in writing of those aspects of the draft **NI System Outage** plan which may affect such **Generator** operationally, including proposed start dates and end dates of relevant **NI System Outages**. The **TSO** will also inform each **Large Demand Customer** with a **Demand** greater than 10 **MW** of the aspects of the plan which may affect it.
OC2.8.5(a)(ii)	The **TSO** will, by 11.00 hours each Thursday during the **Programming Phase,** notify each **Generator** in writing of those aspects of the **NI System Outage** plan which may affect it operationally, including proposed start dates and end dates of relevant **NI System Outages**. The **TSO** will also inform each **Large Demand Customer** with a **Demand** greater than 10 **MW** of the aspects of the plan which may affect it.
	Indicative Operations Schedule
SDC1.4.8.9	The **TSO** will issue the **Indicative Operation Schedule** each day to each **Generator** with **CDGUs, Controllable PPMs** or **Dispatchable PPMs**, each **Pumped Storage Generator** with respect to their **Pumped Storage Plant Demand**, **Energy Storage Generator** with respect to their **Energy Storage Power Station Demand**, each **Interconnector Owner** with regard to their **Interconnectors**, each **Demand Side Unit Operator** in relation to their **Demand Side Units**, provided that all the necessary information from these **Users** was made available by not later than **Gate Closure.**

GRID CODE PROVISION	DATA DESCRIPTION **Initial Planning Data**
PC6.4.1	Initial planning data to be submitted on the TSO website including the following information: (i) **User's** name (legal and project name); (ii) **User's** contact details; (iii) **User's** date of completed application; (iv) Status of application, for example in progress or issued; (v) Specific location, including grid co-ordinates; and (vi) The capacity applied for the project; and (vii) Interacting group where applicable.

DATA TO BE SUPPLIED BY THE **TSO** IN CONNECTION WITH APPLICATIONS FOR CONNECTION TO THE **NI SYSTEM** OR USE OF THE **DISTRIBUTION SYSTEM** AND **ALL ISLAND TRANSMISSION NETWORKS**.

1. The **TSO Licence** requires the **TSO** to produce a **Transmission System Statement** (save where the **TSO** is relieved of such obligations by the **Authority)** which provides a means by which **Users** and intending **Users** of the **Transmission System** are able to assess opportunities for connecting to and using the **Transmission System**. The **TSO's** obligations in this respect are described more fully in PC5.

2. The **TO Licence** requires the **DNO** to produce a **Distribution System Statement** (save where the **DNO** is relieved of such obligations by the **Authority)** which provides a means by which **Users** and intending **Users** of the **Distribution System** are able to assess opportunities for connecting to and using the **Distribution System**. The **DNO's** obligations in this respect are described more fully in PC5.

3. The **TSO Licence** also imposes upon the **TSO** certain obligations to offer to enter into an agreement for a new or modified connection to the **NI System** or for use of the **Distribution System** and **All Island Transmission Networks**. In the case of a new or modified connection, the intending **User's Plant** and **Apparatus** must comply with the requirements of the CC. Where a **User** or intending **User** requires more detailed information concerning the requirements for a particular connection, that **User** may obtain such information pursuant to CC6.1, CC.S1.1 and CC.S2.1**.**

GENERAL CONDITIONS

GC.1 INTRODUCTION

The **General Conditions** contain provisions which are of general application to all sections of the **Grid Code**. Their objective is to ensure, to the extent possible, that the various sections of the **Grid Code** work together and work in practice for the benefit of all **Users**.

GC.2 SCOPE

GC2.1 The **General Conditions** apply to the **TSO**, the **TO** and to all **Users** which, in these **General Conditions**, means all persons (other than the **TSO** and the **TO**) to whom any individual section of the **Grid Code** applies.

GC2.2 In relation to a **User** whose **Plant** and/or **Apparatus** are connected to the **Distribution System**, but also uses the **Transmission System,** the **User** will be bound by both the **Distribution Code** and the relevant provisions of the **Grid Code**. Each section of the **Grid Code** will indicate, where relevant, which categories of **Users** that are connected to the **Distribution System**, are to be subject to that section of the **Grid Code**.

GC.3 ASSISTANCE IN IMPLEMENTATION

GC.3.1 The **TSO Licence** imposes a duty upon the **TSO** to implement the **Grid Code** and it is accepted by the **TSO** and all **Users** that the **Grid Code** must, therefore, be capable of being enforced by the **TSO**. In certain cases the **TSO** may need access across boundaries, services and facilities from **Users** or to issue instructions to **Users** in order to be able to implement and enforce the **Grid Code**. It is hoped that these cases would be exceptional and it is not, therefore, possible to envisage precisely or comprehensively what the **TSO** might reasonably require in order to put it in a position to be able to carry out its duty to implement and enforce the **Grid Code**, in these cases.

GC.3.2 Accordingly, all **Users** are required not only to abide both by the letter and the spirit of the **Grid Code**, but also to provide the **TSO** with such rights of access, services and facilities and to comply with such instructions as it may reasonably require to implement and enforce the **Grid Code**.

GC3.3 As the **TO** is also a party to certain sections of the **Grid Code** (CC10.2, CC10.3 and OC6), the **TO** may also in certain cases need access across boundaries, services and facilities from **Users** in order to be able to carry out its rights and obligations under these sections of the **Grid Code** (for example, to isolate or disconnect **Plant** or **Apparatus**). Accordingly, all **Users** are required to provide the **TO** with such rights of access, services and facilities and to comply with such instructions as it may reasonably require to carry out its obligations under the **Grid Code**.

GC.4 UNFORESEEN CIRCUMSTANCES

If circumstances arise which the provisions of the **Grid Code** have not foreseen, the **TSO** shall, to the extent reasonably practicable in the circumstances, consult promptly and in

good faith all affected **Users** in an effort to reach agreement as to what action should be taken. If agreement between the **TSO** and such **Users** cannot be reached in the time available, the **TSO** shall determine what is to be done. Whenever the **TSO** makes a determination, it shall do so having regard, wherever possible, to the views expressed by **Users** and, in any event, to what is reasonable in all the circumstances. Each **User** shall comply with all instructions given to it by the **TSO** following such a determination provided that the instructions are consistent with the then current technical parameters of the relevant **User's System** registered under the **Grid Code**. The **TSO** shall, as soon as reasonably practicable following the occurrence of unforeseen circumstances, notify all relevant details thereof to the **Panel** for consideration in accordance with GC.6.2(e).

GC.5 HIERARCHY

GC.5.1 In the event of any conflict between the provisions of any direction of the **Secretary of State** on the one hand and any provisions of the **Grid Code** on the other, the provisions of such direction shall prevail (provided that such direction or ruling is binding upon the person to whom it is addressed), and neither the **TSO** nor any **User** shall be liable for failing to comply with the conflicting provision of the **Grid Code**.

GC.5.2 In the event of any conflict between the provisions of the **Grid Code** unless otherwise specified and any contract, agreement or arrangement between the **TSO** and a **User**, the provisions of the **Grid Code** shall prevail unless the **Grid Code** expressly provides otherwise.

GC.5.3 In the event of any conflict between provisions of the **Grid Code** applicable to **Users** connected to the **Distribution System** and the provisions of the **Distribution Code**, the provisions of the **Grid Code** shall prevail.

GC.5.4 In the event of any conflict between provisions of the **Grid Code** and the provisions of the **Applicable Legislation**, including (for the avoidance of doubt) the **Network Codes**, the **Applicable Legislation** shall prevail in such order of precedence as the law requires between such statutes or regulations.

GC.6 THE **GRID CODE** REVIEW PANEL

GC.6.1 The **TSO** shall establish and maintain the **Panel**, which shall be a standing body carrying out the functions referred to in paragraph GC.6.2.

GC.6.2 The **Panel** shall, with regard to all sections of the **Grid Code** which are not **Sections under Common Governance**:

(a) keep the **Grid Code** and its working under review;

(b) review all suggestions for amendments to the **Grid Code** which the **Authority** or any **User** or the **TO** (in respect of data items to be submitted under the Planning Code, PC Appendix A, the Connection Conditions CC4, CC5, CC6, CC7, safety related matters in CC9 and CC10, CC Schedule 1, CC Schedule 2, CC Appendix 1, CC Appendix 2, OC6 and other Grid Code sections which are relevant to the **TO**) may submit to the **TSO** for consideration by the **Panel** from time to time;

(c) determine recommendations for amendments to the **Grid Code** which the

TSO or the **Panel** feels are necessary or desirable and the reasons for the recommendations;

(d) issue guidance in relation to the **Grid Code** and its implementation, performance and interpretation upon the reasonable request of any **User**; and

(e) consider what changes are necessary to the **Grid Code** arising out of any unforeseen circumstances referred to it by the **TSO** under GC.4.

GC.6.3 The **Panel** shall consist of the following persons, each of whom shall have the right to vote:

(a) a chairman appointed by the **TSO**;

(b) 3 persons representing the **TSO**;

(c) 3 persons representing **Generators**;

(d) 2 persons representing **Suppliers**;

(e) a person representing the **Interconnector Owner**;

(f) a person representing the **TO** provided that such person shall only have a right to vote on matters related to the list of data items in GC6.2(b) which the **TO** is allowed to submit suggestions for amendment;

(g) a person representing the **DNO**;

(h) a person appointed by, and representing, the **Authority**;

(i) 3 persons representing renewable energy sources and their impact on the **NI System** (including photovoltaic, large scale renewable generation and small scale renewable generation);

(j) a person representing electricity storage;

(k) a person representing **Demand Side Unit Operators**; and

(l) a person representing the **SEM** operator

each of whom shall be appointed pursuant to the rules issued pursuant to GC.6.4.

GC.6.4 The **Panel** shall establish and comply at all times with its own rules and procedures relating to the conduct of its business, which shall be approved by the **Authority**.

GC.6.5 The **TSO** shall submit all proposed amendments to the **Grid Code** (regardless of which party proposes such amendment) to the **Panel** for discussion prior to fulfilling any obligations under its **Licence** in relation to wider consultation.

GC.7 **JOINT GRID CODE REVIEW PANEL**

GC7.1 The **TSO** and the **Other TSO** shall jointly establish, with the approval of the **Authority** and the **Other Authority**, a **Joint Grid Code Review Panel** which shall be a standing body carrying out the functions referred to in GC7.2.

GC7.2 The **Joint Grid Code Review Panel** shall:

(a) keep the **Sections under Common Governance** and their working under review;

(b) review all suggestions for amendments to the **Sections under Common Governance** which the **Authority**, the **Other Authority** or any **User** may submit to the **TSO** or the **Other TSO** for consideration by the **Joint Grid Code Review Panel** from time to time;

(c) determine recommendations for amendments to the **Sections under Common Governance** which the **TSO**, the **Other TSO** or the **Joint Grid Code Review Panel** feels are necessary or desirable and the reasons for the recommendations; and

(d) consider what changes are necessary to the **Sections under Common Governance** arising out of any unforeseen circumstances referred to it by the **TSO** under GC.4 or the **Other TSO** pursuant to the **Other Grid Code**.

GC7.3 The **Joint Grid Code Review Panel** shall consist of the **Panel** established by the **TSO** pursuant to GC6.1 and the panel established by the **Other TSO** pursuant to the **Other Grid Code**.

GC.7.4 The **Joint Grid Code Review Panel** shall establish and comply at all times with its own rules and procedures relating to the conduct of its business, which shall be approved by the **Authority** and the **Other Authority**.

GC.7.5 The **TSO** and the **Other TSO** shall submit all proposed amendments to the **Sections under Common Governance** (regardless of which party proposes such amendment) to the **Joint Grid Code Review Panel** for discussion prior to fulfilling any obligations under their respective **Licence** in relation to wider consultation. Following the determination of a recommendation at a **Joint Grid Code Review Panel** meeting, the **TSO** shall ensure that it fulfils its **Licence** obligation in relation to wider consultation.

GC.7.6 The **TSO** shall, in conjunction with the **Other TSO**, issue guidance in relation to the **Sections under Common Governance** and their implementation, performance and interpretation upon the reasonable request of any **User.** If a **User** requires further clarification on the interpretation of the **Sections under Common Governance**, the User may request that it be raised for discussion at the next **Joint Grid Code Review Panel** meeting.

GC.8 COMMUNICATION BETWEEN THE **TSO** AND **USERS**

GC.8.1 Unless otherwise specified in the **Grid Code**, all instructions given by the **TSO** and communications (other than those relating to the submission of data and notices) between the **TSO** and **Users** (other than **Generators**) shall take place between the **TSO System** Operations Manager and the relevant **User's Responsible Engineer/Operator** or such

other person as **TSO** or the **User** (as the case may be) may from time to time notify to the other for such purposes.

GC.8.2 Unless otherwise specified in the **Grid Code**, all instructions given by the **TSO** and communications (other than those relating to the submission of data and notices) between the **TSO** and a **Generator** shall take place between the **TSO System** Operations Manager and the **Generator's Power Station** Manager or such other person as the **TSO** or the **Generator** (as the case may be) may from time to time notify to the other for such purposes.

GC.8.3 Unless otherwise specified in the **Grid Code**, all instructions given by the **TSO** and communications (other than relating to the submission of data and notices which shall be submitted pursuant to GC.9.1) between the **TSO** and **Users** will be by means of telephone with a facility to record messages permanently.

GC.8.4 Where instructions or communications are given under the **Grid Code** by means of a communications system with a facility to record (by whatever means) messages permanently, such recording shall be accepted by the **TSO** and **Users** as evidence of those instructions or communications.

GC.9 DATA AND NOTICES

GC.9.1 Data and notices to be submitted to the **TSO** under the **Grid Code** (other than data which is the subject of a specific requirement of the **Grid Code** as to the manner of its delivery) shall be delivered in writing either by hand or sent by registered first class pre-paid post, or by telex or facsimile transmission. Data shall be submitted in the format set out in the Data Registration Code.

GC.9.2 Data delivered pursuant to paragraph GC.9.1 shall:

(a) in the case of data other than operational data, be submitted by a **User** to the Grid Operations Planning Manager at the address notified by the **TSO** to the **User** via the **TSO's** website or to such other department within the **TSO** or address as the **TSO** may notify to the **User** from time to time; and

(b) in the case of operational data, be submitted by a **User** to the Grid Operations Manager at the address notified by the **TSO** to the **User** via the **TSO's** website or to such other department within the **TSO** or address as the **TSO** may notify to the **User** from time to time.

GC.9.3 Notices submitted to **Users** shall be addressed to such person as may be notified in writing to the **TSO** from time to time by the relevant **User** at its address(es) notified by the **User** to the **TSO** in writing from time to time for submission of data and service of notices under the **Grid Code** (or failing which to the registered or principal office of the **User**).

GC.9.4 All data items, where relevant, will be referenced to nominal voltage and **Frequency** unless otherwise stated.

GC.10 OWNERSHIP OF **PLANT** AND/OR **APPARATUS**

References in the **Grid Code** to **Plant** and/or **Apparatus** of a **User** include **Plant** and/or **Apparatus** used by a **User** under any agreement with a third party.

GC.11 EMERGENCY SITUATIONS

Users should note that the provisions of the **Grid Code** may be suspended in whole or in part pursuant to any directions given and/or orders made by the Secretary of State under Article 58 of the **Order**.

GC.12 ILLEGALITY AND PARTIAL INVALIDITY

GC.12.1 If any provision of the **Grid Code** should become or be declared unlawful or partially invalid for any reason, the validity of all remaining provisions of the **Grid Code** shall not be affected.

GC.12.2 If part of a provision of the **Grid Code** is invalid or unlawful but the rest of such provision would remain valid if part of the wording were deleted, the provision shall apply with such modifications as may be necessary to make it valid and effective but without affecting the meaning or validity of any other provision of the **Grid Code**.

GC.13 CONTRACTUAL COMMITMENTS

GC.13.1 Where appropriate, in relation to OC2.6.2(c)(iii), OC2.6.3(c)(iii) and OC2.6.3(f)(iii) a **Generator** with **PPA CDGUs** may refuse to accept a request under either of those provisions but only where, in the **Generator's** reasonable opinion there is a significant risk that to do so would result in:

(1) damage or deterioration to **Plant** and/or **Apparatus**; and/or
(2) costs, expenses or losses;

in either case for which the **Generator** reasonably considers there to be no or an insufficient contractual commitment by **NIE Energy** to compensate the **Generator**. The **Generator** shall provide the **TSO** with such evidence as is reasonable in relation to the above.

GC.13.2 Where appropriate, in relation to OC2.6.2(c)(ii), OC2.6.3(c)(ii) and OC2.6.3(f)(ii), a **Generator** with **PPA CDGUs** may refuse to comply with the **TSO's** request to approach the relevant authorities for an extension of time but only where, in the **Generator's** reasonable opinion, there is a significant risk that the terms (if any) on which the relevant authority will grant an extension would result in damage or deterioration to **Plant** and/or **Apparatus** and/or costs, expenses or losses for which the **Generator** reasonably considers there to be no or an insufficient contractual commitment by **NIE Energy** to compensate the **Generator**.

GC.13.3 Where appropriate, in relation to OC2.6.7.4, notwithstanding OC2.6.7.4(b), a **Generator** with **PPA CDGUs** shall not be required to defer or continue to defer the **Outage** where (a) there would, in the **Generator's** reasonable opinion, be an imminent risk of injury to persons or material damage to property (including the **CDGU**) or (b) in the **Generator's** reasonable opinion there is a significant risk that to do so would result in:

(1) damage or deterioration to **Plant** and/or **Apparatus**; and/or
(2) costs, expenses or losses;

in either case for which, in the **Generator's** reasonable opinion, there is no or an insufficient contractual commitment by **NIE Energy** to compensate the **Generator**. The

Generator shall provide the **TSO** with such evidence as is reasonable in relation to the above.

GC.13.4 Where appropriate, in relation to OC7.4.6.6, a **Generator** with **PPA CDGUs** shall not be obliged to comply with the **TSO's** instructions relating to a **Black-Start** where these are outside the **Technical Parameters** of the relevant **CDGU** if:

(a) in the **Generator's** reasonable opinion there is an imminent risk of injury to persons or material damage to property (including the **CDGU**); or

(b) there is, in the **Generator's** reasonable opinion, a significant risk that to comply with such instruction would result in damage or deterioration to **Plant** and/or **Apparatus** and/or costs, expenses or losses, in either case for which the **Generator** reasonably considers there to be no or an insufficient contractual commitment by **NIE Energy** to compensate the **Generator**.

The **Generator** shall provide the **TSO** with such evidence as is reasonable in relation to the above.

GC13.5 Where appropriate, in relation to SDC2.4.2.9, a **Generator** with **PPA CDGUs** may refuse to comply or continue to comply with instructions referred to in SDC2.4.2.9 but only:

(a) in order to avoid, in the **Generator's** reasonable opinion, an imminent risk of injury to persons or material damage to property (including the **CDGU**); or

(b) where in the **Generator's** reasonable opinion there is a significant risk that to comply with such instruction would result in damage or deterioration to **Plant** and/or **Apparatus** and/or costs, expenses or losses, in either case for which the **Generator** reasonably considers there to be no or an insufficient contractual commitment by **NIE Energy** to compensate the **Generator**.

METERING CODE

for the electricity industry in Northern Ireland

MC - 464

24 April 2024

CONTENTS OF THE MAIN CODE **PAGE**

MAIN CODE

MC1 **DEFINITIONS**

"Active Energy"	the electrical energy produced, flowing or supplied by an electrical circuit during a time interval, being the integral with respect to time of Active Power, measured in units of watt-hours or standard multiples thereof, that is: 1000 Wh = 1 kWh; 1000 kWh = 1 MWh; 1000 MWh = 1 GWh;
"Actual Metering Point"	The physical point at which electricity is metered.
"Agreed Procedure" or "AP"	each of the agreed procedures which are specified in MC2.3 and set out in this Metering Code;
"Approved Meter Manufacturer"	A Meter manufacturer who produces Meters approved by regulatory body OFGEM under the MID (Measuring Instruments Directive) or equivalent Directive. They have the legal authority to calibrate, set compensation values and certify Electricity Settlement Meters. The Relevant Meter Operator is responsible for procurement of meters from such a Manufacturer.
"Approved Meter Test Station"	as defined in Sub-Code No. 2.4;
"Confirmation Statement"	a daily statement prepared by NIE Energy Limited and submitted to a Generator in accordance with Clause 7 of the relevant PPA;
"Data Collection System"	the data collection system (sometimes referred to as an "instation") operated by the TSO to supply Settlement Values to the Market Operator for use in calculating

	payments due, inter alia, to Generators and from Suppliers (currently comprising a central computer together with datalinks to and from it connecting to System Meters), or such other data collection system as the TSO may reasonably specify to be used for such purpose with the prior agreement of the Authority and after consultation with all Generators and those other Users which are, in the reasonable opinion of the TSO, interested in any such system. For the avoidance of doubt, the System Meters, the Generator Meters and the accounting software known as the contract management system are not part of the Data Collection System;
Customer"	a person who is supplied with or sold electricity by a Supplier;
"Data Protection Legislation"	All applicable data protection and privacy legislation in force from time to time in the UK including without limitation the UK GDPR and the Data Protection Act 2018 (and regulations made thereunder and including all regulations and codes of practice applicable to those persons subject to the Metering Code in relation to matters the subject of the Metering Code;
"Disputes Procedure"	in relation to a Fuel Security Period, the procedure if any detailed in the Northern Ireland Fuel Security Code, or in relation to the TSO and any other User the procedure referred to in MC15, provided that in relation to NIE Energy and a Generator in relation to its Generating Units subject to a PPA, the TSO may provide such data to NIE Energy and/or the Generator on metered values and related issues for the procedure detailed in a PPA between NIE Energy and such Generator and as reflected in the

	interface arrangements between NIE Energy and the TSO for resolving disputes;
"Effective Date"	the Transfer Date;
"Event Recorder"	the device referred to in Sub-Code No. 3 (and used in the manner specified therein);
"Export"	in respect of any User, a flow of electricity from the Plant or Apparatus of such User to the Plant or Apparatus of another User and the verb "export" and its respective tenses shall be construed accordingly;
"Final Metering Scheme" or "FMS"	The Metering scheme to replace the Interim Metering scheme defined in Sub Code 1 of this Meter Code, which will be in compliance with Sub Code 2 according to the capacity of the Generation Circuit.
"Generator Circuits"	circuits in a Power Station and their associated current and voltage transformers which feed Metering, in each case which are not in the ownership of the TO;
"Generator Meter"	a Meter available to transmit data directly to the relevant Generator;
"Import"	in respect of any User, a flow of electricity to the Plant or Apparatus of such User from the Plant or Apparatus of another User and the verb "import" and its respective tenses shall be construed accordingly;
"Interconnections"	the electric lines and Plant or Apparatus and meters for the transfer of electricity to or from the Transmission System into or out of Northern Ireland;
"Interested User"	in relation to Metering and Generator Circuits at any Relevant Connection Site of a Generating Unit or a PPM, the Generator which operates such Generating Unit or PPM;

“Main Code”	the part of the Metering Code entitled the "Main Code" and comprising MC1 to MC20;
“Market Operator”	has the meaning given in the TSC;
“Market Registration Code”	the code of that name drawn up by the TO pursuant to the TO Licence as amended or restated from time to time;
“Meter Advance Reconciliation”	the process for reconciliation of meter readings with Settlement Values described in AP3 and AP4;
“Meter Advance Reconciliation Record”	the record produced in accordance with AP3 and/or AP4 in the form set out in Appendix B to each of AP3 and AP4;
“Meter Advance “Reconciliation Statement”	the statement produced in accordance with AP3 and/or AP4 in the form set out in Appendix B or D (as the case may be) to AP3 and AP4;
“Meter Reconciliation Statement"	a statement prepared by the TSO and submitted to each Generator on request or if an issue is identified;
“Metering”	Tariff Metering and Operational Metering;
“Metering Code”	the Main Code, each Sub-Code and each Agreed Procedure;
“Metering Committee”	the committee in the relevant form established in accordance with MC16;
“Northern Ireland Fuel Security Code"	the document of that title designated as such by the Department for Economy or its successors, as from time to time amended;
“Operational Metering”	indicating instruments, meters, current and voltage transformers, metering protection equipment including alarms, electrical circuitry, transducers, Event Recorders, Unit Dynamic Models and other equipment or any part

	thereof which is required by the TSO to provide the data in relation to each Power Station and Generating Unit: (i) as set out in Appendix A to Sub-Code No. 3; (ii) not used; and (iii) any additional data as may be agreed between the TSO and the relevant Interested User as is specified in the relevant Connection Agreement, but excluding any Tariff Metering and Generator Circuits;
"Overall Accuracy"	the accuracy of any Metering as affected by its current and voltage transformers and Generator Circuits;
"Party"	any person subject to the provisions of the Grid Code;
"Personal Data"	the personal data (as defined in Data Protection Legislation) that is collected or processed under the Metering Code;
"Point of Supply"	the Connection Point between the NI System and the relevant User System, unless another point is agreed between the TSO and the User;
"Power Purchase Agreement" or "PPA"	the Power Station Agreement and associated Generating Unit Agreements relating to a Power Station;
"Process/Processing"	has the meaning given to "process" and "processing" under the Data Protection Act 2018;
"Reactive Energy"	the integral with respect to time of the Reactive Power measured in units of voltampere-hours reactive or standard multiples thereof, that is: 1000 VAr = 1 kVAr; 1000 kVAr = 1 MVAr;

"Registrant"	the TSO, the Relevant Meter Operator or the User referred to as such in this Metering Code as defined in MC3.3;
"Relevant Connection Site"	a site which includes a Connection Point of a Power Station or Customer to the Transmission System;
"Relevant Meter Operator"	The entity obliged under agreement or under Licence, to operate and provide for the installation and testing of a defined set of metering points. The Relevant Meter Operator is the TO.
"Retail Market Procedure" or "MP"	each of the retail market procedures forming part of the Market Registration Code, including those specified in MC2.3;
"SCADA"	the Operational Metering data collection system used by the TSO for the storage, display and processing of Operational Metering data by the TSO (currently comprising a communication system and computer system) or such other data collection system as the TSO may reasonably specify to be used for such purpose with the prior agreement of the Authority and after consultation with all Generators and those other Users which are in the reasonable opinion of the TSO, interested in any such system. For the avoidance of doubt, the Event Recorders are not part of SCADA;
"Settlement Values"	values of Active Energy and Reactive Energy delivered over a Settlement Period as recorded by Metering required by and operating in accordance with this Metering Code or as estimated or substituted in accordance with this Metering Code. Settlement Values are identified by the time at the end of the relevant Settlement Period;
"Sub-Code"	each of the Sub-Codes referred to in MC2.3 and set out in this Metering Code;

"Supplier"	a holder of a Supply Licence;
"Supply Licence"	a licence to supply electricity granted pursuant to Article 10(1)(c) of the of the Electricity (Northern Ireland) Order 1992;
"Tariff Metering"	meters, associated current and voltage transformers, metering protection equipment including alarms, electrical circuitry and other devices or any part thereof which are part of the Active Energy or Reactive Energy measuring equipment at or relating to a Relevant Connection Site but excluding Generator Circuits;
"TO"	means Northern Ireland Electricity Networks in its capacity as owner of the NI System;
"TO Licence"	a licence authorising the TO to participate in the transmission of electricity granted under Article 10(1)(b) of the Electricity (Northern Ireland) Order 1992;
"TSC" or "Trading and Settlement Code"	the Single Electricity Market Trading and Settlement Code adopted by the Market Operator and approved by the regulatory authorities;
"TSO" or "Transmission System Operator"	SONI Limited in its capacity as the holder of a licence granted pursuant to Article 10(1)(b) of the Electricity (Northern Ireland) Order 1992 to operate a Transmission System;
"UKAS"	the National Accreditation Body for the United Kingdom. Appointed by government, to assess and accredit organisations that provide services including certification, testing, inspection and calibration.
"User"	an Interconnector Owner, a Generator, a Customer or a Supplier.

MC2 **INTRODUCTION AND SCOPE**

MC2.1 This Metering Code sets out or refers to the requirements for Metering and Generator Circuits in the electricity industry in Northern Ireland. It covers:

MC2.1.1 Tariff Metering for Active and Reactive Energy; and

MC2.1.2 Operational Metering for Active and Reactive Power and monitoring Power Stations and Generating Units that Import and Export Energy; and

MC2.1.3 Generator Circuits.

It deals with Metering at Relevant Connection Sites although it does not require Operational Metering at Points of Supply at certain points of generation as may be specified in the relevant Sub-Code.

MC2.2 The Metering Code does not apply to Imports at Power Stations below a certain Active Power level as may be specified in the relevant Sub-Code. In such circumstances, the Metering will be required to meet the TO's current standards for Metering in respect of supplies to large industrial customers, and the TSO will provide the Generator with a copy of such standards upon request.

MC2.3 Where the detailed requirements for Metering are too extensive for inclusion in the Main Code they are set out in the Sub-Codes and Agreed Procedures or, in certain cases, in the Retail Market Procedures. In general, the Main Code contains the broader principles applying to Metering and the Sub-Codes, Agreed Procedures and relevant Retail Market Procedures contain the more detailed requirements. The Sub-Codes, Agreed Procedures and relevant Retail Market Procedures cover, inter alia, the following matters:

MC2.3.1 Generation Metering Sub-Codes:

Sub-Code No.	Subject
1	Generation Tariff Metering for Power Stations existing at the Effective Date;
2.1	Metering of Circuits with a Rated Capacity exceeding 100 MVA;

	2.2	Metering of Circuits with a Rated Capacity exceeding 10 MVA and up to and including 100 MVA;
	2.3	Metering of Circuits with a Rated Capacity of 70kVA or more and up to and including 10 MVA;
	2.4	Metering of Circuits associated with an Aggregated Generation Unit;
	2.5	Calibration, Testing and Commissioning Requirements of Metering Equipment;
	3	Generation Operational Metering.

MC2.3.3 Agreed Procedures

Agreed Procedure No.	Title	Reference
1.	Maintenance, Testing, inspection and Sealing of Tariff Metering (Generation) and Generator Circuits	MC8.7
2.	Meter Advance Reconciliation (Generation)	MC10
3.	Settlement Values Estimation (Generation)	MC4.3, MC13 & MC14
4.	Communication Protocols	MC4.4

Retail Market Procedures (Code can be found on UREGNI website)

Title	Reference
New Connection Registration	MC19.1
Change of Supplier	MC19.1

MC2.4 Applicability of Sub-Codes

MC2.4.1 Sub-Code No. 1 applies to Power Stations and Generating Units commissioned on or prior to the Effective Date, unless the TSO and the Generator agree that Sub-Codes Nos. 2.1 to 2.4 are to apply, in which case they shall so apply.

MC2.4.2 Sub-Codes Nos. 2.1 to 2.4 apply to those Relevant Connection Sites to which Sub-Code No. 1 does not apply.

MC2.4.3 Sub-Code No. 3 applies to all Power Stations and Generating Units.

MC3 GENERAL

MC3.1 Active and Reactive Energy and Active and Reactive Power exported or imported by Parties shall be metered and Power Stations and Generating Units shall be monitored as required by this Metering Code. Each Generating Unit which is subject to Central Despatch (whether alone or jointly with other Generating Units) shall have separate Tariff Metering.

MC3.2 Tariff Metering shall be designed and installed so as to measure both net Exports to and Imports from the Transmission System and gross output from each Generating Unit. Data from Tariff Metering required under this Metering Code shall be collected from the System Tariff Metering or any other Meter nominated by the TSO through the Data Collection System.

MC3.3 All Metering shall be owned by the TO. The TSO shall ensure that the TO ensures that all such Metering complies with this Metering Code, other than:

MC3.3.1 all Tariff Metering relating to Interconnectors which shall, for the purposes of this Metering Code, be the responsibility of the Interconnector Owner to show compliance with the relevant requirements of this Metering Code.

MC3.3.2 all Generator Circuits which shall, for the purposes of this Metering Code, be the responsibility of the Generator which operates the Generating Unit and/or PPM to which they relate.

MC3.3.3 all Metering relating to Interconnections, responsibility for which shall be governed by the provisions of the relevant Interconnection Agreement.

the TSO, the Relevant Meter Operator or the User responsible for Metering shall be known in this Metering Code as the Registrant in respect of such Metering. The User responsible for Generator Circuits shall be known as the Interested User.

MC3.4 Each of the TSO, the Relevant Meter Operator and the User (which in this context means the User acting in its capacity as a Registrant or as an Interested User) shall, by the date such person becomes bound by this Metering Code and in respect of that Metering or those Generator Circuits for which it is responsible, ensure such Metering or Generator Circuits are properly installed and that they comply with the requirements of this Metering Code. Details of such Metering or Generator Circuits shall be provided by the relevant Registrant or Interested User to the TSO on request for the purposes of maintaining the register pursuant to MC8.6.1 PROVIDED ALWAYS that all reasonable costs of upgrading any Generator Circuit to ensure compatibility with the requirements of any changes to the Data Collection System required by the TSO shall be met by the TSO. Maintenance and replacement of Generator Circuits in the ordinary course shall be the responsibility of the relevant Interested User.

MC3.5 Unless Sub-Code No. 1 applies, all current and voltage transformers associated with Tariff Metering must be installed at the expense of the Registrant as close as reasonably practicable to each Point of Supply or Delivery Point taking into account physical location and cost. Where Sub-Code No. 1 applies, all current and voltage transformers associated with Tariff Metering shall remain where sited at the Effective Date.

MC3.6 Generator Circuits and Tariff Metering installed prior to the Effective Date shall comply with Sub-Code No. 1 and Sub-Code No. 3. Generator Circuits and Tariff Metering installed after the Effective Date shall comply with the applicable Sub-Codes of Sub-Codes Nos. 2.1 to 2.5, and Sub-Code No. 3, except for replacement Tariff Metering at Generating Units or Relevant Connection Sites which were commissioned on or before the Effective Date. In such case such Metering may comply with Sub-Code No. 1 or the applicable Sub-Codes under Sub-Codes Nos. 2.1 to 2.4, and in each case with Sub-Code No. 3, as the relevant Registrant and

the TSO may agree. Once Metering to Sub-Codes Nos. 2.1 to 2.5 and No. 3 has been installed and commissioned, the installation may not revert to Sub-Code No. 1 standards.

MC3.7 Operational Metering shall be sited where reasonably required by the TSO after consultation with the Interested User so as to measure at points reasonably determined by the TSO. Operational Metering will be installed so as to ensure it will not adversely affect plant performance. Installation of Operational Metering shall either be undertaken by the TO, or the Interested User on behalf of and under the supervision of the TO as soon as is reasonably practicable following the request of the TSO, with the TSO bearing all such costs as are reasonable in respect thereof.

MC3.8 A Registrant shall continue to be responsible for Metering in accordance with this Metering Code, until another person becomes Registrant in respect of such Metering in accordance with this Metering Code or until electricity ceases to be imported or exported at the Relevant Connection Site as a result of permanent disconnection but may not otherwise cease to be responsible as Registrant.

MC3.9 Subject to MC3.4 above, Generator Circuits are the responsibility of the Interested User which operates the Power Station where such Generator Circuits are installed. Such Interested User shall be required to maintain the same in accordance with the Metering Code.

MC4 **DATA COLLECTION**

MC4.1 The TSO shall have the right to collect data relating to Active Power and Reactive Power and Active Energy and Reactive Energy imported and exported and data permitted to be collected by Operational Metering by remote interrogation or manual on-site interrogation in accordance with the terms of this Metering Code.

MC4.2 In the event of failure of the data links used for remote interrogation the TSO shall inform the Interested User who shall read each meter register in respect of which it is the Interested User, daily at a time agreed with the TSO or as soon as possible thereafter.

MC4.3 For the purposes of remote interrogation the TSO may use its own data communications network or failing this, shall enter into, manage and monitor

contracts to provide for the maintenance of all data links by which data is passed from System Tariff or Operational Metering to the TSO. In the event of any fault or failure on such communication lines or any error or omission in such data the TSO shall, if possible, retrieve such data by manual on-site interrogation in accordance with Agreed Procedure No.3 failing which it shall estimate the same in accordance with the relevant Agreed Procedure.

MC4.4 For the purposes of remote interrogation an Interested User shall provide its own data communications network or failing this, shall enter into, manage and monitor contracts to provide for the maintenance of all Interested User provided data links by which data is passed from System Tariff or Operational Metering to the TSO.

MC4.5 Each of the TSO and all Users shall use communications protocols in relation to Metering specified in Agreed Procedure No.4.

MC5 DESCRIPTION OF METERING

MC5.1 Metering shall comply with the requirements set out in the relevant Sub-Code.

MC5.2 All Tariff Metering shall be compatible with the Data Collection System.

MC5.3 All Generator Circuits shall be compatible with the relevant Metering.

MC5.4 All Tariff Metering shall only be procured from an Approved Meter Manufacturer.

MC6 ACCURACY

Metering shall be accurate within the prescribed limits set out in the relevant Sub-Codes. With respect to Tariff Metering these prescribed limits shall be applied after adjustments have been made in accordance with the relevant Sub-Code to compensate for any errors due to measuring current and voltage transformers and connections thereto and/or due to Generator Circuits.

MC7 CALIBRATION

Each Registrant shall ensure that all Metering for which it is responsible and each Interested User shall ensure that all Generator Circuits for which it is responsible shall, at the Effective Date and thereafter, be calibrated or compensated in accordance with this Metering Code in order to meet the accuracy requirements in the Sub-Codes. The Registrant in the case of Metering or in the case of Generator Circuits shall be granted access to such Metering or

Generator Circuits by the relevant Party upon reasonable notice and at reasonable times, in order to make or inspect any adjustments thereto and to attend any tests or inspection thereof required pursuant to this Metering Code.

MC8 PROPER ORDER, TESTING, SEALING AND READINGS

MC8.1 Proper Order:

MC8.1.1 Each Registrant shall at its own cost and expense keep in good working order, repair and condition all Metering in respect of which it is the Registrant to the extent necessary to ensure the correct registration, recording and transmission of the requisite data relating to or in respect of the quantity of Active and Reactive Energy and Active and Reactive Power measured by the relevant Metering and, in the case of Metering at Power Stations, of the performance of the relevant Power Station and/or Generating Unit.

MC8.1.2 Each Generator shall at its own cost and expense keep in good working order, repair and condition all Generator Circuits for which it is responsible.

MC8.2 Testing:

MC8.2.1 Any new or replacement meters shall be calibrated at an Approved Meter Test Station prior to installation of the same in accordance with the provisions of Sub-Code No. 1 (for Generator Circuits and Tariff Metering installed prior to the Effective Date) or Sub-Code No. 2.5 (for all other Generator Circuits and Tariff Metering).

MC8.2.2 Any new, replacement or modified Metering shall be tested by the Registrant as soon as is reasonably practicable after installation or modification of the same.

MC8.2.3 No less frequently than is specified in the relevant Sub-Code each Registrant shall carry out a periodic testing of all Metering in respect of which it is the Registrant.

MC8.2.4 The Registrant shall give the TSO or (in the case of Metering of which the TSO is the Registrant), the Interested User at least one

month's prior written notice of a routine test and 5 Business Days' prior written notice in the case of every site test of new, replacement or modified Metering stating the date, time, work required and estimated duration of every such test except where such test is carried out as a result of an emergency or equipment failure in respect of Metering which is already in service.

MC8.2.5 The TSO or the Interested User, as the case may be, shall have the right to attend any such test should it so require. Any such test shall comply with the relevant Sub-Code.

MC8.2.6 The costs and expenses of such testing shall be borne by the Registrant.

MC8.2.7 If all or any part of a Generator Circuit is replaced, the relevant Generator Circuit shall be recalibrated if calibration is possible. If required, the TSO and the Interested User shall agree any change that may be necessary to the existing compensation for that Generator Circuit.

MC8.3 Adhoc Testing

MC8.3.1 If the TSO or any User has reason to believe that Metering or Generator Circuits are not performing properly or within the prescribed limits of accuracy referred to in the relevant Sub-Code then such person (where it is not the TSO) shall promptly notify the TSO accordingly.

MC8.3.2 Subject to MC8.3.3 the TSO shall notify the relevant Registrant or Interested User promptly and require them to test the accuracy of the relevant Metering or Generator Circuits as soon as practicable but in any event within 24 hours of receiving notification of such requirement, whereupon the relevant Registrant or Interested User as the case may be shall inspect such Metering or Generator Circuits and make such tests as the TSO shall reasonably deem necessary to determine the accuracy of the same.

MC8.3.3 Where the TSO and Relevant Meter Operator have reason to believe it would not be appropriate for the relevant Registrant or Interested User to test the accuracy of Metering or Generator Circuits then they shall without being required to give prior notice to the relevant Registrant or Interested User as the case may be, inspect such Metering or Generator Circuits and make such tests as they shall reasonably deem necessary to determine the accuracy of the same.

MC8.3.4 Subject to MC8.3.5 below:

MC8.3.4.1 the Registrant's costs associated with any such inspections and tests of Metering referred to in MC8.3 shall be borne by such Registrant; and

MC8.3.4.2 the Interested User's costs associated with any such inspections and tests of Generator Circuits referred to in MC8.3 shall be borne by such Interested User.

MC8.3.5 Where any Metering or Generator Circuits pass all inspections and tests required pursuant to MC8.3.2 or 8.3.3, the costs of or associated with such inspections and tests referred to in MC8.3.4 shall be borne by the User which has notified the TSO pursuant to MC8.3.1 or otherwise, by the TSO, which shall reimburse the relevant Registrant or Interested User such costs and expenses on demand.

MC8.3.6 Calibration certificates for test equipment shall be made available for inspection by the relevant Registrant, the TSO or Interested User.

MC8.4 Testing: General

MC8.4.1 Subject to MC8.3.3 above, any testing of any Metering or Generator Circuits will, prima facie, be carried out by the Registrant in the case of Metering, or by the Interested User in the case of Generator Circuits, on the relevant Metering or Generator Circuits mounted in their operational position. Both the Interested User and the Registrant and (where the TSO is not the Registrant) the TSO shall have the right

to attend all such tests. All testing will be carried out in accordance with the relevant Sub-Code. Any breaking of seals and sealing on Tariff Metering will be carried out in accordance with Agreed Procedure No.1. The test performance of any Metering or Generator Circuits shall be compared with calibrated test equipment by one of the following methods:

MC8.4.1.1 injecting into the measuring circuits (i.e. excluding the primary current and voltage transformers) and comparing the readings or records over such period as may reasonably be required by the TSO and Relevant Meter Operator or, where an Interested User has instigated the test, by that Interested User to ensure a reliable comparison; or

MC8.4.1.2 where practicable, operating the calibrated test equipment from the same primary current and voltage transformers as the meter under operating conditions. The readings or recordings of the meter and the calibrated test equipment shall be compared over such period as may reasonably be required by the TSO and Relevant Meter Operator or, where an Interested User has instigated the test, by that Interested User to ensure a reliable comparison; or

MC8.4.1.3 in any other circumstances, such other method as may be reasonably specified by the TSO or, where an Interested User has instigated the test, by that Interested User.

MC8.5 Test Failures

MC8.5.1 Any meter which fails any test whilst in its operational position shall be removed by the Registrant forthwith and tested by the Relevant Meter Operator under laboratory conditions at an Approved Meter Test Station in accordance with Sub-Code No. 1 or Sub-Code No. 2.4, as the case may be, in the presence of the Registrant or the Interested

User if either wishes to attend. The Relevant Meter Operator shall give the Registrant or the Interested User, as the case may be, prior notice of such test.

MC8.5.2 For meters removed in accordance with MC8.5.1 on circuits that are required to remain in service either:

MC8.5.2.1 the meter shall be replaced by the Registrant forthwith with a previously recalibrated meter suitably prepared and compensated for the circuit; or

MC8.5.2.2 where the Metering includes both main and check meters for the affected circuit, and the meter (main or check) which is to remain on site is within its calibration period, such other meter may be removed provided it is returned to site or replaced within 10 Business Days. In such circumstances where the remaining meter is the check meter it shall, for all estimation or retrieval purposes, be regarded as the main meter until replacement or return to site of the main meter.

MC8.6 Records:

MC8.6.1 The Relevant Meter Operator shall at its own cost and expense maintain a register in relation to Metering for which it is the Registrant, which will be inspected for compliance with this Meter Code by the TSO at least once annually and made available upon reasonable request. Each Interested User shall at its own cost and expense maintain a register in relation to Generator Circuits for which it is responsible. Each such register shall detail any relevant loss adjustment factors, specification details, e.g. serial number and accuracy class, and all relevant matters as may be required by the relevant Sub-Code relating to the calibration of such Metering or Generator Circuits including the dates, location and results of any tests, readings, adjustments or inspections carried out, any temporary or permanent replacement of meters and the dates on

which any seal was applied or broken, the reason for any seal being broken and the persons carrying out and attending any such tests, readings, inspections or sealings. Such records shall also include any other details as may be reasonably required by the TSO or any other Registrant or Interested User. Any such records shall be complete and accurate and retained for a minimum period of 12 months following the permanent removal of the relevant Metering or Generator Circuits. Any data which forms part of such records shall be made available to the Interested User in the case of Metering and the Relevant Meter Operator in the case of Generator Circuits. Copies of the results of all manual readings, adjustments, tests and inspections shall be provided to the Registrant, Interested User or the TSO in accordance, where appropriate, but without limitation, in compliance with the Agreed Procedures.

MC8.6.2 Each Registrant shall pass such records or copies of the same to its successor as Registrant in relation to any Metering.

MC8.6.3 Each Registrant, or in the case of Generator Circuits, each Interested User shall, at its own cost and expense, ensure that the TSO is provided with copies of all records referred to in MC8.6.1 and that these are updated forthwith whenever there is any change in the information comprised in such records.

MC8.6.4 Each of the TSO and each User shall upon reasonable notice and at reasonable times have access to the records maintained by the Registrant or Interested User pursuant to MC8.6.1 and used for the purposes of a PPA which NIE Energy and the User has entered into and may take copies thereof.

MC8.6.5 Each User shall upon reasonable notice and at reasonable times have access to the Operational Metering data that is relevant to the Power Station and/or Generating Unit operated by such User which is in the possession of the TSO.

MC8.7 Sealing:

MC8.7.1 Following the Effective Date, all Tariff Metering as is capable of being made secure shall be sealed by or on behalf of each Registrant and either the TSO or the Interested User as is appropriate and following any test or inspection thereof in accordance with Agreed Procedure No.1 except, where sealing is impractical in the reasonable opinion of such Registrant and either the TSO or the Interested User as is appropriate having regard to the physical and electrical configuration at each Relevant Connection Site.

MC8.7.2 Each Generator and the TSO shall, following the Effective Date, make arrangements for all Generator Circuits as are capable of being made secure to be sealed by or on its behalf in accordance with Agreed Procedure No. 1, except where impractical in the reasonable opinion of the relevant Generator and the TSO having regard to the physical and electrical configuration at each Relevant Connection Site.

MC8.7.3 No seal applied pursuant to this Metering Code shall be broken or removed except in the presence of or with the prior consent of the Relevant Meter Operator or the User affixing the seal or on whose behalf the seal has been affixed unless it is necessary to do so in circumstances where (i) both main and check meters are malfunctioning or there occurs a fire or other similar hazard and such removal is essential and such consent cannot be obtained (provided that the person which has affixed the seal and which has not given such consent shall be informed forthwith thereafter) or (ii) such action is required for the purposes of MC12. Where verbal consent is given it must be confirmed in writing forthwith.

MC8.7.4 Neither the Relevant Meter Operator nor the relevant User shall incur any liability under this Metering Code in the event it cannot perform any of its duties hereunder due to any such consent required by MC8.7.3 being withheld save that it shall promptly inform the TSO and the relevant Registrant or Interested User accordingly.

MC8.7.5 Each of the Relevant Meter Operator and each User shall ensure, so far as it is able, that physical access to Metering and Generator Circuits is, where practicable, restricted to personnel who are required to have such access for the proper performance of their duties and have received permission for such access. A record of any such access shall be maintained by the TSO or the User, as the case may be, on whose land the Metering or Generator Circuits are positioned, with copies provided to the Registrant and the TSO pursuant to MC8.6.3. In addition all Metering and Generator Circuits, where practicable, must be made secure, if necessary by making the lock and keys subject to similar access restrictions.

MC8.7.6 Each User shall control the issue of its own seals and sealing pliers, and shall keep an accurate register of all such pliers and the authorised persons to whom they are issued.

MC8.8 Inspection and Readings:

MC8.8.1 The TSO shall ensure that all meters forming part of Metering which is subject to the terms of this Metering Code are inspected by the Relevant Meter Operator on-site in compliance with manufacturer recommendations, and with their relevant operational policy. They shall give the Registrant or the Interested User at least 5 Business Days' prior notice thereof or such shorter period as the TSO and the relevant User may agree. The TSO shall ensure that all the registers of meters forming part of Metering which is subject to the terms of this Metering Code, are interrogated remotely using the data collection system at a frequency not less than specified in the conditions of the relevant sub-code. Each reading shall be taken at, or as close as is practicable to, the end of a Settlement Period. The Relevant Meter Operator shall generate reports of all such inspections and readings and provide copies to the Registrant or the Interested User for the purposes of MC8.6.1. Any resulting discrepancies will be dealt with as provided in MC10, the relevant Agreed Procedure and the relevant PPA.

MC8.8.2 The Registrant or Interested User, as the case may be shall have the right to attend any such inspection and reading although the failure to attend shall not prevent such inspection or reading taking place nor invalidate its results. The representative of the Interested User or Registrant shall acknowledge the results of any such inspection or reading in the manner required by the Agreed Procedure.

MC9 **ACCESS**

MC9.1 Each Party hereby agrees to grant to any other Party, its employees, agents and contractors and persons duly authorised by them (each an "Invitee") full right to enter upon and through and remain upon any part of such Party's property to the extent necessary for the purposes of this Metering Code subject to the other provisions of MC9. Each Party granting access must further ensure that any consents or other forms of approval of third parties required in respect of such access have been correctly obtained and remain valid at the time of such access including, if appropriate, rights of access across third party land.

MC9.2 The right of access provided for in MC9.1 includes the right to bring on to such property such vehicles, plant, machinery and maintenance or other materials as shall be necessary for the purposes of this Metering Code.

MC9.3 Each Party shall ensure that any particular authorisation or clearance for any Invitee which is required to be given to ensure access by such Invitee is available on the arrival of such Invitee at the relevant Site.

MC9.4 Subject to the right of the Relevant Meter Operator to inspect without notice pursuant to MC8.3.3 each Party shall ensure that all reasonable arrangements and provisions are made and/or revised from time to time as and when necessary or desirable to facilitate the safe exercise of any right of access granted pursuant to MC9.1 with the minimum of disruption, disturbance and inconvenience. Such arrangements and provisions may, to the extent that the same is reasonable, limit or restrict the exercise of such right of access and/or provide for any Party to make directions or regulations from time to time in relation to a specified matter. Matters to be covered by such arrangements and/or provisions include:

MC9.4.1 the identification of the relevant Metering or Generator Circuits;

MC9.4.2 the particular access routes applicable to the land in question having particular regard for the weight and size limits on these routes;

MC9.4.3 any limitations on times of exercise of the right of access;

MC9.4.4 any requirements as to prior notification and as to authorisation or security clearance of individuals exercising such right of access and procedures for obtaining the same;

MC9.4.5 the means of communication to the Invitee of any relevant directions or regulations made by the Party granting access; and

MC9.4.6 the identification of and arrangements applicable to personnel exercising the right of access granted by MC9.1; and

MC9.4.7 safety procedures.

Each Invitee shall observe and comply with any such arrangements and all provisions (or directions or regulations issued pursuant thereto) made from time to time.

MC9.5 Each Invitee shall ensure that all reasonable steps are taken in the exercise of any right of access by such Invitee to:

MC9.5.1 avoid or minimise damage in relation to the property over which it has access; and

MC9.5.2 cause as little disturbance and inconvenience as possible to any Party or other occupier of such property,

and shall make good any damage caused to any such property in the course of exercise of such rights as soon as may be practicable. Subject to this, all such rights of access shall be exercisable free of any charge or payment of any kind.

MC9.6 In the case of Operational Metering, the Relevant Meter Operator shall agree with the Interested User (such agreement not to be unreasonably withheld) whether such Operational Metering is sited in an area which includes both Operational Metering and other equipment which is of importance in relation to a Power Station and/or Generating Unit and, if it is the Interested User shall maintain or with the approval of the Relevant Meter Operator shall procure the maintenance of

such Operational Metering on behalf of and under the supervision of the Relevant Meter Operator, with the Relevant Meter Operator bearing all such costs and expenses as are reasonable in respect thereof.

MC9.7 For the avoidance of doubt, no Party shall incur any liability under this Metering Code in the event it cannot perform any of its duties hereunder due to access to Metering or Generator Circuits being denied to it save that such Party shall promptly inform the TSO, the relevant Registrant and the Interested User accordingly.

MC10 METER DISCREPANCIES

The Parties acknowledge that, in transmitting metered data, impulses representing quantities of electricity may be lost between the relevant meter and or the Data Collection System giving rise to inaccuracies in Settlement Values notwithstanding that the Metering is complying with the standards required by this Metering Code. In such circumstances any differences between electricity flows recorded on meters and the total of the Settlement Values recorded in the Data Collection System will be noted at the time that the meter is inspected and read either pursuant to MC8.8 or MC4.2. Reports of such meter readings will be provided to the Interested User and any resulting discrepancies will be dealt with as provided in the relevant Agreed Procedure and the relevant PPA. In any other circumstances where Metering is not complying with the standards required by this Metering Code such difference will be dealt with in accordance with MC13.

Save as provided in the relevant PPA, no financial adjustment shall be made to any payment to be made in respect of a day under a PPA as a result of identifying any Metering discrepancy in respect of such day unless a dispute is raised in respect of such discrepancy prior to the expiry of the fourteenth Business Day following receipt by the Interested User of the Confirmation Statement in respect of such day or the Meter Reconciliation Statement which identifies such discrepancy.

MC11 DEFECTIVE EQUIPMENT

If at any time any Metering or Generator Circuits are destroyed or damaged or otherwise cease to function, or are found to be outside the prescribed limits of accuracy referred to in MC6, the Registrant or, in the case of Generator Circuits, the Interested User shall, subject to compliance with its obligations under MC8.7, promptly adjust, renew or repair the same or replace any defective component or procure the same so as to ensure that the relevant

Metering or Generator Circuits are returned to service and operating within the prescribed limits of accuracy as quickly as is reasonably practicable in all the circumstances.

MC12 SANCTIONS FOR NON-COMPLIANCE

In the event that a Registrant or Interested User cannot or does not comply with its obligations to repair, adjust or replace or renew any defective component pursuant to MC11, the Relevant Meter Operator or the Interested User shall have the right to carry out or procure there is carried out such repair, adjustment, replacement or renewal and to recover its own costs, expenses and profit thereon from such Registrant or Interested User forthwith on demand (such profit to be based on a reasonable rate of return).

MC13 METER FAILURE

MC13.1 If at any time any Metering ceases to function or is found to be outside the prescribed limits of accuracy referred to in MC6 (as the case may be) for whatever reason then, except in the circumstances referred to in MC13.2:

MC13.1.1 in the case of Metering ceasing to function, during the period from the date of such cessation; or

MC13.1.2 in any other case, during the period from the time when such inaccuracy first occurred or, if such time is unknown, from the midnight preceding the day during which the disputed reading occurred,

until, in either such case, the date of adjustment, replacement, repair or renewal of such Metering under MC11 and MC12, meter readings shall be deemed to be those calculated pursuant to Agreed Procedure No.3 and, in the case of disputes under Agreed Procedure No. 3, either the relevant PPA or under MC.15.

MC13.2 If at any time a voltage transformer fuse on a circuit supplying a meter has failed with the result that the Metering is outside the prescribed limits of accuracy referred to in MC6, the meter readings from the time the failure is deemed to have occurred until the voltage transformer circuit is again restored to the meter shall be deemed to be those calculated pursuant to Agreed Procedure No. 3 and, in the case of disputes under Agreed Procedure No. 3, either the relevant PPA or under MC.15.

MC14 COLLECTION, RETRIEVAL, VALIDATION AND ESTIMATION OF DATA

Where a Party identifies that data required from any Metering is incomplete, inaccurate or has not been transmitted or received, that Party will notify the TSO, the Interested User or the Registrant as appropriate in accordance with the relevant Agreed Procedure. The TSO, the Relevant Meter Operator, the Interested User or the Registrant as appropriate shall investigate and remedy the defect in accordance with the relevant Agreed Procedure taking into account the following priorities in the following order:

MC14.1 the need to obtain accurate data;

MC14.2 the need to apply verification procedures;

MC14.3 the need to produce estimated or substitute data where it is incorrect or unavailable.

MC15 DISPUTES

MC15.1 Any dispute relating to Metering or Generator Circuits which would affect any payment to be made or reduced in respect of a Generating Unit under a PPA shall be dealt with in accordance with the relevant PPA and the TSO will provide the parties with data on the metered values and related issues.

MC15.2 Any dispute in relation to the following matters:

MC15.2.1 siting of Metering;

MC15.2.2 technical specifications for Metering, Generator Circuits or the Data Collection System;

MC15.2.3 sealing of Tariff Metering;

MC15.2.4 compliance of Metering or Generator Circuits with technical specifications of the Metering Code;

MC15.2.5 compensation values;

MC15.2.6 such other matters as the relevant Parties may agree,

shall be referred to the Metering Committee who shall act as experts and whose decision shall be final and binding on, and published to, the Parties concerned (giving reasons therefor).

MC15.3 Any other dispute under this Metering Code shall be dealt with in accordance with the disputes procedure in the relevant Connection Agreement.

MC15.4 Any testing of Metering or Generator Circuits required to settle a dispute will be carried out in accordance with MC8.4 and MC8.5.

MC15.5 The Metering Committee may order payment of costs and expenses in respect of any dispute referred to it in such manner as it considers appropriate. The Metering Committee can demand any information it may properly and reasonably require to settle a dispute from any Party and such Party shall provide the relevant information on request.

MC15.6 Notwithstanding MC15.1 to MC15.5, any dispute under this Metering Code in relation to a matter that is also subject to the dispute resolution procedures contained within the Trading and Settlement Code and the Market Registration Code will be dealt with in accordance with the relevant dispute resolution procedure contained within the Market Registration Code.

MC16 **METERING COMMITTEE**

MC16.1 A Metering Committee shall be appointed for the purposes of this Metering Code. The composition of the Metering Committee shall vary depending upon whether it is considering generation matters or supply matters. It will comprise:

MC16.1.1 when it considers generation matters, one representative from the TSO (such person having one vote for each vote cast by a Generator at the meeting), one representative from the Relevant Meter Operator, one representative from each Generator and one representative from the Authority's office; and

MC16.1.2 when it considers supply matters, one representative from the TSO (such person having one vote for each vote cast by a Supplier at the meeting), one representative from the Relevant Meter Operator, one

representative from each Supplier and one representative from the Authority's office.

In default of agreement as to whether a matter is a generation or supply matter, the Authority shall have the right to determine the same.

MC16.2 Members of the Metering Committee shall be appointed, from time to time, by the relevant Party or Parties concerned. In default of appointment by the relevant Parties the Authority shall have the right to appoint representatives from the Parties who have failed to appoint their own representatives. Members of the Metering Committee shall be required to enter into confidentiality undertakings in favour of all Parties in a form specified by the Grid Code Review Panel.

MC16.3 Decisions of the Metering Committee shall be made by voting of committee members attending any meeting. Save as provided in MC16.1.1, each committee member shall have one vote. The chairperson, where necessary, shall have a casting vote. Two committee members shall be a quorum for any meeting of the Metering Committee. No less than 5 Business Days' notice of a meeting of the Metering Committee is required to be given to all committee members entitled to attend such meeting unless otherwise agreed by all such committee members.

MC16.4 The chairperson shall be appointed by the Metering Committee and in the absence of agreement shall be the representative from the Authority's office.

MC16.5 The Metering Committee shall operate in accordance with such other rules and procedures as are laid down by it.

MC16.6 The TSO shall act as secretary of the Metering Committee for the purpose, inter alia, of giving and receiving of notices.

MC17 **INFORMATION**

MC17.1 All Users shall give to the TSO all such information in their possession regarding Metering as the TSO shall reasonably require for the proper functioning of the Data Collection System including information regarding the dates and time periods for installation of new Metering and the dates and periods when Metering is out of service.

MC17.2 At the request of any Party which is a party to a dispute referred to in MC15.2 any relevant data derived from Metering shall and may be submitted by the TSO to the Metering Committee for the purposes of resolving such dispute.

MC17.3 In the event of any material malfunction, breakdown or other such occurrence or difficulty of or affecting the Data Collection System which, in the reasonable opinion of the TSO, affects or is likely to affect any Party other than the TSO to a material extent the TSO shall as soon as reasonably practicable thereafter provide each Party so affected (or likely to be affected) with a report describing in reasonable detail such occurrence or difficulty and its likely duration.

MC17.4 Any Party that chooses to receive electronic data from Metering shall install such computer equipment as may be necessary for such purpose and which shall be compatible with such Metering and shall comply with any relevant requirement of the Agreed Procedures. Each Party shall be responsible for its own computer equipment and communication lines.

MC17.5 Each Interested User shall have the right to receive electronic data from Metering in respect of which it is the Interested User. The TSO shall not, without good cause, interrupt or otherwise disturb such electronic data. The Interested User shall be responsible for the maintenance of any communication lines required for them to receive their Metered data.

MC18 OWNERSHIP OF METERING DATA

MC18.1 The Registrant of any Metering shall own the data acquired therefrom. Any Party shall at all times have the right to and is hereby authorised to have access to the same and to use the same in each case as may be permitted pursuant to this Metering Code, free of charge and, if confidential, may only release such data to others to the extent required pursuant to this Metering Code or as permitted by the Connection Agreement.

MC18.2 Any person subject to this Metering Code shall, at all times, comply with its respective obligations under all applicable Data Protection Legislation in relation to all Personal Data that is Processed by it in the course of performing its obligations under this Metering Code, including maintaining any required notification under the Data Protection Legislation. To the extent that any Personal Data is data that is Processed for a purpose set out in the data protection provisions

contained within the Market Registration Code, any Person Processing such data will be subject to those provisions.

MC19 NEW CONNECTION REGISTRATION AND CHANGE OF SUPPLIER

MC19.1 The procedures for registration of a new connection in Northern Ireland and for a change of Supplier are set out in Retail Market Procedures, this documentation can be found on the Authority's website.

MC20 NOTICES

MC20.1 Any notice of a new Registrant or of a change in Registrant or any other communication required under this Metering Code to be given to the TSO shall if required be sent by email via the contact details found on the SONI Ltd website- www.soni.ltd.uk/contact., attention: Systems Integrity Manager (with hard copy to follow by first class post) as may from time to time be nominated in writing by the TSO and, if required to be given to any other Party, shall be sent by such address and to such person as such Party shall nominate in writing to the TSO (with hard copy to follow by first class post). In the absence of nomination such communication as is required shall be sent to the registered office of such other Party.

MC20.2 Any notice or other communication sent by email pursuant to MC20.1 shall be deemed to have been received when despatched.

MC20.3 A new Registrant must be notified to the TSO at least 20 Business Days prior to either:

MC20.3.1 the date of the intended commencement of obligations of the Registrant; or

MC20.3.2 the date of simultaneous termination of obligations by the existing Registrant and the assumption of those obligations by the new Registrant,

(as the case may be) in connection with the relevant Metering.

SUB-CODE NO. 1

GENERATION TARIFF METERING

INTERIM METERING SCHEME

for the electricity industry in Northern Ireland

MC - 496

24 April 2024

SUB-CODE NO. 1 FOR GENERATION TARIFF METERING

USING THE INTERIM METERING SCHEME FOR NORTHERN IRELAND (IMS)

CONTENTS **PAGE**

1. SCOPE

1.1 This Sub-Code for the Interim Metering Scheme specifies the facilities that are to be provided and certain practices that are to be employed, for the measurement of electricity produced by Generating Units and for the measurement of electricity consumed at Power Stations. It will terminate automatically on the FMS Date.

1.2 This Sub-Code supplements the Main Code of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of this Sub-Code and the Main Code, provisions of the Main Code shall prevail.

1.3 This Sub-Code should also be read in conjunction with relevant Agreed Procedures.

1.4 The Metering Code will not apply to imports at Power Stations with an agreed import capacity of below 5 MW which shall be treated in accordance with MC2.2.

2. STANDARDS

2.1 All references to industry standards given in the text of this Sub-Code are to versions which are current at the Effective Date. Where Metering is in use at the Effective Date which was installed when earlier versions of these standards (or their predecessors) were in force there is no requirement to update such Metering unless expressly required pursuant to this Sub-Code.

2.2 Metering installed after the Effective Date is required to comply with the standards specified in the Final Metering Scheme except where defective Metering is being replaced or renewed prior to the FMS Date and such defective Metering was required to comply with the standards set out below in which case such replacement Metering shall be required to comply with the standards set out below until the FMS Date.

3. FACILITIES TO BE PROVIDED AT METERING POINTS

3.1 Meters

3.1.1 Meters installed at the Effective Date for Active Energy measurement shall meet the requirements of BS EN/IEC 62053-22 Class 0.2S, and for Reactive Energy measurement shall meet the requirements of BS EN/IEC 62053-23 Class 2.0.

3.1.2 Each Registrant shall ensure that Metering shall be provided at or in relation to the following points in order to measure required Settlement Values:

3.1.2.1 at or in relation to each Generating Unit Delivery Point where Settlement Values are required for:

(a) Active Energy for Export

(b) Active Energy for Import (where energy can be imported through the Generator Transformer)

(c) Reactive Energy for Import

(d) Reactive Energy for Export

3.1.2.2 at or in relation to station transformer high-tension bushings where Settlement Values are required for:

(a) Active Energy for Import

(b) Active Energy for Export (where Energy can be exported through the station transformer)

3.1.2.3 at or in relation to Generating Unit high-tension bushings where Settlement Values are required for:

(a) Reactive Energy for Import

(b) Reactive Energy for Export (where an auxiliary gas turbine is used for synchronous compensation)

(c) Active Energy for Export (to be measured every minute).

3.1.3 If direct measurement of the required values cannot be achieved, then the required values may be calculated using values measured at other points.

3.1.4 Each Metering point associated with the determination of energy exported or imported shall be provided with both a main and a check meter.

3.1.5 Where the import and/or export of Reactive Energy and Active Energy is required to be measured at the same point, these functions may be combined in a single meter in which each energy flow is measured separately.

3.1.6 Meters shall be labelled in accordance with Appendix B.

3.1.7 Meters shall store values for a period of 1 month.

3.1.8 Meters transmit Settlement Values to the Data Collection System using an approved communications route as per agreed procedure 4 of this code. The Settlement Period shall be selectable over the following range: 30, 20, 15, 10, 5 and 1 minute(s), or at minimum in compliance with the Trading and Settlement Code. For any selectable value in this range one Settlement Period shall commence on the hour.

3.1.9 Where direct measurement of required values cannot be achieved and the required values are calculated using values measured at other points, data compensation will be applied in the meter settings.

3.2 Current Transformers

Current transformers which are installed after the Effective Date shall comply with BS EN 61869-2, accuracy class 0.2S and have a rated output of not less than 15 VA.

3.3 Voltage Transformers

Voltage transformers which are installed after the Effective Date shall comply with BS EN 61869-5, accuracy class 0.2 and have a rated output of not less than 100 VA. Each voltage transformer secondary winding supplying a main meter shall be dedicated for that purpose unless otherwise agreed with the TSO. Each voltage transformer secondary winding supplying a check meter may be used for purposes other than those associated with the Interim Metering Scheme so long as such other uses do not degrade the accuracy of the check meter outside the limits required by 4.1.1 unless otherwise agreed with the TSO. Where both a main meter and a check meter are supplied by the same voltage transformer secondary winding, each such voltage transformer secondary winding shall be dedicated for that purpose unless otherwise agreed with the TSO.

3.4 Data Collection System

The Data Collection System shall include a computer and communications configuration capable of communicating with the tariff meters.

3.5 Power Supplies

Metering at Power Stations shall be connected to assured power supplies. Where assured power supplies are not available voltage selection schemes shall be installed to support Metering.

4. MEASUREMENT CRITERIA

4.1 Accuracy

4.1.1 Overall Accuracy of Equipment

Meters shall be calibrated so as to achieve Overall Accuracy of Metering within the limits set out below. Calibration of meters shall be adjusted due to current and voltage transformer errors and/or errors due to Generator Circuits (see 4.2) and for primary transformer losses.

4.1.2 Accuracy of Metering

Metering shall register amounts of Active Energy or Reactive Energy within the following limits of error, after account is taken of the adjustment for current and voltage transformer errors as detailed in 4.1.1 above.

4.1.2.1 Active Energy Metering Overall Accuracy:

	Conditions of Test	Limits of error at stated power factor	
	Current expressed as a percentage of the rated	Power factor	Limits of error

	meter current		
Generating Units	125% to 20% inclusive	1.0	±1.0%
Station transformers, unit transformers, auxiliary gas turbines	125% to 20% inclusive	1.0	±2.5%

4.1.2.2 Reactive Energy Metering Overall Accuracy:

	Conditions of Test	Limits of error at stated power factor	
	Current expressed as a percentage of the rated meter current	Power factor	Limits of error
All Units	125% to 5% inclusive	0.0 lag and lead	±5.0%

4.1.2.3 Active Energy Meters:

(a) Generating Units:

Conditions of test	Limits of error at stated power factor	
Current expressed as a percentage of the rated meter current	Power factor	Limits of error
125% to 20% inclusive Less than 20% to 10% inclusive Less than 10% to 5% inclusive 125% to 20% inclusive Less than 20% to 10% inclusive	1.0 1.0 1.0 0.5 lag and lead 0.5 lag and lead	±0.5% ±1.0% ±1.3% ±1.0% ±1.5%

(b) Station transformers, unit transformers, auxiliary gas turbines:

Conditions of test	Limits of error at stated power factor	
Current expressed as a percentage of the rated meter current	Power factor	Limits of error
125% to 20% inclusive	1.0	±2.0%
Less than 20% to 10% inclusive	1.0	±2.5%
125% to 20% inclusive	0.5 lag	±2.0%

4.1.2.4 Reactive Energy Meters:

Conditions of test	Limits of error at stated power factor	
Current expressed as a percentage of the rated meter current	Power factor	Limits of error
125% to 5% inclusive	Zero	±2.0%
125% to 20% inclusive	0.866 lag and lead	±2.0%
Less than 20% to 10% inclusive	0.866 lag and lead	±2.5%

4.1.3 Accuracy of Time Keeping

4.1.3.1 The time keeping accuracy of Metering shall be maintained in accordance with Standard Time.

4.1.3.2 The commencement of each Settlement Period shall be within 10 seconds of the true time.

4.1.3.3 The duration of each Settlement Period shall be within 1 second of the required duration.

4.2 Compensation for Current and Voltage Transformer Errors and Generator Circuit Errors

4.2.1 Compensation shall be made for errors of current and voltage transformers and/or Generator Circuits, if possible, in the meter calibration. The amount of such compensation shall be set by the Approved Meter Manufacturer. Where existing calibration records do not assist, a recalibration test shall be carried out where practicable. Where compensation cannot be determined no compensation shall be made.

4.2.2 A record of compensation settings shall be kept in accordance with MC8.6.1 and be available for inspection in accordance with MC8.6.4.

4.3 Compensation for Primary Transformer Losses

4.3.1 Compensation shall be made in the Relevant Meter Operator's meter by the Approved Meter Manufacturer.

4.3.1.1 to measure gross output at Generating Unit high tension bushings; and

4.3.1.2 for losses in the primary transformers where required to simulate the measurement of energy at each Delivery Point.

The formula for calculating the compensation shall be set by the Approved Meter Manufacturer with details made available to the Registrant. Where existing calibration records do not assist, a recalibration test shall be carried out where practicable. Where compensation cannot be determined no compensation shall be made.

4.3.2 A record of compensation settings shall be kept in accordance with MC8.6. 1 and be available for inspection in accordance with MC8.6.4.

5. CALIBRATION AND TESTING OF EQUIPMENT

5.1 Meters

5.1.1 Initial Calibration

Meters shall be calibrated by the Approved Meter Manufacturer, within the requirements of the relevant standards. Compensation shall be applied to take account of current and voltage transformer errors and errors due to Generator Circuits in accordance with 4.2.1 above.

5.1.2 Periodic Accuracy Testing

Meters shall be tested no less frequently than once every 5 years or such period as otherwise agreed between the Relevant Meter Operator and the Interested User from time to time having regard to an acquired knowledge of the performance of the particular design of meter.

Meters shall be recalibrated if required by the Approved Meter Manufacturer following any adjustment or test by the Relevant Meter Operator.

5.2 Test Access to Metering Equipment

Test terminal blocks in accordance with BS EN 61010-1:1993/A2:1995 & BS EN 60950:1992/A11:1997 shall be provided to facilitate meter testing and current and/or voltage transformer checks in situ.

5.3 Records

The results of all calibration tests and recalibrations on meters (including those prior to the Effective Date) from the Approved Meter Manufacturer, shall be kept by the Relevant Meter Operator in accordance with MC8.6.1 and be available for inspection in accordance with MC8.6.4.

6. DATA TRANSMISSION ROUTES AND PROCESSING

The system provides and records energy data measured over both one-minute intervals and Settlement Periods, as appropriate. Where necessary, measured values are subject to calculation and compensation in order to generate the required Settlement Values. This data compensation works in conjunction with the data held in the Meter.

The Meter transmits energy data via the Data Collection System to the contract management system where it is used to determine payments made under the PPA in place between the TSO and the operator of each Generating Unit.

The Generator has a read-only connection to the meter available an independent means of checking the data provided to it by the TSO as the basis for payments.

APPENDIX A

LABELLING OF METERS FOR IMPORT AND EXPORT

1. Active Energy

Active Energy is considered to be imported when it flows to the power station from the TSO. The meter(s) registering this Active Energy should be labelled "Import".

Active Energy is considered to be exported when it flows from the power station to the TSO. The meter(s) registering this Active Energy should be labelled "Export".

Meters shall be labelled to distinguish between main and check meters.

2. Reactive Energy

Reactive Energy is considered to be imported or exported as follows:

Flow of Active Energy	Power Factor	Flow of Reactive Energy
Import	Lagging	Import*
Import	Leading	Export*
Import	Unity	Zero
Export	Lagging	Export
Export	Leading	Import
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where Import for active energy is defined as in 1. above.

SUB-CODE NO. 2.1

(FOR THE METERING OF CIRCUITS WITH A RATED CAPACITY EXCEEDING 100 MVA)

for the electricity industry in Northern Ireland

24 April 2024

MC - 483

SUB-CODE NO. 2.1 FOR THE METERING OF CIRCUITS WITH A RATED CAPACITY EXCEEDING 100 MVA

CONTENTS **PAGE**

1. SCOPE

1.1 This Sub-Code No. 2.1 specifies the metering facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with:

a) Suppliers in relation to their Customers;

b) Generating Units and PPMs.

1.2 This Sub-Code supplements the Main Code of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of this Sub-Code and the Main Code, the provisions of the Main Code shall prevail.

1.3 This Sub-Code should also be read in conjunction with any relevant Agreed Procedures and Schedule 7 of the Order.

1.4 This Sub-Code applies to circuits with a rated capacity which exceed 100 MVA.

2. STANDARDS

All references to industry standards given in the text of this Sub-Code are to versions which are current at the Effective Date. However, Metering installed after the Effective Date is required to comply with the version of any such standard in force at the date of installation.

3. FACILITIES TO BE PROVIDED AT METERING POINTS

3.1 General

Although for clarity the specification identifies separate items of equipment, nothing in this Sub-Code prevents the items being combined to perform the same task provided the requirements of this Sub-Code are met.

3.2 Meters

3.2.1 For each circuit the following energy measurements are required at or in relation to the Point of Supply:

(a) Active Energy for Import (kWh);

(b) Active Energy for Export (kWh);

(c) Reactive Energy for Import and Export (kVArh).

3.2.2 The Registrant shall ensure that Metering for the above measurements shall normally be provided on the TSO side of the Point of Supply in order to measure required Settlement Values.

3.2.3 Active Energy Measurement (kWh)

Active Energy measurement shall meet the requirements of BS EN/IEC 62053-22 Class 0.2S.

3.2.4 Reactive Energy Measurement (kVArh)

Reactive Energy measurement shall meet the requirements of BS EN/IEC 62053-23 Class 2.0.

3.2.5 The measurements will be produced using the outputs from current transformers and voltage transformers.

3.2.6 Each circuit will be provided with:

(a) main kWh and kVAr meter.; (b) check kWh and kVAr meter

.

The Import and/or Export of Active Energy and Reactive Energy are required to be measured at the same point; these functions will be combined in a single meter in which each energy flow is measured separately.

3.2.7 All meters shall be of an approved pattern or construction and, where appropriate, will be installed in an approved manner under paragraph 3 of Schedule 7 of the Order.

3.2.8 If direct measurement of the required values cannot be achieved, then the required values may be calculated using values measured at other points subject to prior agreement with the TSO and the Relevant Meter Operator providing the overall accuracy meets the requirements of section 4.1. Where compensation is applied the values shall be recorded and supporting evidence shall be available to justify the compensation criteria.

3.2.9 Meters shall be labelled in accordance with the Appendix of this Sub-Code.

3.3 Instrument Transformers

3.3.1 The terms "current transformer" ("CT") and "voltage transformer" ("VT") used in this Sub-Code do not preclude the use of other measuring techniques with accuracies of the required standards providing the accuracy, and also the longer term accuracy, in accordance with this Sub-Code can be verified to the TSO's satisfaction.

3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the TSO's side of the Point of Supply.

3.3.3 Where CTs and/or VTs are used, they shall meet the requirements set out in paragraphs 3.3.5 and 3.3.6 below.

3.3.4 Where CTs and/or VTs are used then a test terminal block or equivalent facility shall be provided close to the meter(s). This facility will be fitted with the Relevant Meter Operator's seals and access granted by prior arrangement with the Relevant Meter Operator on reasonable request.

3.3.5 Current Transformers

(a) Two sets of CTs to BS EN 61869-2 with a minimum standard of accuracy class 0.2S shall be provided per circuit and shall also meet (to the extent applicable) any meter certification regulations in force at the time.

(b) Each CT secondary winding supplying a main meter shall be dedicated to Metering purposes only. Each CT secondary winding only supplying a check meter may be used for other purposes so long as such other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (f) below, and the TSO and the Relevant Meter Operator is notified of such other uses in accordance with sub-paragraph (g) below.

(c) Where a CT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way without obtaining the approval of the TSO and the Relevant Meter Operator in accordance with sub-paragraph (g) below.

(d) Common return leads for two or more CT secondary circuits are not permitted.

(e) Main and check meters must be connected to different CTs.

(f) The total burden on CTs shall not exceed their rating at the rated secondary current.

(g) Where any of the foregoing provisions of this paragraph 3.3.5 permit a modification to CT secondary circuits, provided that the approval of the TSO and the Relevant Meter Operator is sought for the modification, any such request must be made in writing to the TSO and the Relevant Meter Operator a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.5 and also to ensure there is no degradation of the accuracy required by paragraph 4.1.1.

3.3.6 Voltage Transformers

(a) Two VTs, or one VT with two or more secondary winding sets, to BS EN 61869-5 with a minimum standard of accuracy class 0.2 shall be provided for the metering of each circuit and shall also (to the extent applicable) meet any meter certification regulations in force at the time.

(b) Capacitor VTs shall have a working burden which provides for monitoring of the integrity of each fuse and which does not exceed the maximum rating or fall below the minimum rating stipulated by the relevant manufacturer.

(c) Each VT secondary winding supplying a main meter shall be dedicated to Metering purposes only. Each VT secondary winding only supplying a check

meter may be used for other purposes so long as other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (g) below and the TSO and the Relevant Meter Operator is notified of such other uses in accordance with sub-paragraph (h) below.

(d) Where a VT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way unless the approval of the TSO and the Relevant Meter Operator is obtained in accordance with sub-paragraph (h) below.

(e) Each meter suite shall be fed by a separate, fused set of leads from the VT.

(f) Main and check meters must be connected to different VTs. If the VT supplies other equipment, separate fusing must be provided for the Metering.

(g) The total burden on VTs shall not exceed their rating at the rated secondary voltages.

(h) Where any of the foregoing provisions of this paragraph 3.3.6 permit a modification to VT secondary circuits, provided that the approval of the TSO and the Relevant Meter Operator is sought for the modification, any such request must be made in writing to the TSO and the Relevant Meter Operator a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.6 and also to ensure there is no degradation of accuracy as required by paragraph 4.1.1.

3.3.7 Existing Installations

For existing installations, the installed instrument transformers may be used irrespective of their accuracy class providing the overall accuracy requirements as defined in paragraph 4.1 are met and also the following:

(i) in the event of a significant alteration to the primary plant (e.g. a switchgear change), new instrument transformers which comply with paragraphs 3.3.5 and 3.3.6 shall be provided;

(ii) separately fused VT supplies shall be provided for each of the following:

(a) the main meters;
(b) the check meters;
(c) any additional electrical burden.

3.3.8 Power Supplies

Metering shall be connected to assured power supplies. Where assured power supplies are not available voltage selection schemes shall be installed to support Metering.

3.4 Data Collection from Meter

3.4.1 The following is required:

(a) the meter must have a minimum of sixteen channels and be capable of storing the recorded demand Settlement Values during failure of the AC power supply;

(b) on demand from the central collection station the meter will transfer the recorded Settlement Values without loss or error. The Settlement Values must also be transferable manually using a portable collection device (personal computer/hand held unit/removable memory module etc) of a type compatible with the system used by the TSO;

(c) In the event of failure of communications with the central collection station the meter will be capable of storing a minimum of five channels of demand values per feeder for a minimum period of 1 month with an integrating period of 30 minutes. This 1 month period may reduce pro rata dependent on the notified demand period selected as described in paragraph 3.4.3 below. Access to the manual transfer facility will be secured, in accordance with the relevant Agreed Procedures, from unauthorised interference.

3.4.2 The settlement period shall be selectable over the following range: 30, 20, 15, 10, and 5 minutes and will be notified by the TSO. For any selectable value in this range one Settlement Period shall commence on the hour.

3.4.3 Monitoring facilities shall be provided for meter fault conditions and also to record instances of local interrogation access which changes data and also tagged wherever possible to the relevant Settlement Period(s). All the above conditions will be reported as, at minimum, a common alarm via the remote interrogation facility.

3.5 Data Collection System

3.5.1 Communications

The means of communication between the meter and the central collection station will be secured from interference, by the TSO and the Relevant Meter Operator, and of a type in accordance with Agreed Procedure 4. However, as technological changes take place this may change in the future and all points of interface shall be programmable to accommodate other equipment which may be used, as technology develops. The TSO will liaise with Users on such developments.

3.5.2 Central Collection Station

The TSO central collection station will interrogate each Meter. All the TSO operations carried out either manually or automatically shall be protected by a security system or by an operational log produced by the system or both. The TSO central collection station will synchronise the outstations during interrogation by interfacing with its own radio clock. Following receipt of all data from the outstation the kWh and kVArh lag and lead totals for each meter will be transferred by the TSO to a file for onward transmission to the TSO's centralised computing facilities.

3.5.3 Supply Voltage

Local and remote phase failure indications shall be provided.

3.6 Facilities

The metering equipment shall be capable of providing the following information locally from voltage free (clean contacts) outputs:

(a) impulsing for kWh and either kVAh or kVArh with a normal duration of 80ms per pulse; and

(b) a 30 minute reset pulse with a minimum duration of 0.5 second and a maximum duration of 10 seconds; and

(b) a synchronising signal for load switching.

4. MEASUREMENT CRITERIA

4.1 Accuracy

4.1.1 Overall Accuracy of Equipment

Meters shall be calibrated by the Approved Meter Manufacturer so as to achieve Overall Accuracy of Metering within the limits set out below. Calibration of meters shall be adjusted due to current and voltage transformer errors and/or errors due to lead electrical burdens but not for primary transformer losses. Paragraph 4.2.2 deals further with this issue.

(a) Active Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
120% to 10% inclusive	1.0	+/-0.5%
Below 10% to 5% inclusive	1.0	+/-0.7%
Below 5% to 1% inclusive*	1.0	+/-1.5%
120% to 10% inclusive	0.5 lag and 0.8 lead	+/-1.0%

*This requirement shall only apply where the energy transfers to be measured by the Import meter and/or the Export meter during normal operating conditions are such that the Rated Measuring Current will be below 5% (excluding zero) for periods equivalent to 10% or greater per annum.

(b) Reactive Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
120% - 10% inclusive	0	+/-4.0%
120% - 20% inclusive	0.866 lag and lead	+/-5.0%

4.1.2 Accuracy of Time Keeping

(a) The time keeping accuracy of metering equipment shall be maintained in accordance with Standard Time.

(b) The commencement of each Settlement Period shall be within 10 seconds of Standard Time.

(c) The duration of each Settlement Period shall be within +/- 0.1% of the required duration, except where synchronisation has occurred in a Settlement Period.

4.2 Compensation For Errors

4.2.1 Compensation for Instrument Transformer Errors

If necessary to achieve the overall accuracy requirements, compensation shall be made for errors of current and voltage transformers and/or lead electrical burdens, if possible, in the meter calibration.

4.2.2 Compensation for Power Transformer and Line Losses

Where the installed Metering location and the Point of Supply do not coincide then, where necessary, compensation for power transformer and/or line losses shall be provided to meet the overall accuracy at the boundary point defined in paragraph 3.2.2. Compensation shall be made in the Meter by the Approved Meter Manufacturer.

4.2.3 Where existing calibration records do not exist, a recalibration test shall be carried out where practicable. Values of compensation shall be recorded and evidence to justify the compensation criteria shall be made available for inspection, including, wherever possible, test certificates as required by MC8.6.1 and MC8.6.4.

5. CALIBRATION AND TESTING OF METERING

5.1 Meters

Meters shall be calibrated and tested in accordance with the requirements of Sub-Code No. 2.5 - "Sub-Code for the Calibration, Testing and Commissioning Requirements for Metering".

5.2 Current And Voltage Transformers

Measuring transformers shall be supplied with known characteristics within the requirements of paragraph 3.3 of this Sub-Code. No periodic recalibration is required.

5.3 Test Access To Metering Equipment

Sealable test terminal blocks shall be provided to facilitate meter testing and current and/or voltage transformer checks in situ. Test terminal blocks shall comply with BS EN 61010-1:1993/A2:1995 & BS EN 60950:1992/A11:1997.

5.4 Records

The results of all calibration tests and recalibration tests on meters carried out in accordance by the Approved Meter Manufacturer and records of all periodic checks or recalibrations shall be kept by the Relevant Meter Operator in accordance with MC8.6.1 and be available for inspection in accordance with MC8.6.4.

APPENDIX

LABELLING OF METERS FOR IMPORT AND EXPORT

1. ACTIVE ENERGY

Active Energy is considered to be Imported when it flows to the User System from the NI System. The meter(s) registering this Active Energy should be labelled "Import".

Active Energy is considered to be Exported when it flows from the User System to the NI System. The meter(s) registering this Active Energy should be labelled "Export".

Meters shall be labelled to distinguish between main and check meters.

2. REACTIVE ENERGY

Reactive Energy is considered to be Imported or Exported as follows:

Flow of active Energy	Power Factor	Flow of Reactive Energy
Import	Lagging	Import*
Import	Leading	Export*
Import	Unity	Zero
Export	Lagging	Export
Export	Leading	Import
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where Import for Active Energy is defined as in 1. above

SUB-CODE NO. 2.2

(FOR THE METERING OF CIRCUITS WITH A RATED CAPACITY EXCEEDING 10 MVA AND UP TO AND INCLUDING 100 MVA)

for the electricity industry in Northern Ireland

24 April 2024

MC - 493

SUB-CODE NO. 2.2 FOR THE METERING OF CIRCUITS WITH A RATED CAPACITY EXCEEDING 10 MVA AND UP TO AND INCLUDING 100 MVA

CONTENTS **PAGE**

1. SCOPE

1.1 This Sub-Code No. 2.2 specifies the metering facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with:

a) Suppliers in relation to their Customers;

b) Generating Units and PPMs.

1.2 This Sub-Code supplements the Main Code of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of this Sub-Code and the Main Code, the provisions of the Main Code shall prevail.

1.3 This Sub-Code should also be read in conjunction with any relevant Agreed Procedures and Schedule 7 of the Order.

1.4 This Sub-Code applies to circuits with a rated capacity which exceed 10 MVA and up to and including 100 MVA.

1.5 For the purposes of this Sub-Code, the criteria for a Customer supply (import active energy) to be over 10 MVA is that monthly maximum demand in each of the three months of the highest maximum demand on the NI System in each period of 12 consecutive months exceeds 10 MVA. For a new supply, a maximum demand is formally agreed between the customer and the TSO and this is periodically reviewed thereafter.

2. STANDARDS

2.1 All references to industry standards given in the text of this Sub-Code are to versions which are current at the Effective Date. However, Metering installed after the Effective Date is required to comply with the version of any such standard in force at the date of installation.

3. FACILITIES TO BE PROVIDED AT METERING POINTS

3.1 General

Although for clarity the specification identifies separate items of equipment, nothing in this Sub-Code prevents the items being combined to perform the same task provided the requirements of this Sub-Code are met.

3.2 Meters

3.2.1 For each circuit the following energy measurements are required at or in relation to the Point of Supply:

(a) Active Energy for Import (kWh) *;

(b) Active Energy for Export (kWh) *;

(c) Reactive Energy for Import and Export (kVArh).

* Subject to agreement of the TSO and the Relevant Meter Operator where system or plant conditions permit, either the
Import or Export quantities may be omitted.

3.2.2 The Registrant shall ensure that Metering for the above measurements shall normally be provided on the TSO side of the Point of Supply in order to measure required Settlement Values.

3.2.3 Active Energy Measurement (kWh)

Active Energy measurement shall meet the requirements of either BS EN/IEC 62053-22 Class 0.5S or BS EN/IEC 62053-11 Class 0.5.

3.2.4 Reactive Energy Measurement (kVArh)

Reactive Energy measurement shall meet the requirements of BS EN/ IEC 62053-23 Class 3.0.

3.2.5 The measurements will be produced using the outputs from current transformers and voltage transformers.

3.2.6 Each circuit will be provided with:

(a) main kWh and KVArh meter.; (b) check kWh and KVArh meter.;

The Import and/or Export of Active Energy and Reactive Energy are required to be measured at the same point, these functions will be combined in a single meter in which each energy flow is measured separately.

3.2.7 All meters shall be of an approved pattern or construction and, where appropriate, will be installed in an approved manner under paragraph 3 of Schedule 7 of the Order.

3.2.8 If direct measurement of the required values cannot be achieved, then the required values may be calculated using values measured at other points subject to prior agreement with the TSO and the Relevant Meter Operator and providing the overall accuracy meets the requirements of section 4.1. Where compensation is applied the values shall be recorded and supporting evidence shall be available to justify the compensation criteria.

3.2.9 Meters shall be labelled in accordance with the Appendix of this Sub-Code.

3.3 Instrument Transformers

3.3.1 The terms "current transformer" ("CT") and "voltage transformer" ("VT") used in this Sub-Code do not preclude the use of other measuring techniques with accuracies of the required standards providing the accuracy, and also the longer term accuracy, in accordance with this Sub-Code can be verified to the TSO's satisfaction.

3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the TSO's side of the Point of Supply.

3.3.3 Where CTs and/or VTs are used, they shall meet the requirements set out in paragraphs 3.3.5 and 3.3.6 below.

3.3.4 Where CTs and/or VTs are used then a test terminal block or equivalent facility shall be provided by the the Relevant Meter Operator close to the meter(s). This facility will be fitted with the Relevant Meter Operator seals and access granted by prior arrangement with the the Relevant Meter Operator on reasonable request.

3.3.5 Current Transformers

(a) One set of CTs to BS EN 61869-2 with a minimum standard of accuracy class 0.2S shall be provided per circuit and shall also meet (to the extent applicable) any meter certification regulations in force at the time.

(b) Each CT secondary winding supplying a main meter shall be dedicated to metering purposes only. Each CT secondary winding only supplying a check meter may be used for other purposes so long as such other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (f) below, and the TSO and the Relevant Meter Operator are notified of such other uses in accordance with sub-paragraph (g) below.

(c) Where a CT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way without obtaining the approval of the TSO in accordance with sub-paragraph (g) below.

(d) Common return leads for two or more CT secondary circuits are not permitted.

(e) Main and check meters must be connected to different CTs.

(f) The total burden on CTs shall not exceed their rating at the rated secondary current.

(g) Where any of the foregoing provisions of this paragraph 3.3.5 permit a modification to CT secondary circuits, provided that the approval of the TSO and the Relevant Meter Operator are sought for the modification, any such request must be made in writing to the TSO a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.5 and also to ensure there is no degradation of the accuracy required by paragraph 4.1.1.

3.3.6 Voltage Transformers

(a) One VT to BS EN 61869-5 with a minimum standard of accuracy class 0.5 shall be provided for the metering of each circuit and shall also (to the extent applicable) meet any meter certification regulations in force at the time.

(b) Capacitor VTs shall have a working burden which provides for monitoring of the integrity of each fuse and which does not exceed the maximum rating or fall below the minimum rating stipulated by the relevant manufacturer.

(c) Each VT secondary winding supplying a main meter shall be dedicated to metering purposes only. Each VT secondary winding only supplying a check meter may be used for other purposes so long as other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (g) below and the TSO and the Relevant Meter Operator are notified of such other uses in accordance with sub-paragraph (h) below.

(d) Where a VT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way unless the approval of the TSO and the Relevant Meter Operator are obtained in accordance with sub-paragraph (h) below.

(e) Each meter suite shall be fed by a separate, fused set of leads from the VT.

(f) Main and check meters must be connected to different VTs. If the VT supplies other equipment, separate fusing must be provided for the metering equipment.

(g) The total burden on VTs shall not exceed their rating at the rated secondary voltages.

(h) Where any of the foregoing provisions of this paragraph 3.3.6 permit a modification to VT secondary circuits, provided that the approval of the TSO and the Relevant Meter Operator are sought for the modification, any such request must be made in writing to the TSO and the Relevant Meter Operator a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.6 and also to ensure there is no degradation of accuracy as required by paragraph 4.1.1.

3.3.7 Existing Installations

For existing installations, the installed instrument transformers may be used irrespective of their accuracy class providing the overall accuracy requirements as defined in paragraph 4.1 are met and also the following:

(i) in the event of a significant alteration to the primary plant (e.g. a switchgear change), new instrument transformers which comply with paragraphs 3.3.5 and 3.3.6 shall be provided;

(ii) separately fused VT supplies shall be provided for each of the following:

(a) the main meter;
(b) the check meter;
(c) any additional electrical burden.

3.3.8 Power Supplies

Metering shall be connected to assured power supplies. Where assured power supplies are not available voltage selection schemes shall be installed to support Metering.

3.4 Data Collection from Meter

3.4.1 The following is required:

(a) the meter must have a minimum of sixteen channels and be capable of storing the recorded demand Settlement Values during failure of the AC power supply;

(b) on demand from the central collection station the meter will transfer the recorded Settlement Values without loss or error. The Settlement Values must also be transferable manually using a portable collection device (personal computer/hand held unit/removable memory module etc) of a type compatible with the system used by the TSO;

(c) In the event of failure of communications with the central collection station the meter will be capable of storing a minimum of five channels of demand values per feeder for a minimum period of 1 month with an integrating period of 30 minutes. This 1 month period may reduce pro rata dependent on the notified demand period selected as described in paragraph 3.4.3 below. Access to the manual transfer facility will be secured, in accordance with the relevant Agreed Procedures, from unauthorised interference.

3.4.2 The settlement period shall be selectable over the following range: 30, 20, 15, 10, and 5 minutes and will be notified by the TSO. For any selectable value in this range one Settlement Period shall commence on the hour.

3.4.3 Monitoring facilities shall be provided for meter fault conditions and also to record instances of local interrogation access which changes data and also tagged wherever possible to the relevant Settlement Period(s). All the above conditions will be reported as, at minimum, a common alarm via the remote interrogation facility.

3.5 Data Collection System

3.5.1 Communications

The means of communication between the meter and the central collection station will be secured from interference, by the TSO, and of a type in accordance with Agreed Procedure 4. However, as technological changes take place this may change in the future and all points of interface shall be programmable to accommodate other equipment which may be used, as technology develops. The TSO will liaise with Users on such developments.

3.5.2 Central Collection Station

The TSO central collection station will interrogate each meter. All the TSO operations carried out either manually or automatically shall be protected by a security system or by an operational log produced by the system or both. The TSO central collection station will synchronise the outstations during interrogation by interfacing with its own radio clock. Following receipt of all data from the outstation the kWh and

kVArh lag and lead totals for each meter will be transferred by the TSO to a file for onward transmission to the TSO's centralised computing facilities.

3.5.3 Supply Voltage

Local and remote phase failure indications shall be provided.

3.6 Facilities

The metering equipment shall be capable of providing the following information locally from voltage free (clean contacts) outputs:

(a) impulsing for kWh and either kVAh or kVArh with a normal duration of 80ms per pulse; and

(b) a 30 minute reset pulse with a minimum duration of 0.5 second and a maximum duration of 10 seconds; and

(c) a synchronising signal for load switching.

4. MEASUREMENT CRITERIA

4.1 Accuracy

4.1.1 Overall Accuracy of Equipment

Meters shall be calibrated by the Approved Meter Manufacturer so as to achieve Overall Accuracy of Metering within the limits set out below. Calibration of meters shall be adjusted due to current and voltage transformer errors and/or errors due to lead electrical burdens but not for primary transformer losses. Paragraph 4.2.2 deals further with this issue.

(a) Active Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
120% to 10% inclusive Below 10% to 5% inclusive 120% to 10% inclusive	1.0 1.0 0.5 lag and 0.8 lead	+/-1.0% +/-1.5% +/-2.0%

(b) Reactive Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
120% - 10% inclusive 120% - 20% inclusive	0 0.866 lag and lead	+/-4.0% +/-5.0%

4.1.2 Accuracy of Time Keeping

(a) The time keeping accuracy of metering equipment shall be maintained in accordance with Standard Time.

(b) The commencement of each Settlement Period shall be within 10 seconds of the Standard Time.

(c) The duration of each Settlement Period shall be within +/- 0.1% of the required duration, except where synchronisation has occurred in a Settlement Period.

4.2 Compensation For Errors

4.2.1 Compensation for Instrument Transformer Errors

Compensation shall be made for errors of current and voltage transformers and/or lead electrical burdens, if possible, in the meter calibration.

4.2.2 Compensation for Power Transformer and Line Losses

Where the installed Metering location and the Point of Supply do not coincide then, where necessary, compensation for power transformer and/or line losses shall be provided to meet the overall accuracy at the boundary point defined in paragraph 3.2.2. Compensation shall be made in the Meter by the Approved Meter Manfacturer.

4.2.3 Where existing calibration records do not exist, a recalibration test shall be carried out where practicable. Values of compensation shall be recorded and evidence to justify the compensation criteria shall be made available for inspection, including, wherever possible, test certificates as required by MC8.6.1 and MC8.6.4.

5. CALIBRATION AND TESTING OF METERING

5.1 Meters

Meters shall be calibrated and tested in accordance with the requirements of Sub-Code No. 2.5 - "Sub-Code for the Calibration, Testing and Commissioning Requirements for Metering".

5.2 Current And Voltage Transformers

Measuring transformers shall be supplied with known characteristics within the requirements of paragraph 3.3 of this Sub-Code. No periodic recalibration is required.

5.3 Test Access To Metering Equipment

Sealable test terminal blocks shall be provided to facilitate meter testing and current and/or voltage transformer checks in situ. Test terminal blocks shall comply with BS EN 61010-1:1993/A2:1995 & BS EN 60950:1992/A11:1997.

5.4 Records

The results of all calibration tests and recalibration tests on meters carried by the Approved Meter Manufacturer and records of all periodic checks or recalibrations shall be kept by the Relevant Meter Operator in accordance with MC8.6.1 and be available for inspection in accordance with MC8.6.4.

APPENDIX

LABELLING OF METERS FOR IMPORT AND EXPORT

1. ACTIVE ENERGY

Active Energy is considered to be Imported when it flows to the User System from the NI System. The meter(s) registering this Active Energy should be labelled "Import".

Active Energy is considered to be Exported when it flows from the User System to the NI System. The meter(s) registering this Active Energy should be labelled "Export".

Meters shall be labelled to distinguish between main and check meters.

2. REACTIVE ENERGY

Reactive Energy is considered to be Imported or Exported as follows:

Flow of active Energy	Power Factor	Flow of Reactive Energy
Import	Lagging	Import*
Import	Leading	Export*
Import	Unity	Zero
Export	Lagging	Export
Export	Leading	Import
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where Import for Active Energy is defined as in 1 above.

SUB-CODE NO. 2.3

(FOR THE METERING OF CIRCUITS WITH A RATED CAPACITY OF 70 KVA OR MORE AND UP TO AND INCLUDING 10 MVA)

for the electricity industry in Northern Ireland

24 April 2024

MC - 504

SUB CODE NO. 2.3 FOR THE METERING OF CIRCUITS WITH A RATED CAPACITY OF 70 KVA OR MORE AND UP TO AND INCLUDING 10 MVA

CONTENTS **PAGE**

1. SCOPE

1.1 This Sub-Code No. 2.3 specifies the metering facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with:

a) Suppliers in relation to their Customers;

b) Generating Units and PPMs.

1.2 This Sub-Code supplements the Main Code of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of this Sub-Code and the Main Code, the provisions of the Main Code shall prevail.

1.3 This Sub-Code should also be read in conjunction with any relevant Agreed Procedures and Schedule 7 of the Order.

1.4 This Sub-Code does not apply to circuits with a rated capacity of less than 70 kVA nor to circuits with a rated capacity greater than 10 MVA, and for such circuits metering arrangements shall meet the relevant Sub-Codes or where there are no applicable Sub-Codes, as agreed with the TSO and the Relevant Meter Operator, and shall be in accordance with Schedule 7 of the Order.

1.5 For the purposes of this Sub-Code, the criteria for a Customer supply (import active energy) to be over 10 MVA is that monthly maximum demand in each of the three months of the highest maximum demand on the NI System in each period of 12 consecutive months exceeds 10 MVA. For a new supply, a maximum demand is formally agreed between the customer and the TSO and this is periodically reviewed thereafter.

2. STANDARDS

2.1 All references to industry standards given in the text of this Sub-Code are to versions which are current at the Effective Date. However, Metering installed after the Effective Date is required to comply with the version of any such standard in force at the date of installation.

3. FACILITIES TO BE PROVIDED AT METERING POINTS

3.1 General

Although for clarity the specification identifies separate items of equipment, nothing in this Sub-Code prevents the items being combined to perform the same task provided the requirements of this Sub-Code are met.

3.2 Meters

3.2.1 For each circuit the following energy measurements are required at or in relation to the Point of supply:

(a) Active Energy for Import (kWh) *;

(b) Active Energy for Export (kWh) *;

(c) Reactive Energy for Import and Export (kVArh).

* Subject to agreement of the TSO and the Relevant Meter Operator where system or plant conditions permit, either the
Import or Export quantities may be omitted.

3.2.2 The Registrant shall ensure that Metering for the above measurements shall normally be provided on the TSO side of the Point of Supply in order to measure required Settlement Values.

3.2.3 Active Energy Measurement (kWh)

Active Energy measurement shall meet the requirements of either BS EN/IEC 62053-21 Class 1 or BS EN 50470-3 Class B or BS EN/IEC 62053-11 Class 1.

3.2.4 Reactive Energy Measurement (kVArh)

Reactive Energy measurement shall meet the requirements of BS EN/IEC 62053-23 Class 3.

3.2.5 The measurements will be produced using the outputs from current transformers and voltage transformers in the case of circuits given at voltages above 400 volts; in the case of circuits given at 400 volts or less than 400 volts, the measurement voltage will be 400 volts (line voltage)/230 volts (phase voltage).

3.2.6 Meters will be provided with pulse output.

3.2.7 All meters shall be of an approved pattern or construction and, where appropriate, will be installed in an approved manner under paragraph 3 of Schedule 7 of the Order.

3.2.8 If direct measurement of the required values cannot be achieved, then the required values may be calculated using values measured at other points subject to prior agreement with the TSO and the Relevant Meter Operator and providing the overall accuracy meets the requirements of section 4.1. Where compensation is applied the values shall be recorded and supporting evidence shall be available to justify the compensation criteria.

3.2.9 Where Import and/or Export of Active Energy and Reactive Energy is required to be measured at the same point, these functions may be combined in a single meter in which each energy flow is measured separately.

3.2.10 Meters shall be labelled in accordance with the Appendix of this Sub-Code.

3.3 Instrument Transformers

3.3.1 The terms "current transformer" ("CT") and "voltage transformer" ("VT") used in this Sub-Code do not preclude the use of other measuring techniques with accuracies of the required standards providing the accuracy, and also the longer term accuracy, in accordance with this Sub-Code can be verified to the TSO and the Relevant Meter Operator's satisfaction.

3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the TSO's side of the Point of Supply.

3.3.3 Where CTs and/or VTs are used, they shall meet the requirements set out in paragraphs 3.3.5 and 3.3.6 below.

3.3.4 Where CTs and/or VTs are used then a test terminal block or equivalent facility shall be provided close to the meter(s). This facility will be fitted with the Relevant Meter Operator's seals and access granted by prior arrangement with the Relevant Meter Operator on reasonable request.

3.3.5 Current Transformers

(a) Two sets of CTs to BS EN 61869-2 where appropriate with a minimum standard of accuracy class 0.2S shall be provided per circuit and shall also (to the extent applicable) meet any meter certification regulations in force at the time.

(b) Each CT secondary winding supplying a main meter shall be dedicated to metering purposes only. Each CT secondary winding only supplying a check meter may be used for other purposes so long as such other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (f) below, and the TSO and the Relevant Meter Operator is notified of such other uses in accordance with sub-paragraph (g) below.

(c) Where a CT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way without obtaining the approval of the TSO and the Relevant Meter Operator in accordance with sub-paragraph (g) below.

(d) Common return leads for two or more CT secondary circuits are not permitted.

(e) Main and check meters must be connected to different CTs.

(f) The total burden on CTs shall not exceed their rating at the rated secondary current.

(g) Where any of the foregoing provisions of this paragraph 3.3.5 permit a modification to CT secondary circuits, provided that the approval of the TSO and the Relevant Meter Operator is sought for the modification, any such request must be made in writing to the TSO a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.5 and also to ensure there is no degradation of the accuracy required by paragraph 4.1.1.

3.3.6 Voltage Transformers

(a) Two sets of VTs to BS EN 61869-5 with a minimum standard of accuracy class 0.5 shall be provided for the metering of each circuit and shall also (to the extent applicable) meet any meter certification regulations in force at the time.

(b) Capacitor VTs shall have a working burden which provides for monitoring of the integrity of each fuse and which does not exceed the maximum rating or fall below the minimum rating stipulated by the relevant manufacturer.

(c) Each VT secondary winding supplying a main meter shall be dedicated to metering purposes only. Each VT secondary winding only supplying a check meter may be used for other purposes so long as other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (g) below and the TSO is notified of such other uses in accordance with sub-paragraph (h) below.

(d) Where a VT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way unless the approval of the TSO and the Relevant Meter Operator is obtained in accordance with sub-paragraph (h) below.

(e) Each meter suite shall be fed by a separate, fused set of leads from the VT.

(f) Main and check meters must be connected to different VTs. If the VT supplies other equipment, separate fusing must be provided for the metering equipment.

(g) The total burden on VTs shall not exceed their rating at the rated secondary voltages.

(h) Where any of the foregoing provisions of this paragraph 3.3.6 permit a modification to VT secondary circuits, provided that the approval of the TSO and the Relevant Meter Operator is sought for the modification, any such request must be made in writing to the TSO and the Relevant Meter Operator a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.6 and also to ensure there is no degradation of accuracy as required by paragraph 4.1.1.

3.3.7 Existing Installations

For existing installations, the installed instrument transformers may be used irrespective of their accuracy class providing the overall accuracy requirements as defined in paragraph 4.1 are met and also the following:

(i) in the event of a significant alteration to the primary plant (e.g. a switchgear change), new instrument transformers which comply with paragraphs 3.3.5 and 3.3.6 shall be provided;

(ii) separately fused VT supplies shall be provided for each of the following:

(a) the main meter;
(b) the check meter;
(c) any additional electrical burden.

3.3.8 Power Supplies

Metering shall be connected to assured power supplies. Where assured power supplies are not available voltage selection schemes shall be installed to support Metering.

3.4

Data Collection from Meter

3.4.1 The following is required:

(a) the meter must have a minimum of sixteen channels and be capable of storing the recorded demand Settlement Values during failure of the AC power supply;

(b) on demand from the central collection station the meter will transfer the recorded Settlement Values without loss or error. The Settlement Values must also be transferable manually using a portable collection device (personal computer/hand held unit/removable memory module etc) of a type compatible with the system used by the TSO;

(c) In the event of failure of communications with the central collection station the meter will be capable of storing a minimum of five channels of demand values per feeder for a minimum period of 1 month with an integrating period of 30 minutes. This 1 month period may reduce pro rata dependent on the notified demand period selected as described in paragraph 3.4.3 below. Access to the manual transfer facility will be secured, in accordance with the relevant Agreed Procedures, from unauthorised interference.

3.4.2 The settlement period shall be selectable over the following range: 30, 20, 15, 10, and 5 minutes and will be notified by the TSO. For any selectable value in this range one Settlement Period shall commence on the hour.

3.4.3 Monitoring facilities shall be provided for meter fault conditions and also to record instances of local interrogation access which changes data and also tagged wherever possible to the relevant Settlement Period(s). All the above conditions will be reported as, at minimum, a common alarm via the remote interrogation facility.

3.5
Data Collection System

3.5.1 Communications

The means of communication between the meter and the central collection station will be secured from interference, by the TSO and the Relevant Meter Operator, and of a type in accordance with Agreed Procedure 4. However, as technological changes take place this may change in the future and all points of interface shall be programmable to accommodate other equipment which may be used, as technology develops. The TSO will liaise with Users on such developments.

3.5.2 Central Collection Station

The TSO central collection station will interrogate each meter. All the TSO operations carried out either manually or automatically shall be protected by a security system or by an operational log produced by the system or both. The TSO central collection station will synchronise the outstations during interrogation by interfacing with its own radio clock. Following receipt of all data from the outstation the kWh and kVArh lag and lead totals for each meter will be transferred by the TSO to a file for onward transmission to the TSO's centralised computing facilities.

3.5.3 Supply Voltage

Local and remote phase failure indications shall be provided.

3.6 Facilities

The metering equipment shall be capable of providing the following information locally from voltage free (clean contacts) outputs:

(a) impulsing for kWh and either kVAh or kVArh with a normal duration of 80ms per pulse; and

(b) a 30 minute reset pulse with a minimum duration of 0.5 second and a maximum duration of 10 seconds; and

(c) a synchronising signal for load switching.

4. MEASUREMENT CRITERIA

4.1 Accuracy

4.1.1 Overall Accuracy of Equipment

Meters shall be calibrated by the Approved Meter Manufacturer so as to achieve Overall Accuracy of Metering within the limits set out below. Calibration of meters shall be adjusted due to current and voltage transformer errors and/or errors due to lead electrical burdens. Paragraph 4.2.2 deals further with this issue.

(a) Active Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
100% to 20% inclusive	1.0	+/-1.5%
Below 20% to 5% inclusive	1.0	+/-2.5%
100% to 20% inclusive	0.5 lag and 0.8 lead	+/-2.5%

(b) Reactive Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
Current expressed as a percentage of rated measuring current	Power Factor	Limit of Error
100% - 20% inclusive	0	+/-4.0%
100% - 20% inclusive	0.866 lag and lead	+/-5.0%

4.1.2 Accuracy of Time Keeping

(a) The time keeping accuracy of metering equipment shall be maintained in accordance with Standard Time.

(b) The commencement of each Settlement Period shall be within 20 seconds of the Standard Time.

(c) The duration of each Settlement Period shall be within +/-0.1% of the required duration except where synchronisation has occurred in a Settlement Period.

4.2 Compensation For Errors

4.2.1 Compensation for Instrument Transformer Errors

Compensation shall be made for errors of current and voltage transformers and/or lead electrical burdens, if possible, in the meter calibration.

4.2.2 Compensation for Power Transformer and Line Losses

Where the installed Metering location and the Point of Supply do not coincide then, where necessary, compensation for power transformer and/or line losses shall be provided to meet the overall accuracy at the boundary point defined in paragraph 3.2.2. Compensation shall be made in the Meter by the Approved Meter Manufacturer.

4.2.3 Where existing records do not exist, a recalibration test shall be carried out where practicable. Values of compensation shall be recorded and evidence to justify the compensation criteria shall be made available for inspection, including, wherever possible, test certificates as required by MC8.6.1 and MC8.6.4.

5. CALIBRATION AND TESTING OF METERING

5.1 Meters

Meters shall be calibrated and tested in accordance with the requirements of Sub-Code No. 2.4 - "Sub-Code for the Calibration, Testing and Commissioning Requirements for Metering".

5.2 Current And Voltage Transformers

Measuring transformers shall be supplied with known characteristics within the requirements of paragraph 3.3 of this Sub-Code. No periodic recalibration is required.

5.3 Test Access To Metering Equipment

Sealable test terminal blocks shall be provided to facilitate meter testing and current and/or voltage transformer checks in situ. Test terminal blocks shall comply with BS EN 60947-7-1:2002.

5.4 Records

The results of all calibration tests and recalibration tests on meters carried out by the Approved Meter Manufacturer and records of all periodic checks or recalibrations shall be kept by the Relevant Meter Operator in accordance with MC8.6.1 and be available for inspection in accordance with MC8.6.4.

APPENDIX

LABELLING OF METERS FOR IMPORT AND EXPORT

1. ACTIVE ENERGY

Active Energy is considered to be Imported when it flows to the User's System from the NI System. The meter(s) registering this Active Energy should be labelled "Import".

Active Energy is considered to be Exported when it flows from the User's System to the NI System. The meter(s) registering this Active Energy should be labelled "Export".

Meters shall be labelled to distinguish between main and check meters.

2. REACTIVE ENERGY

Reactive Energy is considered to be Imported or Exported as follows:

Flow of Active Energy	Power Factor	Flow of Reactive Energy
Import	Lagging	Import*
Import	Leading	Export*
Import	Unity	Zero
Export	Lagging	Export
Export	Leading	Import
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where Import for Active Energy is defined as in 1. above.

SUB-CODE NO. 2.4

(FOR THE METERING OF CIRCUITS ASSOCIATED WITH AN AGGREGATED GENERATING UNIT)

for the electricity industry in Northern Ireland

24 April 2024

MC - 514

SUB CODE NO. 2.4 FOR THE METERING OF CIRCUITS ASSOCIATED WITH AN AGGREGATED GENERATING UNIT

CONTENTS **PAGE**

1. SCOPE

1.1 This Sub-Code No. 2.4 specifies the metering facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with Generating Units associated with an Aggregated Generating Unit.

1.2 This Sub-Code supplements the Main Code of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of this Sub-Code and the Main Code, the provisions of the Main Code shall prevail.

1.3 This Sub-Code should also be read in conjunction with any relevant Agreed Procedures and Schedule 7 of the Order.

1.4 This Sub-Code does not apply to circuits that are not associated with an Aggregated Generating Unit, and for such circuits metering arrangements shall meet the relevant Sub-Codes or where there are no applicable Sub-Codes, as agreed with the TSO and the Relevant Meter Operator, and shall be in accordance with Schedule 7 of the Order.

2. STANDARDS

2.1 All references to industry standards given in the text of this Sub-Code are to versions which are current at the Effective Date. However, Metering installed after the Effective Date is required to comply with the version of any such standard in force at the date of installation.

3. FACILITIES TO BE PROVIDED AT METERING POINTS

3.1 General

Although for clarity the specification identifies separate items of equipment, nothing in this Sub-Code prevents the items being combined to perform the same task provided the requirements of this Sub-Code are met.

3.2 Meters

3.2.1 For each circuit the following energy measurements are required at or in relation to the Point (or Points) of supply:

(a) Active Energy for Import (kWh) *;

(b) Active Energy for Export (kWh) *;

(c) Reactive Energy for Import and Export (kVArh).

* Subject to agreement of the TSO and the Relevant Meter Operator where system or plant conditions permit, either the
Import or Export quantities may be omitted.

3.2.2 The Registrant shall ensure that Metering for the above measurements shall normally be provided on the TSO side of the Point of Supply in order to measure required Settlement Values. Where Metering at the TSO side of Point of Supply is not possible, the generation shall be metered at a point agreed with the TSO and the Relevant Meter Operator.

3.2.3 Active Energy Measurement (kWh)

Active Energy measurement shall meet the requirements of either BS EN/IEC 62052-21 Class 2 or BS EN 50470-3 Class A of BS EN/IEC 62053-11 and BS 7856 Class 2.

3.2.4 Reactive Energy Measurement (kVArh)

Reactive Energy measurement shall meet the requirements of BS EN/IEC 62053-23 Class 3.

3.2.5 The measurements will be produced using the outputs from current transformers and voltage transformers in the case of circuits given at voltages above 400 volts; in the case of circuits given at 400 volts or less than 400 volts, the measurement voltage will be 400 volts (line voltage)/230 volts (phase voltage).

3.2.6 Meters will be provided with pulse output.

3.2.7 All meters shall be of an approved pattern or construction and, where appropriate, will be installed in an approved manner under paragraph 3 of Schedule 7 of the Order.

3.2.8 If direct measurement of the required values cannot be achieved, then the required values may be calculated using values measured at other points subject to prior agreement with the TSO and the Relevant Meter Operator and providing the overall accuracy meets the requirements of section 4.1. Where compensation is applied the values shall be recorded and supporting evidence shall be available to justify the compensation criteria.

3.2.9 Where Import and/or Export of Active Energy and Reactive Energy is required to be measured at the same point, these functions may be combined in a single meter in which each energy flow is measured separately.

3.2.10 Meters shall be labelled in accordance with the Appendix of this Sub-Code.

3.2.11 Only in cases where the Interested User has sufficiently demonstrated to the TSO and Relevant Meter Operator that it is impractical to fit both Main and Check Meters, Metering of a circuit associated with an Aggregated Generating Unit with only a Main Meter fitted will be acceptable. For clarity, the circuit itself must comply with all other aspects of this sub-code and the Grid Code.

3.3 Instrument Transformers

3.3.1 The terms "current transformer" ("CT") and "voltage transformer" ("VT") used in this Sub-Code do not preclude the use of other measuring techniques with accuracies of the required standards providing the accuracy, and also the longer term accuracy, in accordance with this Sub-Code can be verified to the TSO and the Relevant Meter Operator's satisfaction.

3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the TSO's side of the Point of Supply or, in the case where this is not possible, fitted at a Point agreed with the TSO and Relevant Meter Operator.

3.3.3 Where CTs and/or VTs are used, they shall meet the requirements set out in paragraphs 3.3.5 and 3.3.6 below.

3.3.4 Where CTs and/or VTs are used then a test terminal block or equivalent facility shall be provided close to the meter(s). This facility will be fitted with the Relevant Meter Operator's seals and access granted by prior arrangement with the Relevant Meter Operator on reasonable request.

3.3.5 Current Transformers

(a) One set of CTs to IEC:60044-1 BS7626:1993 where appropriate with a minimum standard of accuracy class 0.2S shall be provided per circuit and shall also (to the extent applicable) meet any meter certification regulations in force at the time.

(b) Each CT secondary winding supplying a main meter shall be dedicated to metering purposes only. Each CT secondary winding only supplying a check meter may be used for other purposes so long as such other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (f) below, and the TSO and the Relevant Meter Operator is notified of such other uses in accordance with sub-paragraph (g) below.

(c) Where a CT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way without obtaining the approval of the TSO and the Relevant Meter Operator in accordance with sub-paragraph (g) below.

(d) Common return leads for two or more CT secondary circuits are not permitted.

(e) W h e r e Main and check meters are fitted they must be connected to different

CTs.

(f) The total burden on CTs shall not exceed their rating at the rated secondary current.

(g) Where any of the foregoing provisions of this paragraph 3.3.5 permit a modification to CT secondary circuits, provided that the approval of the TSO and the Relevant Meter Operator is sought for the modification, any such request must be made in writing to the TSO a reasonable time in advance of the

modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.5 and also to ensure there is no degradation of the accuracy required by paragraph 4.1.1.

3.3.6 Voltage Transformers

(a) One VT to BS EN 61869-5 with a minimum standard of accuracy class 0.5 shall be provided for the metering of each circuit and shall also (to the extent applicable) meet any meter certification regulations in force at the time.

(b) Capacitor VTs shall have a working burden which provides for monitoring of the integrity of each fuse and which does not exceed the maximum rating or fall below the minimum rating stipulated by the relevant manufacturer.

(c) Each VT secondary winding supplying a main meter shall be dedicated to metering purposes only. Each VT secondary winding only supplying a check meter may be used for other purposes so long as other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (g) below and the TSO is notified of such other uses in accordance with sub-paragraph (h) below.

(d) Where a VT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way unless the approval of the TSO and the Relevant Meter Operator is obtained in accordance with sub-paragraph (h) below.

(e) Each meter suite shall be fed by a separate, fused set of leads from the VT.

(f) Main and check meters must be connected to different VTs. If the VT supplies other equipment, separate fusing must be provided for the metering equipment.

(g) The total burden on VTs shall not exceed their rating at the rated secondary voltages.

(h) Where any of the foregoing provisions of this paragraph 3.3.6 permit a modification to VT secondary circuits, provided that the approval of the TSO and the Relevant Meter Operator is sought for the modification, any such request must be made in writing to the TSO and the Relevant Meter Operator a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.6 and also to ensure there is no degradation of accuracy as required by paragraph 4.1.1.

3.3.7 Existing Installations

For existing installations, the installed instrument transformers may be used irrespective of their accuracy class providing the overall accuracy requirements as defined in paragraph 4.1 are met and also the following:

(i) in the event of a significant alteration to the primary plant (e.g. a switchgear change), new instrument transformers which comply with paragraphs 3.3.5 and 3.3.6 shall be provided;

(ii) separately fused VT supplies shall be provided for each of the following:

(a) the main meter;
(b) the check meter;
(c) any additional electrical burden.

3.3.8 Power Supplies

Metering shall be connected to assured power supplies. Where assured power supplies are not available voltage selection schemes shall be installed to support Metering.

3.4

Data Collection from Meter

3.4.1 The following is required:

(a) the meter must have a minimum of sixteen channels and be capable of storing the recorded demand Settlement Values during failure of the AC power supply;

(b) on demand from the central collection station the meter will transfer the recorded Settlement Values without loss or error. The Settlement Values must also be transferable manually using a portable collection device (personal computer/hand held unit/removable memory module etc) of a type compatible with the system used by the TSO;

(c) In the event of failure of communications with the central collection station the meter will be capable of storing a minimum of five channels of demand values per feeder for a minimum period of 1 month with an integrating period of 30 minutes. This 1 month period may reduce pro rata dependent on the notified demand period selected as described in paragraph 3.4.3 below. Access to the manual transfer facility will be secured, in accordance with the relevant Agreed Procedures, from unauthorised interference.

3.4.2 The settlement period shall be selectable over the following range: 30, 20, 15, 10, and 5 minutes and will be notified by the TSO. For any selectable value in this range one Settlement Period shall commence on the hour.

3.4.3 Monitoring facilities shall be provided for meter fault conditions and also to record instances of local interrogation access which changes data and also tagged wherever possible to the relevant Settlement Period(s). All the above conditions will be reported as, at minimum, a common alarm via the remote interrogation facility.

3.5
Data Collection System

3.5.1 Communications

The means of communication between the meter and the central collection station will be secured from interference, by the TSO and the Relevant Meter Operator, and of a type in accordance with Agreed Procedure 4. However, as technological changes take place this may change in the future and all points of interface shall be programmable to

accommodate other equipment which may be used, as technology develops. The TSO will liaise with Users on such developments.

3.5.2 Central Collection Station

The TSO central collection station will interrogate each meter. All the TSO operations carried out either manually or automatically shall be protected by a security system or by an operational log produced by the system or both. The TSO central collection station will synchronise the outstations during interrogation by interfacing with its own radio clock. Following receipt of all data from the outstation the kWh and kVArh lag and lead totals for each meter will be transferred by the TSO to a file for onward transmission to the TSO's centralised computing facilities.

3.5.3 Supply Voltage

Local and remote phase failure indications shall be provided.

3.6 Facilities

The metering equipment shall be capable of providing the following information locally from voltage free (clean contacts) outputs:

(a) impulsing for kWh and either kVAh or kVArh with a normal duration of 80ms per pulse; and

(b) a 30 minute reset pulse with a minimum duration of 0.5 second and a maximum duration of 10 seconds; and

(c) a synchronising signal for load switching.

4. MEASUREMENT CRITERIA

4.1 Accuracy

4.1.1 Overall Accuracy of Equipment

Meters shall be calibrated by the Approved Meter Manufacturer so as to achieve Overall Accuracy of Metering within the limits set out below. Calibration of meters shall be adjusted due to current and voltage transformer errors and/or errors due to lead electrical burdens. Paragraph 4.2.2 deals further with this issue.

(a) Active Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
100% to 20% inclusive	1.0	+/-1.5%
Below 20% to 5% inclusive	1.0	+/-2.5%
100% to 20% inclusive	0.5 lag and 0.8 lead	+/-2.5%

(b) Reactive Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
Current expressed as a percentage of rated measuring current	Power Factor	Limit of Error
100% - 20% inclusive	0	+/-4.0%
100% - 20% inclusive	0.866 lag and lead	+/-5.0%

4.1.2 Accuracy of Time Keeping

(a) The time keeping accuracy of metering equipment shall be maintained in accordance with Standard Time.

(b) The commencement of each Settlement Period shall be within 20 seconds of the Standard Time.

(c) The duration of each Settlement Period shall be within +/-0.1% of the required duration except where synchronisation has occurred in a Settlement Period.

4.2 Compensation For Errors

4.2.1 Compensation for Instrument Transformer Errors

Compensation shall be made for errors of current and voltage transformers and/or lead electrical burdens, if possible, in the meter calibration.

4.2.2 Compensation for Power Transformer and Line Losses

Where the installed Metering location and the Point of Supply do not coincide then, where necessary, compensation for power transformer and/or line losses shall be provided to meet the overall accuracy at the boundary point defined in paragraph 3.2.2. Compensation shall be made in the Meter by the Approved Meter Manufacturer.

4.2.3 Where existing records do not exist, a recalibration test shall be carried out where practicable. Values of compensation shall be recorded and evidence to justify the compensation criteria shall be made available for inspection, including, wherever possible, test certificates as required by MC8.6.1 and MC8.6.4.

5. CALIBRATION AND TESTING OF METERING

5.1 Meters

Meters shall be calibrated and tested in accordance with the requirements of Sub-Code No. 2.4 - "Sub-Code for the Calibration, Testing and Commissioning Requirements for Metering".

5.2 Current And Voltage Transformers

Measuring transformers shall be supplied with known characteristics within the requirements of paragraph 3.3 of this Sub-Code. No periodic recalibration is required.

5.3 Test Access To Metering Equipment

Sealable test terminal blocks shall be provided to facilitate meter testing and current and/or voltage transformer checks in situ. Test terminal blocks shall comply with BS EN 60947-7-1:2002

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5.4 Records

The results of all calibration tests and recalibration tests on meters carried out by the Approved Meter Manufacturer and records of all periodic checks or recalibrations shall be kept by the Relevant Meter Operator in accordance with MC8.6.1 and be available for inspection in accordance with MC8.6.4.

APPENDIX

LABELLING OF METERS FOR IMPORT AND EXPORT

1. ACTIVE ENERGY

Active Energy is considered to be Imported when it flows to the User's System from the NI System. The meter(s) registering this Active Energy should be labelled "Import".

Active Energy is considered to be Exported when it flows from the User's System to the NI System. The meter(s) registering this Active Energy should be labelled "Export".

Meters shall be labelled to distinguish between main and check meters.

2. REACTIVE ENERGY

Reactive Energy is considered to be Imported or Exported as follows:

Flow of Active Energy	Power Factor	Flow of Reactive Energy
Import	Lagging	Import*
Import	Leading	Export*
Import	Unity	Zero
Export	Lagging	Export
Export	Leading	Import
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where Import for Active Energy is defined as in 1. above

SUB-CODE NO. 2.5

(FOR THE CALIBRATION TESTING AND COMMISSIONING REQUIREMENTS OF METERING)

for the electricity industry in Northern Ireland

24 April 2024

MC - 525

SUB-CODE N0. 2.5 FOR THE CALIBRATION, TESTING AND COMMISSIONING REQUIREMENTS OF METERING

CONTENTS **PAGE**

1. SCOPE

1.1 This Sub-Code No. 2.5 specifies the requirements for the calibration, testing and commissioning of Metering covered by the Grid Code.

1.2 This Sub-Code defines the minimum requirements that must be met in all instances.

1.3 This Sub-Code states the practices that shall be employed, and the apparatus that shall be used for the calibration, testing and commissioning of Metering.

1.4 This Sub-Code specifies the frequency for both calibration and on-site accuracy tests.

1.5 This Sub-Code supplements the Main Code of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of this Sub-Code and the Main Code, the provisions of the Main Code shall prevail.

1.6 The obligations of the Registrant in respect of the requirements for calibration and testing under this Sub-Code, also extends to calibration and testing carried out on Metering by the Approved Meter Manufacturer.

1.7 The Approved Meter Manufacturer is responsible for calibration and certification of Meters, with the associated certificates kept on record by the Relevant Meter Operator.

1.8 The Relevant Meter Operator is responsible for carrying out all accuracy testing of Metering covered by the Grid Code with all Records made available to the TSO upon reasonable request to demonstrate compliance in accordance with section 12 of this sub-code. Any compliance issues identified by the Relevant Meter Operator should be discussed and resolved with the TSO.

2. STANDARDS

2.1 All references to industry standards given in the text of this Sub-Code are to versions which are current at the Effective Date.

2.2 Metering installed after the Effective Date is required to comply with the version of any such standard in force at the date of installation.

3. DEFINITIONS

In this Sub-Code No.2.5, the following terms have the following meanings:

3.1 AC/DC Transfer Standard

AC/DC Transfer Standard means a standard which has been verified at an Approved Meter Test Station and is used to verify AC Transfer Standards or Working Standards.

3.2 AC Transfer Standard

AC Transfer Standard means a standard which has been verified by comparison to a Reference Standard or an AC/DC Transfer Standard and is used for the calibration and testing of Metering.

3.3 Approved Meter Test Station

Apparatus used for calibrating a Working Standard. It has been calibrated annually by a laboratory that has been has been accredited by the United Kingdom Accreditation Service (UKAS), or an international laboratory recognized by UKAS for the measurement required, or any other laboratory approved by the Authority.

3.4 Mobile Standard

Mobile Standard means a Standard (i.e. AC Transfer Standard or Working Standard) which is used for on-site accuracy test purposes.

3.5 Reference Standard

Reference Standard means a standard whose measurement traceability to National Standards has been verified at an Approved Meter Test Station.

3.6 Reference Temperature

Reference Temperature means a stated temperature for any apparatus at which that apparatus has a known specification. If no temperature is stated the Reference Temperature is 23 degrees Celsius.

3.7 Working Standard

Working Standard means a Standard, including a complete meter testing system, which has been verified by comparison to either a Reference Standard or a Transfer Standard, and is used for the testing of Metering.

4. REFERENCE STANDARDS

4.1 Temperature tolerances

4.1.1 Reference Standards shall be maintained at the appropriate Reference Temperature within a tolerance of +/-2 degrees Celsius.

4.1.2 Save insofar as it is necessary to comply with the accuracy requirements of this Sub-Code, Reference Standard CTs and VTs need not be maintained at a Reference Temperature where it is impracticable.

4.2 Use

4.2.1 Where any Reference Standard is used for on-site accuracy testing it should be calibrated by the Relevant Meter Operator within a period that shall not exceed two months.

5. AC/DC TRANSFER STANDARDS

5.1 Temperature tolerance

5.1.1 AC/DC Transfer Standards shall be maintained at the appropriate Reference Temperature within a tolerance of +/-2 degrees Celsius.

5.2 Use

5.2.1 Where any AC/DC Transfer Standard is used for on-site accuracy testing it should be calibrated by the Relevant Meter Operator within a period that shall not exceed two months.

6. AC TRANSFER STANDARDS

6.1 Temperature tolerance

6.1.1 Save insofar as it is necessary to comply with the accuracy requirements of the Sub-Code, AC Transfer Standards need not be maintained at a given temperature.

6.2 Use

6.2.1 Where any AC Transfer Standard is used for on-site accuracy testing it should be calibrated by the Relevant Meter Operator within a period that shall not exceed two months.

6.3 Outside specification

6.3.1 When an AC Transfer Standard is tested and is found to be outside specification, the reason shall be investigated and the occurrence reported to the TSO within 3 working days of its discovery. The results of the investigation shall determine:

a) whether Metering tested using that Standard since its last satisfactory calibration complies with the relevant Sub-Code.

b) the reason why that AC Transfer Standard is outside its specification.

7. WORKING STANDARDS

7.1 Temperature tolerance

7.1.1 Save insofar as is necessary to comply with the accuracy requirements of this Sub-Code, Working Standards need not be maintained at a given temperature.

7.2 Use

7.2.1 Where any Working Standard is used for on-site accuracy testing it should be calibrated by the Relevant Meter Operator within a period that shall not exceed two months.

7.3 Outside specification

7.3.1 When a Working Standard is tested and is found to be outside specification, the reason shall be investigated and the occurrence reported to the TSO within 3 working days of its discovery. The results of the investigation shall determine:

a) whether Metering calibrated or tested using that Standard since its last satisfactory calibration complies with the relevant Sub-Code;

b) the reason why that Working Standard is outside its specification.

8. MOBILITY

8.1.1 Reference Standards and AC/DC Transfer Standards shall not be Mobile Standards and shall remain in one location as far as possible and only be moved for verification at an Approved Meter Test Station.

8.1.2 AC Transfer Standards and Working Standards may be Mobile Standards.

9. ACCURACY REQUIREMENTS FOR ON-SITE TESTING OF ELECTRICITY METERS

9.1 Meters shall be tested using standards complying with this Sub-Code to demonstrate compliance of such meters with the accuracy requirements of the Grid Code.

9.2 Overall uncertainty

The overall uncertainty of measurement during on-site accuracy test shall be calculated in accordance with the NAMAS directive NIS3003 and the Approved Meter Manufacturer recommendations allowing for all uncertainties in the chain of measurement from true value to the meter under test.

9.3 On-site accuracy tests

9.3.1 Meters shall be on-site tested to demonstrate that the overall accuracy is within the percentage error limit defined in the Approved Meter Manufacturer recommendations. The overall uncertainty of measurement of the on-site accuracy shall not exceed the limits referred to in the Approved Meter Manufacturer recommendations.

9.3.2 For any Meter an Active Energy on-site accuracy test may be performed by an injection test or at a prevailing load.

Where a prevailing load test is performed, the load used shall be between 10% and 120% (for whole current metering percentage relates to I_{max} and shall not exceed 100%) of meter rated current, at a power factor between 0.8 lead and 0.5 lag. Injection tests shall be performed between 5% and 120% (for whole current Metering percentage relates to I_{max} and shall not exceed 100%) of meter rated current, at unity power factor.

9.3.3 For any Meter, a Reactive Energy on-site accuracy test may be performed depending on conditions.

Injection tests shall be performed at between 20% and 120% (for whole current metering percentage relates to I_{max} and shall not exceed 100%) of meter rated current at zero power factor.

9.3.4 If any on-site accuracy test shows that the meter is outside the required error limits then either:

a) the meter shall be returned to the Approved Meter Manufacturer for re-testing or re- calibration; or

b) if it can be shown that the prevailing influence quantity conditions are sufficiently different to the reference conditions to have caused the meter to be outside of the required error limits then the meter may be left in operation only where these influence quantity conditions are temporary.

Records shall be maintained which record the calculations and observations to justify this and shall state that those influence quantities were temporary.

10. FREQUENCY OF TESTING OF METERING

10.1 Meters

10.1. Periodic Testing

(a) Replacement of Metering

Electronic Meters shall be replaced in line with Approved Meter Manufacturer recommendations and the Relevant Meter Operator's policies.

(b) On-Site Accuracy Tests

In addition to the requirements in (a) above, on-site accuracy tests shall be performed as follows:

For all main and check meters employed on a circuit on-site accuracy tests shall be performed on such meters at intervals not exceeding 5 years.

(c) Accuracy Requirement

The accuracy requirements for on-site tests are specified by the Approved Meter Manufacturer.

(d) If experience shows that a particular installation/meter type is not capable of sustaining its accuracy class for the specified period then the routine test for that meter/installation will be reviewed by the Relevant Meter Operator.

A test of accuracy will be carried out where:

(i) The Registrant of the meter believes that the meter is not performing to its required accuracy.

(ii) The TSO believes that the meter is not performing to its required accuracy.

(iii) The TSO is aware the Customer believes that the meter is not performing to its required accuracy.

10.2 Current And Voltage Transformers

Measuring transformers shall be supplied with electrical calibration load curves. Evidence shall be made available to the TSO, in the form of a test certificate, to show that the measurement transformers comply with their accuracy class. No periodic recalibration is required.

11. COMMISSIONING

11.1 A commissioning programme shall be performed on all new and replacement metering. The Relevant Meter Operator shall hold evidence in accordance with section 12 to confirm that, following its commissioning, that the metering equipment shall meet the requirements of this Sub-Code.

Appendix A sets out those tests and checks which are necessary as part of the commissioning programme.

11.2 At the completion of commissioning, metering equipment shall be sealed in accordance with the requirements of the appropriate Agreed Procedure.

12. RECORDS

The results of all calibration tests and recalibration tests on meters carried out by the Approved Meter Manufacturer and records of all periodic checks or recalibrations shall be kept in accordance with MC8.6.1 and be available for inspection in accordance with MC8.6.4.

APPENDIX A

Metering equipment shall have basic tests undertaken such as earthing, insulation, continuity and other tests which would normally be conducted in accordance with good industry practice as well as the following where appropriate;

1. Measurement transformers

(a) Confirm and record installed unit details including: Manufacturer, serial number, rating, accuracy class, ratio(s).

(b) Confirm CT ratio and polarity for selected tap.

(c) Confirm VT ratio and phasing for each winding.

NOTE: For (b) and (c) the confirmation shall include a visual inspection at the time of installation followed by either site measurements (e.g. injection tests) or a final visual inspection and check against drawings.

2. Measurement transformer leads and burdens

(a) Confirm cable/core connections are to schedule at the instrument transformers, the metering cubicles and at any other connection points.

(b) Establish and record the values of resistance for VT and CT leads by means of measurement or calculation.

(c) Record details (e.g. description, number etc) of any non-metering burden connected to VTs or CTs.

(d) Establish and record the value of the total burden on CTs and VTs.

(e) Establish and record any other burdens necessary to provide evidence of overall accuracy.

3. Metering Panel/Cubicle

3.1 General

(a) Record details of all installed equipment.

(b) Confirm that meter nameplate details agree with the measurement transformer details where appropriate.

(c) Confirm operation of meter test terminal blocks where appropriate.

(d) Confirm that meter registers advance and output pulses are produced for both Import and Export directions. Confirm separately meter operation for each phase current and for

normal balanced current operation. (These tests should check all cubicle wiring from the incoming terminal blocks.)

(e) Confirm the meter to outstation channel allocations and the meter units per pulse values. (f) Confirm that the local interrogation facility operates.

3.2 Site Tests

(a) Perform prevailing load checks after establishing that the phase rotation of the measurement voltage supply is correct at the panel or cubicle. Measure and record Active Energy and Reactive Energy for each circuit/meter, or from other available site instruments.

(b) Confirm that settlement instation can interrogate the outstation(s).

(c) Confirm operation of the metering equipment alarms such as phase imbalance/phase failure devices through to their final destination points.

SUB-CODE NO. 3

GENERATION OPERATIONAL METERING

for the electricity industry in Northern Ireland

24 April 2024

MC - 536

SUB-CODE NO. 3 FOR OPERATIONAL METERING FOR ACTIVE AND REACTIVE POWER

CONTENTS **PAGE**

1. **SCOPE**

(a) This Sub-Code No. 3 specifies the facilities that shall be provided and the certain practices that shall be employed, for monitoring output and response of Power Stations and Generating Units and for control of the Transmission System.

(b) This Sub-Code supplements the Main Code of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of this Sub-Code and the Main Code, the provisions of the Main Code shall prevail.

(c) This Sub-Code should also be read in conjunction with any relevant Agreed Procedures.

(d) The need for Operational Metering is optional at points of generation for Generating Units or PPMs with Contracted Capacities or Registered Capacities, as the case may be, between 2 **MW** and 5 **MW** and will be the subject of discussion with the TSO. Operational Metering is generally not required for Generating Units or PPMs with Contracted Capacities or Registered Capacities, as the case may be, below 2 **MW**.

2. **STANDARDS**

(a) All references to industry standards given in the text of this Sub-Code are to versions which are current at the Effective Date. Where Operational Metering is in use at the Effective Date which was installed when earlier versions of these standards (or their predecessors) were in force there is no requirement to update such Operational Metering unless expressly required pursuant to this Sub-Code.

(b) Operational Metering installed after the Effective Date is required to comply with the version of any such standard in force at the date of installation.

3. **FACILITIES TO BE PROVIDED**

3.1. Operating Characteristics

The TSO shall have the right to install Operational Metering so as to provide operational information in relation to each Generating Unit and each Power Station:

(i) as is set out in Appendix A to this Sub-Code;

(ii) not used; and

(iii) any additional data as may be agreed between the TSO and the relevant Interested User as is specified in the relevant Connection Agreement.

3.2. Current Transformers

Current transformers installed after the Effective Date shall comply with:

i) for circuits with a rated capacity exceeding 100 MVA, a minimum accuracy of class 0.2S to BS7626/HD553S1;

ii) for circuits with a rated capacity exceeding 1 MVA and up to and including 100 MVA, a minimum accuracy of class 0.2 to BS7626/HD553S1.

Each current transformer secondary winding may be used for purposes other than those associated with Operational Metering so long as such other uses do not degrade the accuracy outside the limits specified in section 4.1.1.

3.3. Voltage Transformers

Voltage transformers installed after the Effective Date shall comply with:

i) for circuits with a rated capacity exceeding 100 MVA, a minimum accuracy of class 0.2 to BS7625/HD554S1;

ii) for circuits with a rated capacity exceeding 1 MVA and up to and including 100 MVA, a minimum accuracy of class 0.5 to BS7625/HD554S1.

Each voltage transformer secondary winding may be used for purposes other than those associated with Operational Metering so long as such other uses do not degrade the accuracy outside the limits specified in section 4.1.1.

3.4 Event Recorders

Event Recorders shall be as specified from time to time by the TSO. Each operational characteristic required to be recorded on Event Recorders shall be recorded on a separate data channel.

During normal operations, the Event Recorder shall scan each input channel at a frequency to be specified by the TSO but not less than once every 0.1 seconds. During a Frequency Transient, the Event Recorder shall scan each input channel at a higher frequency to be specified by the TSO but not less than 50 times per second for a period of 30 seconds after commencement of the transient.

The Event Recorder shall store all scanned information for a minimum period of 2 weeks. Provisions for access to such data shall include the production of printed data reports. Access to such data shall be available to the Generator.

3.5 Power Supplies

Operational Metering at Power Stations shall be connected to assured power supplies. Where assured power supplies are not available, voltage selection schemes shall be installed to support Operational Metering.

4. MEASUREMENT CRITERIA

4.1 Accuracy

4.1.1 Overall Accuracy of Equipment

Metering shall be calibrated, so as to achieve overall accuracy of Operational Metering within the limits set out below. Calibration of Metering shall be adjusted due to current and voltage transformer errors and/or errors due to Generator Circuits (see 4.2).

4.1.1.1 Active Power Measurement

(a) For circuits with a rated capacity exceeding 100 MVA

Conditions of test	**Limits of Error at Power Factor Under System Balanced Conditions**	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
120% to 10% inclusive Below 10% to 5% inclusive 120% to 10% inclusive	1.0 1.0 0.5 lag and 0.8 lead	± 0.5% ± 0.7% ± 1.0%

(b) For circuits with a rated capacity exceeding 1 MVA and up and including 100 MVA

Conditions of Test	**Limits of Error at Power Factor Under System Balanced Conditions**	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
120% to 10% inclusive Below 10% to 5% inclusive 120% to 10% inclusive	1.0 1.0 0.5 lag and 0.8 lead	± 1.0% ± 1.5% ± 2.0%

4.1.1.2 Power Measurement

Conditions of Test	**Limits of Error at Power Factor Under System Balanced Conditions**	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
120 to 10% inclusive 120 to 20% inclusive	0 0.866 lag and lead	± 4.0% ± 5.0%

4.1.2 Accuracy of Time Keeping

The time keeping accuracy of Operational Metering shall be maintained in accordance with Standard Time.

4.1.3 Other Measurements:

Overall Accuracy requirements for all other electrical and non-electrical parameters shall be as determined by the TSO with the agreement of the Authority after consultation with all Interested Users and those other Parties who are, in the reasonable opinion of the TSO, interested.

4.2 Compensation for Current and Voltage Transformer Errors and Generator Circuit Errors

Compensation shall be made for errors of current and voltage transformers and/or Generator Circuits. The amount of such compensation shall be agreed between the TSO and the Interested User. Where existing calibration records do not assist, a recalibration test shall be carried out where practicable.

5. CALIBRATION AND TESTING OF EQUIPMENT

5.1 (i) Initial Calibration

Operational Metering shall be calibrated in accordance with manufacturers' recommendations. Compensation shall be applied to take account of current and voltage transformer errors and errors due to Generator Circuits in accordance with 4.2 above.

(ii) Periodic Calibration

Operational Metering shall be tested no less frequently than once every 5 years or such period as otherwise agreed between the TSO and the Interested User from time to time having regard to an acquired knowledge of the performance of the particular design of Operational Metering.

Operational Metering shall be recalibrated following any adjustment or test.

5.2 Test Access to Metering Equipment

Test terminal blocks in accordance with Electricity Association Technical (EAT) Specification 50-18 shall be provided to facilitate Operational Metering testing and/or current and voltage transformer checks in situ. Non-electrical parameters shall be tested in situ as agreed between the TSO and the relevant Interested User.

5.3 Records

The results of all calibration tests and recalibrations on Operational Metering and all periodic checks or recalibrations shall be kept in accordance with MC8.6.1 and where used for the purposes of the relevant PPA shall be available for inspection in accordance with MC8.6.4.

APPENDIX A

PART 1

OPERATIONAL
AVR Status
Tap Position
Gen Tx Tap Change
AVR Set Point
Load Controllers
ALARMS
Neg. Phase Seq. Op
Field Fail Op
Turbine Trip
Boiler Trip
Trans Diff Op
Trans REF Op
Trans SBEF Op
Trans Rev Power Op
Buch Surge Op
Buch Gas Op
WT Trip Op
WT Alarm Op
Trip Relay Op
Generational Red. Ah
ENHANCED MODEL
Volts
Frequency

MWatts
MVAr

AGREED PROCEDURE NO. 1

MAINTENANCE, TESTING, INSPECTION AND SEALING OF TARIFF METERING (GENERATION) AND GENERATOR CIRCUITS

for the electricity industry in Northern Ireland

24 April 2024

MC - 546

AGREED PROCEDURE No. 1

MAINTENANCE, TESTING, INSPECTION AND SEALING OF TARIFF METERING (GENERATION) AND GENERATOR CIRCUITS

Contents **Page**

1. SCOPE OF PROCEDURE

1.1 This Agreed Procedure (the "Procedure") outlines the responsibilities of the TSO, the Relevant Meter Operator and the Interested User with regard to notification, authorisation and witnessing of the breaking and replacement of seals on generation Tariff Metering and Generator Circuits and the carrying out of routine and emergency maintenance, testing and calibration. The procedure assumes the initial placement of seals by the appropriate Parties in accordance with the Main Code.

1.2 The Procedure supplements the Main Code and the Sub-Codes of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of the Procedure and the Main Code or a Sub-Code the provisions of the Main Code or such Sub-Code shall prevail. The provisions of the Main Code shall prevail over the provisions of any Sub-Code.

1.3 The Procedure is part of the Grid Code and terms and expressions defined in the Grid Code have the same meaning in the Procedure.

2. USE OF THE PROCEDURE

2.1 The Procedure is to be used by the TSO, the Relevant Meter Operator and Interested User staff to ensure that the breaking and replacement of seals and the carrying out of routine and emergency maintenance, testing and calibration on generation Tariff Metering and Generator Circuits is correctly authorised and witnessed and that documentary evidence is available to that effect.

2.2 Where it is not possible to gain prior authorisation for the breaking of a seal necessitated by malfunctioning of both main and check meters on a circuit, fire or similar hazard or non-compliance by a Party with its obligations under the Main Code authorisation should be sought as soon as possible after the event.

3. AMENDMENTS TO FORMS

Forms set out in the Appendices to this Procedure may be amended from time to time by the TSO and the Relevant Meter Operator upon reasonable notice to all Interested Users. The TSO and the Relevant Meter Operator shall also take into account reasonable comments of Interested Users.

4. **INTERFACE AND TIMETABLE INFORMATION**

Section: MAINTENANCE, TESTING, INSPECTION AND SEALING OF TARIFF METERING (GENERATION) AND GENERATOR CIRCUITS

Subject: Interface and Timetable Information - Maintenance, Testing, Inspection, Calibration and Sealing of Metering

REF	WHEN	ACTION	FROM/BY	TO	METHOD
EITHER:					
1a	Routine Inspection, Maintenance, Testing & Calibration				
	At least 5 days prior to carrying work out	Notify date, time, work required, estimated duration and request breaking of seals (as necessary)	TO or Interested User	Interested User or TO	Email on standard form (Appendix A)
OR:					
1b	Inspection, Maintenance, Testing and Calibration in an Emergency				
	At the earliest opportunity	Notify, date, time, place, work required, estimated duration and request breaking of seals (as necessary)	TO or Interested User	Interested User or TO	Email on standard form (Appendix A) or verbally
2	Prior to work being carried out (Note 1)	Grant permission to break seals (as appropriate) and notify as to attendance	Interested User or TO	TSO or Interested User	Email on standard form (Appendix A) or verbally
3	Day work carried out	Record meter readings prior to seals being broken and commencing work	TO or Nominated Party		Manual record (Appendix B)

4. **INTERFACE AND TIMETABLE INFORMATION**

Section: MAINTENANCE, TESTING, INSPECTION AND SEALING OF TARIFF METERING (GENERATION) AND GENERATOR CIRCUITS

Subject: Interface and Timetable Information - Maintenance, Testing, Inspection, Calibration and Sealing of Metering

REF	WHEN	ACTION	FROM/BY	TO	METHOD
4a	Day work carried out	Carry out required work. Record details of work done	TO or Interested User		Manual record (Appendix A)
4b	Where possible	Witness work being carried out	Interested User or TO		
5	After work completed	Apply own seals and read meters	TSO and Interested User		
6	After work completed	Check accuracy of manual record and sign to confirm work completed and seal applied	TO and Interested User		Manual record (Appendix A)
7	After work completed	Record meter readings	TO or Interested User		Manual record (Appendix B)

4. **INTERFACE AND TIMETABLE INFORMATION**

Section: MAINTENANCE, TESTING, INSPECTION AND SEALING OF TARIFF METERING (GENERATION) AND GENERATOR CIRCUITS

Subject: Interface and Timetable Information - Maintenance, Testing, Inspection, Calibration and Sealing of Metering

REF	WHEN	ACTION	FROM/BY	TO	METHOD
8	After work completed	Copy meter record sheet and work sheet and issue to other party	TO or Interested User	Interested User or TO	By hand

Note 1 In an emergency situation when it is impossible to contact the TSO, the Relevant Meter Operator or the Interested User, it may be necessary to break seals prior to the granting of permission. An emergency situation is defined by the Main Code as when "both main and check meters are malfunctioning or there occurs a fire or other similar hazard and such removal (of seals) is essential". In such circumstances email or other communication of the intent to break seals will be supplied to the TSO, the Relevant Meter Operator or Interested User prior to the commencement of emergency work. The authorisation procedure to break seals must be followed retrospectively. In an emergency situation when it is impossible to await the required paperwork, verbal consent may be given. In such circumstances written consent must follow forthwith.

APPENDIX A

REQUEST TO BREAK SEALS

TO:

[TSO/Interested User]
Date: [ ]
Tel: [ ]
Email: [ ]

INTERESTED USER:_____ SERIAL NO:

DETAILS OF WORK TO BE CARRIED OUT:

We request permission to carry out the work described below and to break such seals as are necessary. We estimate the duration of the work to be from [ ] to [ ]. The work is to be carried out at [Site] by [ ].

The description of the work is as follows: _____

_____

_____

The circuits and meters to be affected are as follows:

CIRCUIT/METER ID	COMMENTS

FROM:

Name _____ Signature

Position _____ Date

Continued .....

COMMENTS OF RECIPIENTS:

We acknowledge receipt of your request dated [ ]. We hereby [give/withhold]* consent. Our reasons for withholding consent are [ ]. Our representative dealing with sealing is [ ]. He will/will not be attending when the work is carried out.

BY:

Name _____ Signature
Position _____ Date

CONFIRM COMPLETION OF WORK AND SEALS APPLIED:

DESCRIPTION OF COMPLETED WORK: _____

_____

_____

CONFIRMATION OF SEALING: _____ (TSO)

Name _____ Signature

Position _____ Date

(INTERESTED USER)

Name _____ Signature

Position _____ Date

[* Delete as appropriate]

SHEET: ____ OF
SERIAL NO: _____

APPENDIX B

METER RECORD SHEET

INTERESTED USER :

SITE NAME :

METER ID : _____

READING DATE :

READING TIMES : START :
FINISH :

FUNCTION	MAIN METER		CHECK METER	
	BEFORE	**AFTER**	**BEFORE**	**AFTER**
MWh EXPORT				
MWh IMPORT				
MVAr EXPORT				
MVAr IMPORT				

	RECORDER	INTERESTED USER WITNESS
NAME		
SIGNATURE		
DATE		
COMPANY		
ACTING FOR		

AGREED PROCEDURE NO. 2

METER ADVANCE RECONCILIATION (GENERATION)

for the electricity industry in Northern Ireland

AGREED PROCEDURE No. 2

24 April 2024

MC - 555

METER ADVANCE RECONCILIATION (GENERATION)

Contents **Page**

1 SCOPE OF THE AGREED PROCEDURE

1.1 This Agreed Procedure (the "Procedure") covers the collection and processing of tariff meter readings which are taken once every six months pursuant to MC8.8 and the reconciliation of such meter readings with Settlement Values collected electronically and stored on the Data Collection System. This reconciliation is achieved by comparing the remotely read meter register readings with the accumulations recorded in the Data Collection System. Financial adjustments are then made pursuant to the terms of the PPA by use of the Meter Reconciliation Statement.

1.2 The Procedure seeks to ensure that any discrepancy between tariff meter register readings and Settlement Values collected electronically from such meters is identified on a regular basis such that appropriate adjustments to payments can be made.

1.3 The Procedure supplements the Main Code and the Sub-Codes of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of the Procedure and the Main Code or a Sub-Code the provisions of the Main Code or such Sub-Code shall prevail. The provisions of the Main Code shall prevail over the provisions of any Sub-Code.

1.4 The Procedure is part of the Grid Code and terms and expressions defined in the Grid Code have the same meaning in the Procedure.

2 USE OF THE PROCEDURE

The Procedure shall be used by the TSO and Interested User staff who are responsible for meter advance reconciliation readings and processing.

3. AMENDMENTS TO PROFORMAS AND EXAMPLES

Proformas and examples set out in the Appendices to this Procedure may be amended from time to time by the TSO upon reasonable notice to all Interested Users. The TSO shall also take into account reasonable comments of Interested Users.

4 **INTERFACE AND TIMETABLE INFORMATION**

Section: METER ADVANCE RECONCILIATION (GENERATION)

Subject: Interface and Timetable Information - Reconciliation of Meter Readings with Accumulated Settlement Values

REF	WHEN	ACTION	FROM/BY	TO	METHOD
1	Annually	Setup the data collection system to remotely read the registers of all relevant meters at the selected date and time interval, at intervals not exceeding 6 months. Configure the meter register comparison process within the TSO Data Collection System to account for any new meters.	TSO		Data Collection System

Section: METER ADVANCE RECONCILIATION (GENERATION)

Subject: Interface and Timetable Information - Reconciliation of Meter Readings with Accumulated Settlement Values

REF	WHEN	ACTION	FROM/BY	TO	METHOD
2	Once every 6 months	(i) Configure the meter register comparison process within the TSO Data Collection System. (ii) Run meter register comparison process which compares the difference between the latest actual and the previous actual reading with the electronically recorded total delivered energy for the known time interval. (iii) Save a soft copy of the meter register comparison report from the TSO Data Collection System for all relevant meters (This may be in the form of secure PDF).	TSO		Data Collection System
EITHER:					
3a	Within 5 Business Days of completing process	Analyse results, where the relevant meter register comparison difference of less than 0.1%: - Sign off report and store in relevant location.	TSO		Email
OR:					
3b	Within 5 Business Days of completing process	Where meter register comparison report shows a difference as described in Appendix C: - prepare a Meter Reconciliation Statement and discuss with TO. Where an issue has been identified inform the Interested User, sending them copies of the relevant meter register comparison reports	TSO	TO / Interested User	

Section: METER ADVANCE RECONCILIATION (GENERATION)

Subject: Interface and Timetable Information - Reconciliation of Meter Readings with Accumulated Settlement Values

REF	WHEN	ACTION	FROM/BY	TO	METHOD
4a	Within 14 Business Days of receipt of Meter Reconciliation Statement	Review Meter Reconciliation Statement and either: (i) advise the TSO that the Meter Reconciliation Statement is agreed OR (ii) discuss areas of concern with the TSO, providing supporting evidence as necessary	Interested User	TSO	
4b		Where revisions to the initial Meter Reconciliation Statement are agreed, prepare a replacement Meter Reconciliation Statement and issue to Interested User	TSO	Interested User	Email
5a	On or before 15th Business Day after receipt of Meter Reconciliation Statement	Where the Meter Reconciliation Statement is agreed, indicate agreement on form and sign and return to the TSO	Interested User	TSO	Email
5b		Where the Meter Reconciliation Statement is disputed, indicate non-agreement on form and sign and return to the TSO. Immediately thereafter raise a formal dispute as per the Disputes Procedure of the relevant PPA or SEMO.	Interested User	TSO	Email

Section: METER ADVANCE RECONCILIATION (GENERATION)

Subject: Interface and Timetable Information - Reconciliation of Meter Readings with Accumulated Settlement Values

REF	WHEN	ACTION	FROM/BY	TO	METHOD
9	Within 14 days of receipt of agreed Meter Reconciliation Statement	Issue invoice for agreed payment adjustment	Interested User	TSO	As per PPA
10	Within 14 days of receipt of invoice	Make payment	Interested User or TSO	TSO or Interested User	BACS

APPENDIX A

EXAMPLE OF METER REGISTER COMPARISON REPORT

Generation Metering Reconciliation Statement

Meter Group WF_Name

Time From 01.01.2020 00:00
Time To 01.07.2020 12:00

Meter Name	Meter Reading	Date Time First Reading	Date Time Last Reading	Factor	Energy Read Meter (MWh)	Energy Acquired (MWh)	Difference abs (MWh)	Difference %
WF_Name_Main								
ActiveImport	AI_MeterCheck	01.01.2020 08:30 **3 000.000**	01.07.2020 08:30 **3 010.000**	**1.000**	**10.000**	**10.000**	**0.000**	**0.01 %**
ActiveExport	AE_MeterCheck	01.01.2020 08:30 **500 100.000**	01.07.2020 08:30 **515 400.000**	**1.000**	**15 300.000**	**15 300.000**	**0.000**	**0.00 %**
WF_Name_Check								
ActiveImport	AI_MeterCheck	01.01.2020 08:30 **3 001.000**	01.07.2020 08:30 **3 011.000**	**1.000**	**10.000**	**10.000**	**0.000**	**0.00 %**
ActiveExport	AE_MeterCheck	01.01.2020 08:30 **499 900.000**	01.07.2020 08:30 **515 199.000**	**1.000**	**15 299.000**	**15 299.000**	**0.000**	**0.00 %**

Main vs. Check Meter Comparison On Export MWh	Export MWH Difference	Comments
WF_Name		
0.01%	1.00	OK

Summary	Comparison checks on these meters individually and main v check comparison complies with meter code tolerances.
Checked By	[Insert Name], System Integrity Engineer
Date	02/07/2020
Next Check Due	Jan-21

APPENDIX B

METER ADVANCE RECONCILIATION STATEMENT

SITE NAME: _____ READING DATE:

INTERESTED USER: _____ SERIAL NO:

SETTLEMENT VALUE AFFECTED:

	Difference Recorded in Meter Register Comparison Report MWh
Metering Point (as appropriate)	
Generator Gross Meter Generator Transformer Meter Unit Transformer Meter Station Transformer Meter	
Net Settlement Value Adjustment MWh	

Associated primary transformer losses are ignored in establishing the Net Settlement Value Adjustment

For TSO:

Signed: _____ Name:
(in block capitals)

Position:

Date:

For Interested **User**:

Signed: _____ Name:
(in block capitals)

Position:

Date: _____ AGREED/DISAGREED (Delete as appropriate)

APPENDIX C

METER ADVANCE RECONCILIATION TOLERANCES

The acceptance limit for the Meter Advance Reconciliation between the main meter register values and settlement values for the corresponding period shall be within a tolerance of ± 0.1%.

Allowance shall be made for the possible variance in the meter reading time and the corresponding half hour point, and that a reasonable advance has occurred over the period considered.

A main and check meter advance comparison shall be undertaken and the tolerance shall be within ± 0.15%.

AGREED PROCEDURE NO. 3

SETTLEMENT VALUES ESTIMATION (GENERATION)

for the electricity industry in Northern Ireland

24 April 2024

MC - 573

AGREED PROCEDURE No.3

SETTLEMENT VALUES ESTIMATION (GENERATION)

Contents **Page**

1. SCOPE OF PROCEDURE

1.1 This Agreed Procedure (the "Procedure") describes the key interfaces and timetable responsibilities of the TSO and the Interested User for agreeing the appropriate Settlement Values required for insertion into the Data Collection System when Settlement Values (or their constituent meter values) submitted via the normal data collection methods are believed to be incorrect or missing save in the case of Meter Advance Reconciliation which is dealt with in Agreed Procedure No. 2.

1.2 The Procedure only applies to generation Tariff Metering. For a given Connection Site/meter for a Business Day, it covers the following:

- notification of missing or incorrect Settlement Values
- determination of substitute values from check meters, by retrieval of local Settlement Values at the Meter or by estimation; and
- agreement and confirmation of Settlement Values to be used in the Confirmation Statement.

1.3 The Procedure excludes a procedure in the event that the TSO and the Interested User fail to agree estimated Settlement Values and Settlement Values in the event of a discrepancy between main and check meters. This would be the basis of a dispute and be dealt with in accordance with the Disputes Procedure as provided for in the MC.

1.4 The Procedure supplements the Main Code and the Sub-Codes of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of the Procedure and the Main Code or a Sub-Code the provisions of the Main Code or such Sub-Code shall prevail. The provisions of the Main Code shall prevail over the provisions of any Sub- Code.

1.5 The Procedure is part of the Grid Code and terms and expressions defined in the Grid Code have the same meaning in the Procedure.

2. USE OF THE PROCEDURE

The Procedure shall be used by the TSO and Interested User staff who are responsible for collection/submission of and agreement of the appropriate Settlement Values.

3 DETERMINATION OF SETTLEMENT VALUES

When a Settlement Value collected by the Data Collection System is incorrect or is missing, save in the case of Meter Advance Reconciliation, a substitute Settlement Value shall be determined by one of the following methods, in order of priority:

3.1 Retrieval

3.1.1 Data link transmission failure

In the event of a failure in the Data Collection System data links, the Settlement Value shall be retrieved by local access to the Main Meter, unless data transmission can be re-established within 1 day.

3.2 Substitution

3.2.1 Main meter failure

In the event of a failure of the main meter the Settlement Value shall be retrieved by reference to the appropriate check meter value.

3.2.2 Check meter failure

In the event of the check meter failing to function, Settlement Values shall continue to be retrieved by reference to the appropriate main meter readings.

3.3 Estimation

3.3.1 Main and check meter failure

Where Operational Metering, Generator's own on-site metering or a TSO-issued Despatch instruction indicates that the relevant circuit was live, use to construct load curves in order of priority:

- Operational Metering
- power station unit load recorders (as confirmed by the TSO-issued Despatch instructions)
- the TSO-issued Despatch instructions
- the TSO total generation recorders
- historic records in the Data Collection System, based on an equivalent period in the previous year, experiencing similar weather conditions and taking into account other known relevant factors.

Such load curves shall be used to derive meter values which shall be substituted into the Data Collection System. Primary transformer compensation values shall be computed using the agreed loss factors.

.

3.3.2 Voltage transformer fuse failure

In the event of a failure of a voltage transformer fuse on a circuit supplying both main and check meters resulting in Metering being outside the prescribed limits of accuracy, Settlement Values shall be computed giving due regard to the mode of failure in the manner set out in 3.3.1.

3.3.3 Main/check monitoring incident

When the daily main/check meter monitoring process in the Data Collection System indicates that there is a discrepancy between the advance of the main and check meters such that they are outside the Metering system tolerance, the TSO shall inform the Interested User of such discrepancy and investigate the reasons for such a discrepancy. Correction for the discrepancy shall be made in accordance with the appropriate method detailed above once the cause of the discrepancy has been determined.

3.4 General

Subject to MC13, estimated Settlement Values shall be used in relation to all Settlement Periods in respect of which a loss of data has occurred. Where it is necessary to estimate Settlement Values and the estimate is disputed, payments shall be made in respect of the amount of the Settlement Values in dispute in accordance with the relevant PPA.

4. AMENDMENTS TO FORMS

Forms set out in the Appendices to this Procedure may be amended from time to time by the TSO upon reasonable notice to all Interested Users. The TSO shall also take into account reasonable comments of Interested Users.

5. INTERFACE AND TIMETABLE INFORMATION

Section: SETTLEMENT VALUES ESTIMATION (GENERATION)

Subject: Interface and Timetable Information - Agreement of Estimated Settlement Values

REF	WHEN	ACTION	FROM/BY	TO	METHOD
1	ASAP	On becoming aware of an equipment malfunction likely to have resulted in missing or incorrect data identify the possible cause inform the other party, as appropriate	Interested User or TSO	TSO or Interested User	Email
2	ASAP	Prepare Data Collection System report identifying missing or Settlement Values and issue to Interested User	TSO	Interested User	Email
3a	ASAP	Investigate equipment malfunction and determine whether readings are retrievable. Retrieve if retrievable and send data to Interested User	TSO	Interested User	Email
3b	ASAP	Where data is not retrievable, substitute data if available and send substitute data to Interested User	TSO	Interested User	Email
3c	ASAP	Where neither retrieval or substitution is possible estimate data and send estimated data to Interested User together with Documentation	TSO	Interested User	Email

Section: SETTLEMENT VALUES ESTIMATION (GENERATION)

Subject: Interface and Timetable Information - Agreement of Estimated Settlement Values

REF	WHEN	ACTION	FROM/BY	TO	METHOD
4a	ASAP and in any event within 7 Business Days of receipt of data	Review data supplied under (3) above by the TSO and either: (i) advise the TSO that the data is accepted and can be used as substitute Settlement Values OR (ii) discuss areas of concern with the TSO, providing supporting evidence as necessary	Interested User		
4b		Where revisions to the initial data under (3) above are agreed, prepare revised data and send to Interested User	TSO	Interested User	Email
5a	No later than the 7th Business Day after receipt of data	Where the data under (4) above is accepted, indicate acceptance on form, sign and return to the TSO	Interested User	TSO	Email
5b		Where the data under (4) above is rejected, indicate non-agreement on form, sign and return to the TSO. Immediately thereafter raise a formal dispute as per the Disputes Procedure of the PPA	Interested User	TSO	(1) Email (2) As per PPA
6		Where the data is accepted, use data in Final Confirmation Statement	TSO		

APPENDIX A

AUTHORISATION FORM
SETTLEMENT VALUES ESTIMATION AND SUBSTITUTION - GENERATION

PART A SERIAL NO:

To: Interested User [Date]

Please find, for authorisation, attached details of substituted/retrieved/estimated* meter values in respect of:

Connection Site:

Identity of Meter (including Serial No.):

Nature of problem:

The date and times affected are detailed in the attached sheet(s).

For TSO:

Signed: Name:
(in block capitals)

Position:

Date:

PART B

To: TSO

I hereby agree/disagree* with the substituted/retrieved/estimated* meter values submitted with this form for the date and times referred to in the attached sheet(s). The reason(s) for disagreement are attached*. Proposed alternative values are included.

For Interested User:

Signed: Name:
(in block capitals)

Position:

Date:

NOTE * Delete as necessary

SETTLEMENT VALUES ESTIMATION/SUBSTITUTION SHEET

CONNECTION SITE: INTERESTED USER: TRADING DAY DATE:
IDENTITY OF METER AFFECTED

Half Hour	TSO		Interested Party	Half Hour	TSO		Interested Party	Half Hour	TSO		Interested Party
	Data As Rec	Substituted/ Retrieved/ Estimated Data	Proposed Alternative Data		Data As Rec	Substituted/ Retrieved/ Estimated Data	Proposed Alternative Data		Data As Rec	Substituted/ Retrieved/ Estimated Data	Proposed Alternative Data
00:30				08:30				16:30			
01:00				09:00				17:00			
01:30				09:30				17:30			
02:00				10:00				18:00			
02:30				10:30				18:30			
03:00				11:00				19:00			
03:30				11:30				19:30			
04:00				12:00				20:00			
04:30				12:30				20:30			
05:00				13:00				21:00			
05:30				13:30				21:30			
06:00				14:00				22:00			
06:30				14:30				22:30			
07:00				15:00				23:00			
07:30				15:30				23:30			
08:00				16:00				24:00			

AGREED PROCEDURE NO. 4

COMMUNICATION PROTOCOLS

for the electricity industry in Northern Ireland

24 April 2024

MC - 582

AGREED PROCEDURE No. 4

COMMUNICATION PROTOCOLS

Contents **Page**

1. SCOPE OF THE AGREED PROCEDURE

1.1 This Agreed Procedure (the "Procedure") outlines the communication protocols to be used by each Party in accessing data held by Metering.

1.2 The Procedure supplements the Main Code and the Sub-Codes of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of the Procedure and the Main Code or a Sub-Code the provisions of the Main Code or such Sub-Code shall prevail. The provisions of the Main Code shall prevail over the provisions of any Sub-Code.

1.3 The Procedure is part of the Grid Code and terms and expressions defined in the Grid Code shall have the same meaning in the Procedure.

2. USE OF THE PROCEDURE

The Procedure is to be used by the TSO, the Relevant Meter Operator and Interested User staff, as appropriate, involved in designing and installing communications links between Metering and other data gathering equipment.

3. COMMUNICATION PROTOCOLS

3.1 Generation Tariff Metering: Interim Metering Scheme

Data transfers in the Interim Metering Scheme between the relevant Meter Operator's Meter and the TSO's Data Collection System and data collection apparatus operated by any Interested User shall be formatted and executed through a communications protocol specified by the TSO and the Relevant Meter Operator.

3.2 Generation Tariff Metering: Final Scheme

Determination of communication protocols is dependent on detailed design and procurement of the Final Metering Scheme.

3.3 Generation Operational Metering

Determination of communication protocols is dependent on detailed design of each aspect of Operational Metering.

4. COMMUNICATION ROUTES

A range of communication routes may be used for transferring data. In each case, selection must consider security of data transfer, reliability and adherence to national and/or industry communications standards. Therefore each proposed communication route (other than those allowed for directly within any given communications protocol) shall be approved by the TSO, the Relevant Meter Operator and the TSO's telecommunications specialists prior to implementation.