SONI GRID CODE

26th June 2019
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 as per Table 1: Non-RfG Generation Requirements are applicable to Non-RfG Generation Units.

Table 1: Non-RfG Generation Requirements

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Applicable to</th>
</tr>
</thead>
<tbody>
<tr>
<td>🏸</td>
<td>Non-RfG Generation Units</td>
</tr>
</tbody>
</table>

Requirements in the Grid Code which are marked by a symbol and border as per Table 2: RfG Generation Requirements are applicable to New Generation Units.

Table 2: RfG Generation Requirements

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Applicable to</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>RfG Generation Units</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

INTRODUCTION ................................................................................................................................. 1

GLOSSARY AND DEFINITIONS (GD) ................................................................................................. 8

GD1. DEFINED TERMS ...................................................................................................................... 8

GD2. CONSTRUCTION OF REFERENCES ...................................................................................... 57

PC1 INTRODUCTION ..................................................................................................................... 59

PC2 OBJECTIVES ............................................................................................................................ 60

PC3 SCOPE ..................................................................................................................................... 61

PC4 PLANNING CRITERIA - TRANSMISSION SYSTEM ................................................................. 61

PC5 TRANSMISSION SYSTEM CAPACITY STATEMENT ............................................................... 61

PC5.1 Development of the Transmission System ............................................................................. 61

PC5.2 Transmission System Capacity Statement .......................................................................... 62

PC6 PLANNING DATA REQUIREMENTS FROM USERS ............................................................... 62

PC6.1 Requirement to provide Planning Data ................................................................................. 62

PC6.2 Manner of provision by Users ............................................................................................. 63

PC6.3 Data to be provided ............................................................................................................... 63

PC6.4 Status of Planning Data ........................................................................................................ 64

PC7 PROCEDURES FOR APPLICATIONS FOR CONNECTION AND TRANSMISSION USE OF SYSTEM AGREEMENTS ................................................................................................................. 68

PC7.1 Application Procedure for New Connection and/or Transmission Use of System Agreements .................................................................................................................................................. 68

PC7.2 Offer of Terms ...................................................................................................................... 68

PC7.3 Right to Reject an Application .......................................................................................... 69

PC7.4 Connection / Transmission Use of System Agreements .................................................... 69

PC7.5 Applications for Modifications .......................................................................................... 70

PC8 OFFERS CONDITIONAL ON CONSENTS AND STATUTORY OBLIGATIONS ...................... 70

APPENDIX A PLANNING DATA REQUIREMENTS FOR USERS (OTHER THAN THE DNO) CONNECTED TO THE TRANSMISSION SYSTEM ONLY ................................................................. 71

PC.A1. INTRODUCTION .................................................................................................................. 71

PART 1 71

PC.A2 STANDARD PLANNING DATA ............................................................................................ 71

PC.A2.1 CONNECTION SITE AND USER SYSTEM DATA .............................................................. 71

PC.A2.2 DEMAND DATA ............................................................................................................... 72

PC.A2.3 GENERATING UNIT AND POWER STATION DATA ....................................................... 73

PART 2 75

PC.A3 DETAILED PLANNING DATA .............................................................................................. 75

PC.A3.1 CONNECTION SITE AND USER SYSTEM DATA .............................................................. 75

PC.A3.2 DEMAND DATA ............................................................................................................... 79

PC.A3.3 GENERATING UNIT AND POWER STATION DATA ....................................................... 79

PC.A3.4 ADDITIONAL / ALTERNATIVE DATA .............................................................................. 84

APPENDIX B PLANNING DATA REQUIREMENTS FOR USERS CONNECTED TO THE DISTRIBUTION SYSTEM ................................................................................................................................. 86

PC.B1. INTRODUCTION .................................................................................................................. 86

26 June 2019
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, cooperate 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:

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

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

(cc) **Generator Aggregators**;
(dd) **Suppliers**; and

(ee) the DNO;

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

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

26 June 2019
(bb) Generators with respect to CDGUs and Controllable PPMs connected to or seeking a new or modified connection to the Distribution System;

(cc) Interconnector Owners;

(dd) Large Demand Customers; and

(ee) the DNO;

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

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

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

(cc) Interconnector Owners;

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

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

(bb) Suppliers; and

(cc) 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:

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

(bb) Interconnector Owners;

(cc) Large Demand Customers; and

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

Interconnector Owners;

the DNO; and

the TO;

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

Generators with respect to Generating Units connected to the Transmission System;

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

Large Demand Customers; and

the DNO;

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

Generators with respect to Generating Units connected to the Transmission System;

Interconnector Owners;

Large Demand Customers; and

the DNO;

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

OC9 applies to:

Generators with respect to Generating Units connected to the Transmission System;

Interconnector Owners;

Large Demand Customers; and

the DNO;

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

26 June 2019
(aa) Generators with respect to Generating Units connected to the Transmission System;

(bb) Interconnector Owners;

(cc) Large Demand Customers;

(dd) Aggregators; and

(ee) the DNO;

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

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

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

(cc) Aggregators;

(dd) Interconnector Owners;

(ee) Demand Side Unit Operator(s); and

(ff) 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:

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

(bb) Pumped Storage Generators with regard to their Pumped Storage Demand;

(cc) Energy Storage Generators with regard to their Energy Storage Demand;

(dd) Interconnector Owners with respect to their Interconnectors;

(ee) Interconnector Users in respect of their Interconnector Units;

(ff) Demand Side Unit Operator(s) in relation to their Demand Side Unit(s);
(gg) **Generator Aggregators** in respect of their **Aggregated Generating Units**.

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

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

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

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

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

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

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

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

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

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

(cc) **Suppliers**; and

(dd) **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) procedures for the maintenance, testing, inspection and sealing of metering (Agreed Procedures No 1 and No 2);

(iv) reconciliation procedures for metering (Agreed Procedures No 3 and No 4);

(v) procedures for estimating settlement values in lieu of normal data collection methods (Agreed Procedures No 5 and No 6); and

(viii) communication protocols (Agreed Procedure No 7).

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 curtailment 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 curtailment 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 Units 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 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

26 June 2019
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.

26 June 2019
<table>
<thead>
<tr>
<th><strong>Average Cold Spell Demand</strong></th>
<th>The forecast of peak daily <strong>Demand</strong> during average cold spell conditions.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Back-up Fuel</strong></td>
<td><strong>Distillate</strong> or heavy fuel oil.</td>
</tr>
<tr>
<td><strong>Black Start</strong></td>
<td>The procedure necessary for a recovery from a <strong>Total Shutdown</strong> or <strong>Partial Shutdown</strong>.</td>
</tr>
<tr>
<td><strong>Black Start Capability</strong></td>
<td>The capability of a <strong>Power Station</strong> where at least one of its <strong>CDGUs</strong> or <strong>CCGT Modules</strong> has the ability to <strong>Start-Up</strong> as provided in OC7.4.4.</td>
</tr>
<tr>
<td><strong>Black Start Station</strong></td>
<td>A <strong>Power Station</strong> identified pursuant to the relevant <strong>Generator's Connection Agreement</strong> as having the ability for at least one of its <strong>CDGUs</strong> or <strong>CCGT Modules</strong> to <strong>Start-Up</strong> as provided in OC7.4.4.</td>
</tr>
<tr>
<td><strong>Business Day</strong></td>
<td>Any day (other than a Saturday or a Sunday) on which banks are open for business in Belfast but excluding those days which the <strong>TSO</strong> may from time to time notify <strong>Generators</strong> as being days on which normal business will not be conducted at the <strong>TSO</strong>'s premises.</td>
</tr>
<tr>
<td><strong>Block Load</strong></td>
<td>The level of output that a <strong>Generating Unit</strong> immediately produces following <strong>Synchronisation</strong>. For avoidance of doubt, <strong>Block Load</strong> can equal 0 MW.</td>
</tr>
<tr>
<td><strong>Block Load Cold</strong></td>
<td><strong>Block Load</strong> during a <strong>Cold Start</strong>.</td>
</tr>
<tr>
<td><strong>Block Load Hot</strong></td>
<td><strong>Block Load</strong> during a <strong>Hot Start</strong>.</td>
</tr>
<tr>
<td><strong>Block Load Warm</strong></td>
<td><strong>Block Load</strong> during a <strong>Warm Start</strong>.</td>
</tr>
<tr>
<td><strong>Bulk Supply Point</strong></td>
<td>A point at which the <strong>Distribution System</strong> connects to the <strong>Transmission System</strong>.</td>
</tr>
<tr>
<td><strong>Cancelled Start</strong></td>
<td>A response by a <strong>Generator</strong> to an instruction from the <strong>TSO</strong> cancelling a previous instruction to <strong>Synchronise</strong> to the <strong>NI System</strong>.</td>
</tr>
<tr>
<td><strong>CCGT Installation</strong></td>
<td>A collection of <strong>CCGT Modules</strong> (registered as a <strong>CCGT Installation</strong> under the PC) comprising one or more gas turbines and one or more steam turbines where, in normal operation, the waste heat from the <strong>CCGT Modules</strong> which are gas turbines is passed to the heat exchanger of the associated <strong>CCGT Modules</strong> which are steam turbines from which it is directly supplied to these steam turbines thereby contributing to the overall</td>
</tr>
</tbody>
</table>
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.

GD13

26 June 2019
**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.

**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.

26 June 2019
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 CDMGU other than a PPA CDMGU or Controllable PPM, in the relevant Connection Agreement.

**De-load 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 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 operates a Demand Side Unit, with a Demand Side MW Capacity not less than 4 MW.

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.
<table>
<thead>
<tr>
<th>Demand Side Unit Performance</th>
<th>The absolute value of the Demand Side Unit Monitoring Error Calculated MWh Response less the Demand Side Unit MWh Response.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand Side Unit Performance Monitoring Percentage Error</td>
<td>The absolute value of the Demand Side Unit Monitoring Percentage Error Calculated MWh Response less the Demand Side Unit MWh Response divided by the Demand Side Unit MWh Response.</td>
</tr>
<tr>
<td>Demand Side Unit Profile</td>
<td>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.</td>
</tr>
<tr>
<td>Demand Side Unit SCADA Error</td>
<td>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.</td>
</tr>
<tr>
<td>Demand Side Unit SCADA Percentage Error</td>
<td>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</td>
</tr>
</tbody>
</table>

26 June 2019
**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.

GD20

26 June 2019
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.

26 June 2019
**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 DSO 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.
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:

\[ 1000 \text{Wh} = 1 \text{kWh} \]
\[ 1000 \text{kWh} = 1 \text{MWh} \]
\[ 1000 \text{MWh} = 1 \text{GWh} \]

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 storage devices owned and/or operated by the same Generator, as a PPM or as part of a PPM, and joined together by a System with a single Connection Point or connection to the Distribution System.

**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.

**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**
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**
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

26 June 2019
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 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.

**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.

**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.

26 June 2019
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementing Safety Co-ordinator</td>
<td>Has the meaning set out in OC6.4.2.6.</td>
</tr>
<tr>
<td>Incident Room</td>
<td>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.</td>
</tr>
<tr>
<td>Independent Generating Plant</td>
<td>A Power Station which is not subject to Central Dispatch and is not a Controllable PPM.</td>
</tr>
<tr>
<td>Indicative Operations Schedule</td>
<td>A schedule prepared by the TSO in conjunction with the Other TSO pursuant to SDC1.4.8.1.</td>
</tr>
<tr>
<td>Individual Demand Site</td>
<td>A single premises of a Customer connected to the Transmission System or Distribution System with a Demand Side Unit MW Capacity.</td>
</tr>
<tr>
<td>Inflexible Planned Outage</td>
<td>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).</td>
</tr>
<tr>
<td>Interconnector</td>
<td>Electric lines and electric Plant 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.</td>
</tr>
<tr>
<td>Interconnector Filter</td>
<td>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.</td>
</tr>
<tr>
<td>Interconnector Owner</td>
<td>A person who owns an Interconnector.</td>
</tr>
<tr>
<td>Interconnector Schedule Quantities</td>
<td>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.</td>
</tr>
<tr>
<td>Interested User</td>
<td>As defined in the Metering Code.</td>
</tr>
<tr>
<td>Inter-jurisdictional Tie Line</td>
<td>The lines, facilities and equipment that connect the transmission system of the Republic of Ireland to the transmission system of Northern Ireland.</td>
</tr>
</tbody>
</table>
**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).

26 June 2019
Underfrequency (LFSM-U) 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.

GD32
**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.

26 June 2019
<table>
<thead>
<tr>
<th><strong>Maximisation</strong></th>
<th>An increase in <strong>MW Output</strong> above the <strong>Contracted Capacity</strong> (for CDGUs other than Open Cycle Gas Turbines) or <strong>Contracted Capacity (Peak)</strong> (for PPA Open Cycle Gas Turbines) or <strong>Registered Capacity</strong> (for non-PPA plant) up to the level of the <strong>Short Term Maximisation Capability</strong>, and the terms “Maximise” and “Maximised” shall be construed accordingly.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximisation Instruction</strong></td>
<td>A <strong>Dispatch</strong> instruction issued by the TSO to the <strong>Generator</strong> to <strong>Maximise</strong> the <strong>MW Output</strong> of a <strong>Generating Unit</strong>.</td>
</tr>
<tr>
<td><strong>Maximum Charge Capacity</strong></td>
<td>The maximum amount of <strong>Energy</strong> that can be produced from the storage of an <strong>Energy Storage Generator</strong> for a <strong>Trading Day</strong>.</td>
</tr>
<tr>
<td><strong>Maximum Down Time</strong></td>
<td>The maximum period of time during which <strong>Demand Side Unit MW Response</strong> at a <strong>Demand Side Unit</strong> can be greater than zero.</td>
</tr>
<tr>
<td><strong>Maximum Export Capacity</strong></td>
<td>The value (in MW, MVA, kW and/or kVA) provided in accordance with the User’s <strong>Connection Agreement</strong> or DNO Demand Customer’s DNO Connection Agreement.</td>
</tr>
<tr>
<td><strong>Maximum Generation</strong></td>
<td>The operation of a CDGU to provide an output in excess of <strong>Contracted Capacity</strong> (for CDGUs other than Open Cycle Gas Turbines) or <strong>Contracted Capacity (Peak)</strong> (for Open Cycle Gas Turbines and PPA CCGTs) or <strong>Registered Capacity</strong> (for non-PPA plant).</td>
</tr>
<tr>
<td><strong>Maximum Import Capacity</strong></td>
<td>The values (kW and/or kVA) provided in accordance with the User’s <strong>Connection Agreement</strong> or DNO Demand Customer’s DNO Connection Agreement.</td>
</tr>
<tr>
<td><strong>Maximum On Time</strong></td>
<td>The maximum time that a <strong>Generating Unit</strong> can run following <strong>Start Up</strong>.</td>
</tr>
<tr>
<td><strong>Maximum Ramp Down Rate</strong></td>
<td>The maximum <strong>Ramp Down Rate</strong> of a <strong>Demand Side Unit</strong>. In the case of a <strong>Demand Side Unit</strong> which consists of an <strong>Aggregated Demand Site</strong> this shall be the aggregated maximum <strong>Ramp Down Rate</strong> of the <strong>Individual Demand Sites</strong>.</td>
</tr>
<tr>
<td><strong>Maximum Ramp Up Rate</strong></td>
<td>The maximum <strong>Ramp Up Rate</strong> of a <strong>Demand Side Unit</strong>. In the case of a <strong>Demand Side Unit</strong> which consists of an <strong>Aggregated Demand Site</strong> this shall be the aggregated maximum <strong>Ramp Up Rate</strong> of the <strong>Individual Demand Sites</strong>.</td>
</tr>
</tbody>
</table>

26 June 2019
<table>
<thead>
<tr>
<th><strong>Maximum Storage Capacity</strong></th>
<th>The maximum amount of Energy that can be produced from the reservoir of a Pumped Storage Generator for a Trading Day.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medium Voltage or MV</strong></td>
<td>A voltage exceeding 250 volts but not exceeding 650 volts.</td>
</tr>
<tr>
<td><strong>Merit Order</strong></td>
<td>An order, compiled by the TSO in conjunction with the Other TSO pursuant to SDC 1, of Commercial Offer Data sorted in price order.</td>
</tr>
<tr>
<td><strong>Meshed Transmission Station</strong></td>
<td>A Substation which is looped into the Transmission System.</td>
</tr>
<tr>
<td><strong>Metering Code or MC</strong></td>
<td>That part of the Grid Code identified as the Metering Code.</td>
</tr>
<tr>
<td><strong>Minimum Charge Capacity</strong></td>
<td>The minimum amount of Energy that must be produced from the storage of an Energy Storage Generator for a Trading Day.</td>
</tr>
<tr>
<td><strong>Minimum Demand Regulation (MDR)</strong></td>
<td>That minimum margin of Active Power to provide a sufficient regulating margin for adequate Frequency Control.</td>
</tr>
<tr>
<td><strong>Minimum Down Time</strong></td>
<td>The minimum period of time during which Demand Side Unit MW Response at a Demand Side Unit can be greater than zero.</td>
</tr>
<tr>
<td><strong>Minimum Off Time</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Minimum On Time</strong></td>
<td>The minimum time that must elapse from the time of a Generating Unit Start-Up before it can be instructed to Shut Down.</td>
</tr>
<tr>
<td><strong>Minimum Storage Capacity</strong></td>
<td>The minimum amount of Energy that must be produced from the reservoir of a Pumped Storage Generator for a Trading Day.</td>
</tr>
<tr>
<td><strong>Minimum Generation</strong></td>
<td>The minimum MW Output which a Generating Unit can generate continuously, registered with the TSO under SDC1 as a Technical Parameter.</td>
</tr>
<tr>
<td><strong>Minor Test</strong></td>
<td>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:</td>
</tr>
</tbody>
</table>

26 June 2019
(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**


**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-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**

**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 Unit 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

26 June 2019
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.

26 June 2019
**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**

The document of that name setting out in Schedule or PPM Settings Schedule or PPM Settings Schedule 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

GD42

26 June 2019
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 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) 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 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). 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.:

\[
1000 \text{ var} = 1 \text{ kvar} \\
1000 \text{ kvar} = 1 \text{ Mvar}
\]

**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.

---

GD45
**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.

GD46

26 June 2019
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 CDGUs other than Open Cycle Gas Turbines or CCGTs) or Contracted Capacity (Peak) (for PPA Open Cycle Gas Turbines and PPA CCGTs) 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

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.
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.
<table>
<thead>
<tr>
<th><strong>Standing Technical Offer Data</strong></th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Start Date</strong></td>
<td>The date on which an Outage is to begin.</td>
</tr>
<tr>
<td><strong>Start of Restricted Range</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Start-Up</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Start-Up Cost</strong></td>
<td>The costs associated with Start-Ups.</td>
</tr>
<tr>
<td><strong>Start Time</strong></td>
<td>The time at which an Outage is to begin.</td>
</tr>
<tr>
<td><strong>Steam Turbine Unit</strong></td>
<td>A Generating Unit driven by a Steam Turbine.</td>
</tr>
<tr>
<td><strong>Substation</strong></td>
<td>An assemblage of equipment including any necessary housing for the conversion, transformation or control of electrical power.</td>
</tr>
<tr>
<td><strong>Substitute Reserve</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Supplier</strong></td>
<td>A holder of a Supply Licence.</td>
</tr>
<tr>
<td><strong>Sustained Load Diagram</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Sustained Response</strong></td>
<td>Has the meaning set out in OC11.5.5.</td>
</tr>
<tr>
<td><strong>Sustained Response Capability</strong></td>
<td>Has the meaning set out in OC11.5.5.</td>
</tr>
<tr>
<td><strong>Sustained Response Test</strong></td>
<td>A test carried out by the TSO pursuant to the provisions of OC11.6.2.</td>
</tr>
<tr>
<td><strong>Synchronised</strong></td>
<td>The condition where an incoming Generating Unit or System is connected to another System so that the Frequencies and phase relationships of...</td>
</tr>
</tbody>
</table>
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 CDGUs 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.

GD51
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.

26 June 2019
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 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 without the TSO’s directions relating to a Black Start.
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**

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.

**Schedule or WFPS Settings Schedule**
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 5MW 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
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 practically 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

PC63

26 June 2019
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**.

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:

PC64

26 June 2019
PC6.1 **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.

PC6.2 **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 PC6.2(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.

PC6.3 **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...
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 10MW 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.
Maximum energy demanded per half hour by the fluctuating load cycle.

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

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.

GENERATING UNIT AND POWER STATION DATA

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.

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**.

**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.A3.2 **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

26 June 2019
(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 disconnectors 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.

PC79

26 June 2019
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 (MWsec/MVA), or, for generators comprised within a PPM, Plant inertia constant (MWsec/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 $\text{MW/Hz}$
(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).

<table>
<thead>
<tr>
<th>Configuration 1</th>
<th>Configuration 2</th>
<th>Configuration 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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);

26 June 2019
(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.
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.B2. 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
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

26 June 2019
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;

PC91

26 June 2019
(r) Stator leakage reactance;

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

PC92

26 June 2019
(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

PC93

26 June 2019
(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;

26 June 2019
(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;

(xx) 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.

26 June 2019
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.

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.C6 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) 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.

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.

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 TSO’s standard confidentiality agreement for Users. In the event the third party manufacturer is unable to enter into the TSO’s 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.
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.

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

<table>
<thead>
<tr>
<th>CCGT INSTALLATION</th>
<th>CCGT MODULES AVAILABLE</th>
<th>1st GT</th>
<th>2nd GT</th>
<th>1st ST</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW OUTPUT</td>
<td>UNIT MW CAPACITY</td>
<td>165</td>
<td>165</td>
<td>170</td>
</tr>
<tr>
<td>68 MW to 165 MW</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>166 MW to 250 MW</td>
<td>√</td>
<td></td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>251 MW to 500 MW</td>
<td>√</td>
<td>√</td>
<td></td>
<td>√</td>
</tr>
</tbody>
</table>

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 prerequisite 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.

CC1.4 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.
CC1.5 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.

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 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 (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**;

26 June 2019
(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.

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.

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.

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.

○

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

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.

26 June 2019
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**.
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.

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**

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.

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.

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.

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.

CC8.5.2 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.

CC8.5.3 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.

○

CC8.5.7 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

26 June 2019
(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.

○

**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 DSO, with the purpose of detecting poorly damped oscillations,

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

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

CC8.8.4 Variations in System Frequency

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.

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.
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) the System Frequency has changed at a rate greater than 0.5HZ/s; or
(c) there is manual intervention by the Generator.

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:

<table>
<thead>
<tr>
<th>Frequency Range (Hz)</th>
<th>Time Period for Operation (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>47.0 – 47.5 Hz</td>
<td>20 seconds</td>
</tr>
<tr>
<td>47.5 – 48.5 Hz</td>
<td>90 minutes</td>
</tr>
<tr>
<td>48.5 – 49.0 Hz</td>
<td>90 minutes</td>
</tr>
<tr>
<td>49.0 – 51.0 Hz</td>
<td>Unlimited</td>
</tr>
<tr>
<td>51.0 – 51.5 Hz</td>
<td>90 minutes</td>
</tr>
<tr>
<td>51.5 – 52 Hz</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

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.

(c) stable operation of each CDGU and Controllable PPM during LFSM-U shall be ensured.

![Diagram](attachment:image.png)

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.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal System Frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Frequency Response Insensitivity in mHz (</td>
<td>$\Delta f$)</td>
</tr>
<tr>
<td>Frequency Response Insensitivity as a percentage of nominal frequency (</td>
<td>$\frac{</td>
</tr>
<tr>
<td>Frequency Response Deadband in mHz</td>
<td>±15 mHz</td>
</tr>
<tr>
<td>Droop (%)</td>
<td>4 %</td>
</tr>
</tbody>
</table>

(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.

![Graph showing frequency step change](image)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active Power</strong> as a percentage of <strong>Registered Capacity</strong> ( \Delta P )</td>
<td>10%</td>
</tr>
<tr>
<td>Maximum admissible initial delay ( t_1 )</td>
<td>0 seconds</td>
</tr>
<tr>
<td>Activation time ( t_2 )</td>
<td>5 seconds</td>
</tr>
</tbody>
</table>

(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**.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active Power</strong> as a percentage of expected MW output based on droop characteristic ((\frac{</td>
<td>\Delta P_t</td>
</tr>
<tr>
<td>Maximum admissible initial delay (t_1)</td>
<td>0 seconds</td>
</tr>
<tr>
<td>Activation time (t_2)</td>
<td>5 seconds</td>
</tr>
</tbody>
</table>

(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.
CC8.8.7.4 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\(^0\)C, 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

26 June 2019

CC130
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.

26 June 2019

CC131
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.

CC10.3 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.

CC10.4 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 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.

CC10.2 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 Coordinator 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 CDGUs 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.
CC11.5 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.

CC11.6 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 CC11.5.

CC11.7 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 CC11.5.

CC11.8 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:

26 June 2019
(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 49.5Hz for 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 49.5Hz for 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;
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 than 1.0 Hz per second as measured over a rolling 500 millisecond period; or
(c) There is manual intervention by the Generator.

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.
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.

<table>
<thead>
<tr>
<th>CC.S1.1.3.2</th>
<th>For <strong>CDGUs</strong> and for <strong>CCGT Installations</strong> (in relation to the <strong>CCGT Modules</strong> therein) the <strong>Reactive Power</strong> capability shall as a minimum be:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>rated power factor (lagging) = 0.8;</td>
</tr>
<tr>
<td>(ii)</td>
<td>rated power factor (leading) = 0.95; and</td>
</tr>
<tr>
<td>(iii)</td>
<td>short circuit ratio not less than 0.5.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CC.S1.1.3.3</th>
<th>A <strong>Generating Unit</strong> shall continuously control voltage at the <strong>Connection Point</strong> within its <strong>Reactive Power</strong> capability limits.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>For <strong>Generating Units</strong>, the minimum <strong>Reactive Power</strong> capability is defined in the characteristic below, within the voltage limits specified under CC5.4.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage (p.u.)</th>
<th>Point A</th>
<th>Mvar consumption (lead) capability of the Generating Unit at Registered Capacity and Voltage of 1.1 p.u. at the Connection Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 0.48            |         |                                                                                                                              |
| Q/<sub>P</sub>REG CAP (p.u.) | Consumption (lead) Mvar Capability of Generating Unit at the Connection Point |

| 0.6            |         |                                                                                                                              |
| Production (lag) Mvar Capability of Generating Unit at the Connection Point |

<table>
<thead>
<tr>
<th>110 kV and 275 kV Connection</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Voltage (p.u.)</th>
<th>Point A</th>
<th>Mvar consumption (lead) capability of the Generating Unit at Registered Capacity and Voltage of 1.1 p.u. at the Connection Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 0.48            |         |                                                                                                                              |
| Q/<sub>P</sub>REG CAP (p.u.) | Consumption (lead) Mvar Capability of Generating Unit at the Connection Point |

| 0.6            |         |                                                                                                                              |
| Production (lag) Mvar Capability of Generating Unit at the Connection Point |

26 June 2019
<table>
<thead>
<tr>
<th>Point</th>
<th>Mvar consumption (lead) capability of the Generating Unit at Registered Capacity and Voltage of 0.9 p.u. at the Connection Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Mvar consumption (lag) capability of the Generating Unit at Registered Capacity and Voltage of 0.9 p.u. at the Connection Point</td>
</tr>
<tr>
<td>A</td>
<td>Mvar consumption (lead) capability of the Generating Unit at Registered Capacity and Voltage of 1.05 p.u. at the Connection Point</td>
</tr>
<tr>
<td>B</td>
<td>Mvar consumption (lag) capability of the Generating Unit at Registered Capacity and Voltage of 1.05 p.u. at the Connection Point</td>
</tr>
<tr>
<td>C</td>
<td>Mvar consumption (lead) capability of the Generating Unit at Registered Capacity and Voltage of 0.875 p.u. at the Connection Point</td>
</tr>
<tr>
<td>D</td>
<td>Mvar consumption (lag) capability of the Generating Unit at Registered Capacity and Voltage of 0.875 p.u. at the Connection Point</td>
</tr>
</tbody>
</table>

(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:

26 June 2019
(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;

<table>
<thead>
<tr>
<th>Connection Voltage</th>
<th>Voltage Range</th>
<th>Time period for operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 kV</td>
<td>0.9 p.u. – 1.1 p.u.</td>
<td>unlimited</td>
</tr>
<tr>
<td>275 kV</td>
<td>0.9 p.u. – 1.09 p.u.</td>
<td>unlimited</td>
</tr>
<tr>
<td>400 kV</td>
<td>0.9 p.u. – 1.05 p.u.</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

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 overexcitation 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.

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 Stations.

(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

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**.

**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 **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 **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 Transformers shall be agreed with the TSO or, if agreement cannot be reached, determined by the TSO.

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.).
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.

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 otherwise instructed by the TSO.

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 make this data publically available.

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.

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 5MW or more, in compliance with the requirements of Engineering Recommendation G59/1/N1 (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**.

**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**.

**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 make this data publically available.

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.
CONNECTION CONDITIONS SCHEDULE 2

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** 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** 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** 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**.

**PPMs** 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**)

**PPMs** must be capable of responding to variations in the voltage of the **NI System** in accordance with CC5.4.

26 June 2019
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.

![Diagram showing voltage stability characteristics](image)

**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**
(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.S2.1.3.3 in 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, PPM 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, PPM 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) PPM 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:

<table>
<thead>
<tr>
<th>Connection Voltage</th>
<th>Voltage Range</th>
<th>Time period for operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 kV</td>
<td>0.9 p.u. – 1.1 p.u.</td>
<td>unlimited</td>
</tr>
<tr>
<td>275 kV</td>
<td>0.9 p.u. – 1.09 p.u.</td>
<td>unlimited</td>
</tr>
<tr>
<td>400 kV</td>
<td>0.9 p.u. – 1.05 p.u.</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

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) WFPSSs 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 the requirements in the above diagram shall apply in respect of the performance of those **Generating Units**.

(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:

<table>
<thead>
<tr>
<th>Voltage Range (U/Un)</th>
<th>Time requirement, minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>115% - 120%</td>
<td>2 seconds</td>
</tr>
<tr>
<td>110% - 115%</td>
<td>10 seconds</td>
</tr>
<tr>
<td>90% - 110%</td>
<td>Continuous operation</td>
</tr>
<tr>
<td>0% - 90%</td>
<td>As per Fault Ride Through Capability of PPMs chart (CC.S2.1.3.7(a))</td>
</tr>
</tbody>
</table>
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.

![Diagram showing voltage and time relationship](attachment:diagram.png)

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 make this data publically available.

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
(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(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.

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 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 Output 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 |

26 June 2019
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 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

CC169

26 June 2019
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.

26 June 2019
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

(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:

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Time requirement, minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>50.5 Hz – 52.0 Hz</td>
<td>60 minutes</td>
</tr>
<tr>
<td>49.5 Hz – 50.5 Hz</td>
<td>Continuous operation</td>
</tr>
<tr>
<td>47.5 Hz – 49.5 Hz</td>
<td>60 minutes</td>
</tr>
<tr>
<td>47.0 Hz – 47.5 Hz</td>
<td>20 seconds</td>
</tr>
</tbody>
</table>
(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 compliance certificate is issued. Each Generator requires a temporary compliance certificate in respect of each of its PPMs before being allowed to operate it.

CC.S2.1.12.2 A temporary compliance certificate may be issued to allow tests or Monitoring that can only be performed on energised and/or loaded Plant. After a period of time not exceeding one year from the date on which a temporary compliance certificate takes effect (unless the TSO in its absolute discretion agrees to extend the validity of a temporary compliance certificate), the TSO shall issue a final compliance certificate or indicate the reason why a final compliance certificate cannot be issued. The final compliance certificate may be issued with or without conditions depending upon the result of compliance tests. A temporary or final compliance certificate may be subsequently withdrawn for the non-compliance of the Generator or a Generator’s PPM with the Grid Code by the TSO and
replaced with a restricted compliance certificate. A restricted compliance certificate shall be issued to the **Generator** which shall set out the matters in respect of which there is non-compliance; the MVA rating at the **Connection Point** to which the **PPM** is restricted; the timescales for resolution of the non-compliance. Upon resolution of the non-compliance the **TSO** in its absolute discretion, may re-issue a temporary or final compliance certificate.

CC.S2.1.12.3 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 5MW 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.
(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.

(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 the requirements in the above diagram shall apply in respect of the performance of those **Generating Units**.

(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:

<table>
<thead>
<tr>
<th>Voltage Range (U/Un)</th>
<th>Time requirement, minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>115% - 120%</td>
<td>2 seconds</td>
</tr>
<tr>
<td>110% - 115%</td>
<td>10 seconds</td>
</tr>
<tr>
<td>90% - 110%</td>
<td>Continuous operation</td>
</tr>
<tr>
<td>0% - 90%</td>
<td>As per Fault Ride Through Capability of PPMs chart (CC.S2.2.3.3(a))</td>
</tr>
</tbody>
</table>
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.

![Diagram showing voltage changes over time](image)

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 make this data publically available.

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.S2.2.3.4  Ramp Rates

(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. 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 a SCADA signal indicating that a process of increasing/decreasing 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 as per 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 input 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.

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 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 Output 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 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:
<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Time requirement, minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>50.5 Hz – 52.0 Hz</td>
<td>60 minutes</td>
</tr>
<tr>
<td>49.5 Hz – 50.5 Hz</td>
<td>Continuous operation</td>
</tr>
<tr>
<td>47.5 Hz – 49.5 Hz</td>
<td>60 minutes</td>
</tr>
<tr>
<td>47.0 Hz – 47.5 Hz</td>
<td>20 seconds</td>
</tr>
</tbody>
</table>

(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 compliance certificate is issued. Each Generator requires a temporary compliance certificate in respect of each of its Controllable or Dispatchable PPMs before being allowed to operate it.

CC.S2.2.7.2 A temporary compliance certificate may be issued to allow tests or Monitoring that can only be performed on energised and/or loaded Plant. After a period of time not exceeding one year from the date on which a temporary compliance certificate takes effect (unless the TSO in its absolute discretion agrees to extend the validity of a temporary compliance certificate), the TSO shall issue a final compliance certificate or indicate the reason why a certificate cannot be issued. The final compliance certificate
may be issued with or without conditions depending upon the result of compliance tests. A temporary or final compliance certificate may be subsequently withdrawn for the non-compliance of the Generator or a Generator’s PPM with the Grid Code by the TSO and replaced with a restricted compliance certificate. A restricted compliance certificate shall be issued to the Generator which shall set out the matters in respect of which there is non-compliance; the MVA rating at the Connection Point to which the PPM is restricted; the timescales for resolution of the non-compliance. Upon resolution of the non-compliance the TSO in its absolute discretion, may re-issue a temporary or final compliance certificate.

CC.S2.2.7.3 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.
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

26 June 2019
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 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

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.

OC1-192

26 June 2019
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 2MW 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 2MW 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 Loading** 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**

**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 **Independent Generating Plant** pursuant to **OC1.4.1.3**;

(d) prospective new **Demand** for **Energy** exceeding 2MW 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;

**OC1-194**

26 June 2019
(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 Outages 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 an 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 Aggregators as if Generators 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,

(aa) 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;
(bb) 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:

(aa) Demand Forecasts;

(bb) The TSO's estimate of Customer Demand Management;

(cc) forecast Availability of CDGUs;
(dd) forecast output available from any Interconnectors;

(ee) the Margin as set by the TSO;

(ff) NI System constraints and constraints on the Inter-jurisdictional Tie Line between Northern Ireland and the Republic of Ireland; and

(gg) 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;

OC2-201

26 June 2019
(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,

(aa) 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;

(bb) 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:

(aa) Demand Forecasts;

(bb) The TSO’s estimate of Customer Demand Management;

(cc) forecast Availability of CDGUs;

(dd) forecast output available from any Interconnectors;

(ee) the Margin as set by the TSO;

(ff) NI System constraints and constraints on the Inter-jurisdictional Tie Line between Northern Ireland and the Republic of Ireland; and

(gg) 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:

(aa) 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;

(bb) a Flexible Planned Outage may have been re-designated as an Inflexible Planned Outage;

(cc) 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:

(aa) 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)(cc) 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

(bb) 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,

(aa) 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;

OC2-207

26 June 2019
(bb) 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:

(aa) 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;

(bb) 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:
(aa) 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

(bb) 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:

   (aa) the identity of CDGUs, Controllable PPMs (or Generating Unit(s) therein) and/or the Power Station Equipment connected to the Distribution System concerned;

   (bb) MW concerned (i.e. MW which will not be available as a result of the Outage); and

   (cc) the start date and duration of the Outage.

(iii) The Final Outage Programme may differ from the draft Final Outage Programme as follows:

   (aa) 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;

(bb) 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 CDGs, 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:

(aa) 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

(bb) 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 CDGs, 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

OC2-213

26 June 2019
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:

(aa) 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;

(bb) 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));

(cc) required duration of Outage (which must not exceed 72 hours); and

(dd) 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:

(aa) acceptance of the request, confirming the requested Start Time and duration of the STPM Outage;

(bb) proposals for the advancement or deferment of the STPM Outage if taken, indicating alternative Start Time and duration; or

(cc) 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):

(aa) the Licence Standards could not be met; or

(bb) 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:

(aa) 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;

(bb) 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));
(cc) duration of the Outage; and

(dd) 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.
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 an 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

OC2.219

26 June 2019
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.

26 June 2019
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

OC2-222

26 June 2019
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.
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 CDGU**s (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.

OC2-225

26 June 2019
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 Installations**, 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

26 June 2019
(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

![Capability Chart for PPMs](image)

- Voltage Control Mode / Reactive Power Dispatch Mode
- Power Factor Control Mode

Consumption (lead) Mvar Capability of the PPM at the Connection Point

Production (lag) Mvar Capability of the PPM at the Connection Point

26 June 2019
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 deLoading 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.

26 June 2019
(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 Codes (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

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:

OC3-233

26 June 2019
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

26 June 2019
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.

26 June 2019
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**.

**OC4-242**

26 June 2019
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.

OC4.4.6 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.

26 June 2019
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.

26 June 2019
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.
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.

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.

Requirement to notify Operations

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.

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.

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 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.

OC5.4.5 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.

OC5.4.6 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.

OC5.5 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.

OC5-249

26 June 2019
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.

OC5-250

26 June 2019
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;

26 June 2019
oc6.1

(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**.

26 June 2019
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.

26 June 2019
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".
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.

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.

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.

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.

Testing

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.
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.

### 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.

### 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.

### 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)

26 June 2019

OC6-260
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.

26 June 2019
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 PPUs 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.

OC7-263

26 June 2019
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").

**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**.

**Black Start**

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.

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**.

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**.

**Black Start Stations**

(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.

OC7.4.6.5 (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.

OC7-265

26 June 2019
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

current voltage automatically during the system restoration phase.

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.

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.
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.

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.

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.

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.

The TSO will decide when conditions no longer justify the use of its Incident Room and will inform all relevant Users of this decision.

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.

Loss of the TSO Control Centre

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.

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.

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.
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.

26 June 2019
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.

OC8-272

26 June 2019
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.
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.
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 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.

26 June 2019
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.

OC10-281

26 June 2019
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.

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.

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.

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.

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.

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.

Interaction with the DNO

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.

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.

OC10-282
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

OC10-283

26 June 2019
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.A.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.A.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.

OC10-284

26 June 2019
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.

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.

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.

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.

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.

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.

Test Panel Final Report

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).

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.

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;
whether Users are in compliance with protection requirements and protection settings under the Grid Code, Users' Connection Agreements and System Support Services Agreements between Users and the TSO;

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;

whether a Black Start Station has the ability to Black Start; and

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.
PROCEDURE FOR MONITORING

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.

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.

(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**:

(aa) "Pretransient Load" means instantaneous Load level (in MW) of the CDGU at 5 seconds before the **Frequency Transient** commenced;

(bb) 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**;

(cc) 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**");

26 June 2019
(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:

\[
A - \text{PTL}
\]

where:

\[
A = \text{the Availability of the CDGU at the time at which the Frequency Transient commenced; and}
\]

\[
\text{PTL} = \text{Pretransient Load (MW)};
\]

(iii) the Governor Droop constrained response (SRG), determined as follows:

\[
\text{SRG} = \frac{CC}{Fg} \times \{(Fp - Ft) - 2A/3\}
\]

where:

\[
CC = \text{Contracted Capacity (MW)};
\]

\[
Fg = \text{determined as:}
\]

\[
50\text{Hz} \times \frac{D}{100}
\]

where D is specified Governor Droop (%) notified in the most recent relevant Technical Parameters Notice;

\[
Fp = \text{NI System Frequency (Hz) at the time 5 seconds before the Frequency Transient commenced;}
\]

\[
Ft = \text{the instantaneous NI System Frequency (Hz) at any time during the Frequency Transient;}
\]

\[
A = \text{determined as:}
\]

\[
(Fp - Ft) - (Fg \times B)
\]

except where this term has a negative value, in which case A is 0;

where B is determined as:

\[
0.9 - \text{PTL/CC}
\]
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:

(aa) 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);

(bb) 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

(cc) 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:

$$ACSR = CSR \times SRC$$

(i) Spinning Reserve Deviation

For the purposes of this OC11 Part A:

(aa) 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;

(bb) the Spinning Reserve Deviation is the Sustained Response Deviation; and

OC11-295
(cc) 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)

OC11-296

26 June 2019
(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:

(aa) 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

(bb) 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**;

(cc) 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**;

OC11-298
(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:

(aa) 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

(bb) 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) (bb) (ii) Sustained Response Capability had been determined at a level lower than previously declared by the Generator.

OC11-299
(ii) If the TSO requests a test pursuant to OC11.6.2(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:

\[
\text{SRC} = \frac{V_a}{(1-T) \times V_e}
\]

where:

\[V_a = \text{the value (in MW) of the Achieved Sustained Response;}\]

\[V_e = \text{the relevant expected value (in MW) on the Sustained Load Diagram;}\]

\[T = \text{the Test tolerance, which shall be 5%, and expressed as a decimal fraction of one for the purposes of the above equation.}\]

(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):

(aa) the lowest incremental **Governor Droop** at any **Load** between zero and 90% of **Contracted Capacity** shall be:

\[ 0.4 \times \text{SGD} \]

(bb) the highest incremental **Governor Droop** at any **Load** above 90% of **Contracted Capacity** shall be:

\[ 3 \times \text{SGD} \]

(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.

OC11-303

26 June 2019
## TABLE A

### TABLE OF TOLERANCE BANDS FOR DISPATCH INSTRUCTIONS

<table>
<thead>
<tr>
<th>DISPATCH CHARACTERISTIC</th>
<th>Wide Tolerance Band</th>
<th>Maximum period of Monitoring at Wide Tolerance Band</th>
<th>Narrow Tolerance Band</th>
<th>Max. period of Monitoring at Narrow Tolerance Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Power (MW)</td>
<td>±5MW or ±5% of Dispatched Load whichever is greater</td>
<td>6 hours</td>
<td>Maximum Tolerance Band: +1MW and -5MW. Minimum Tolerance Band: -1MW and +5MW.</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Reactive Power (Mvar)</td>
<td>±10 Mvar</td>
<td>2 hours</td>
<td>±5 Mvar</td>
<td>1 hour</td>
</tr>
<tr>
<td>Loading Rate (MW/min)</td>
<td>±5% or ±2 minutes for period to achieve Load whichever is longer</td>
<td>period to achieve Load</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Synchronising Time</td>
<td>±5 minutes</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Governor Droop</td>
<td>3.5-5.5%</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
## Table B

**Table of Tolerance Bands for Dispatch Instructions: Gas Turbine Units**

<table>
<thead>
<tr>
<th>Dispatch Characteristic</th>
<th>Wide Tolerance Band</th>
<th>Maximum period of Monitoring at Wide Tolerance Band</th>
<th>Narrow Tolerance Band</th>
<th>Max. period of Monitoring at Narrow Tolerance Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Power (MW)</td>
<td>±3MW</td>
<td>2 hours</td>
<td>Maximum Tolerance Band: +1MW and -5MW Minimum Tolerance Band: -1MW and +5MW</td>
<td>30 Minutes</td>
</tr>
<tr>
<td>Reactive Power (Mvar)</td>
<td>±5Mvar</td>
<td>2 hours</td>
<td>±3Mvar</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Loading Rate (MW/min)</td>
<td>±5%</td>
<td>period to achieve Load</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Synchronous Compensation</td>
<td>±5Mvar</td>
<td>2 hours</td>
<td>±3Mvar</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Governor Droop</td>
<td>4%</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

OC11-305

26 June 2019
PART B – ALL USER’S EQUIPMENT OTHER THAN PPA CDGUS

OC11.10 MONITORING

OC11.10.1 Procedure for Monitoring

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 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

OC11-306

26 June 2019
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 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 Relevant Plant.

(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 Relevant Plant.

26 June 2019
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.

OC11-308

26 June 2019
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.

OC11-310

26 June 2019
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.

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.

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).

(a) In determining whether the CDGU, Controllable PPM, Demand Side Units 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.
### TABLE A

**TABLE OF TOLERANCE BANDS FOR DISPATCH INSTRUCTIONS**

<table>
<thead>
<tr>
<th>DISPATCH CHARACTERISTIC</th>
<th>Wide Tolerance Band</th>
<th>Maximum period of Monitoring at Wide Tolerance Band</th>
<th>Narrow Tolerance Band</th>
<th>Max. period of Monitoring at Narrow Tolerance Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Power (MW)</td>
<td>±5MW or ±5% of Dispatched Load whichever is greater</td>
<td>6 hours</td>
<td>Maximum Tolerance Band: +1MW and -5MW. Minimum Tolerance Band: -1MW and +5MW.</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Reactive Power (Mvar)</td>
<td>±10 Mvar</td>
<td>2 hours</td>
<td>±5 Mvar</td>
<td>1 hour</td>
</tr>
<tr>
<td>Loading Rate (MW/min)</td>
<td>±5% or ±2 minutes for period to achieve Load whichever is longer</td>
<td>period to achieve Load</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Synchronising Time</td>
<td>±5 minutes</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Governor Droop</td>
<td>3.5-5.5%</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
# TABLE B

## TABLE OF TOLERANCE BANDS FOR DISPATCH INSTRUCTIONS: GAS TURBINE UNITS

<table>
<thead>
<tr>
<th>DISPATCH CHARACTERISTIC</th>
<th>Wide Tolerance Band</th>
<th>Maximum period of Monitoring at Wide Tolerance Band</th>
<th>Narrow Tolerance Band</th>
<th>Max. period of Monitoring at Narrow Tolerance Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Power (MW)</td>
<td>± 3MW</td>
<td>2 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reactive Power (Mvar)</td>
<td>± 5Mvar</td>
<td>2 hours</td>
<td>± 3Mvar</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Loading Rate (MW/min)</td>
<td>± 5%</td>
<td>period to achieve Load</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Synchronous Compensation</td>
<td>± 5Mvar</td>
<td>2 hours</td>
<td>± 3Mvar</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Governor Droop</td>
<td>4%</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>
## TABLE C

**TABLE OF TOLERANCE BANDS FOR DISPATCH INSTRUCTIONS: DEMAND SIDE UNITS**

<table>
<thead>
<tr>
<th>DISPATCH CHARACTERISTIC</th>
<th>Tolerance Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Time Validation</td>
<td>±5% of the Dispatch Instruction</td>
</tr>
<tr>
<td>Active Power (MW)</td>
<td>&lt; ±5% of the Demand Side Unit Energy Profile</td>
</tr>
<tr>
<td>Post event validation</td>
<td>&lt; ±5% of the Demand Side Unit Energy Profile</td>
</tr>
<tr>
<td>Demand Side Unit Energy Profile – (metered Demand + Demand Side Unit MW Response)</td>
<td></td>
</tr>
<tr>
<td>Demand Side Units not Dispatched but declared Available in an Availability Notice</td>
<td></td>
</tr>
<tr>
<td>Demand Side Unit Energy Profile – metered Demand</td>
<td>&lt; ±5% of the Demand Side Unit Energy Profile</td>
</tr>
</tbody>
</table>
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
(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) 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;
Demand Side Units;
Aggregated Generating Units; and/or
Controllable PPMs

may be required.

SDC1.3 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.

SDC1.4 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);
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) 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;

(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.

SDC1-323

26 June 2019
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;

SDC1-324
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

(c) 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;

SDC1-325

26 June 2019
(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 a **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.

SDC1-328

26 June 2019
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

SDC1-332

26 June 2019
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 each 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.

SDC1-333

26 June 2019
(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;

SDC1-334

26 June 2019
- 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; and
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 PPMs 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 Units or Interconnector on 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 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 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.
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 flows;

(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 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

SDC1-339
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;
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 no 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.
## Part 1. Technical Parameters

<table>
<thead>
<tr>
<th>Technical Parameter</th>
<th>CDGU</th>
<th>Control PPM</th>
<th>DSU</th>
<th>Agg. Gen</th>
<th>ESPS Demand</th>
<th>Pump Storage Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thermal</td>
<td>Hydr/ En Ltd</td>
<td>Disp. PPM</td>
<td>Pump S Gen</td>
<td>Indiv. Demand Site</td>
<td>Agg. Demand Sites</td>
</tr>
<tr>
<td>Block Load Cold</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Block Load Hot</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block Load Warm</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charging Capacity</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Cycle Efficiency</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Demand Side Unit</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>=Notice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deload Break Point</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Demand Side Unit MW</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand Side Unit MW</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Response Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>De-Loading Rate 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>De-Loading Rate 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Up 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Up 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Up 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Down 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Down 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Down 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Up Trigger Point 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Up Trigger Point 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Up Trigger Point 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Down Trigger Point 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Down Trigger Point 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Down Trigger Point 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>End Point of Start Up Period</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Energy Limit</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forecast Minimum</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Output Profile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Forecast Minimum</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Generation Profile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Up Break Point</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cold (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Up Break Point</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cold (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Up Break Point</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical Parameter</td>
<td>CDGU Control PPM</td>
<td>DSU Disp. PPM</td>
<td>Pump S Gen</td>
<td>Indiv. Demand Site</td>
<td>Agg. Demand Sites</td>
<td>ESPS Demand</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------</td>
<td>---------------</td>
<td>------------</td>
<td>--------------------</td>
<td>-------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Load Up Break Point Hot (2)</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Up Break Point Warm (1)</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Up Break Point Warm (2)</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Cold (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Loading Rate Cold (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Loading Rate Cold (3)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Loading Rate Hot (1)</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Hot (2)</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Hot (3)</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Warm (1)</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Warm (2)</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Warm (3)</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Ramp Down Rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>(shall be a number</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>greater than zero)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Ramp Up Rate</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>(shall be a number</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>greater than zero)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Charge Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>ESPS Gen Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Down Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Maximum Generation /</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registered Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum On Time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Maximum Storage Capacity</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Charge Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESPS Gen Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Down Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Minimum Generation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Minimum Off Time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Minimum On Time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Minimum Storage Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off to Generating Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Off to Spin Pump Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>(Other relevant technical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>parameters)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pumping capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ramp Down Break Point 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Break Point 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Break Point 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Break Point 4</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Rate 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

26 June 2019

SDC1-345
<table>
<thead>
<tr>
<th>Technical Parameter</th>
<th>CDGU</th>
<th>Control PPM</th>
<th>DSU</th>
<th>Agg. Gen</th>
<th>ESPS Demand</th>
<th>Pump Storage Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Thermal</td>
<td>Hydr/ En Ltd</td>
<td>Disp. PPM</td>
<td>Pump S Gen</td>
<td>Indiv. Demand Site</td>
</tr>
<tr>
<td>Ramp Down Rate 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Rate 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Rate 4</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Rate 5</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Break Point 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Break Point 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Break Point 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Break Point 4</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Rate 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Rate 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Rate 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Rate 4</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Rate 5</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Short Term Maximisation Capability</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Short Term Maximisation Time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Cold (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Cold (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Hot (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Hot (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Trigger Point Cold (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Trigger Point Cold (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Trigger Point Hot (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Trigger Point Hot (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Trigger Point Warm (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Trigger Point Warm (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Warm (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Warm (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Spin Pump to Pumping Energy Time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Synchronous Start-Up Time Cold</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Synchronous Start-Up Time Hot</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Synchronous Start-Up Time Warm</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Start of Restricted Range 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>End of Restricted Range 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Start of Restricted Range 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>End of Restricted Range 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

SDC1-346

26 June 2019
### Part 2. Additional data items required in an Additional Grid Code Characteristics Notice

<table>
<thead>
<tr>
<th>Variable</th>
<th>Applies to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time from initiation of a start to achieving Dispatched Load</td>
<td>CDGUs which are Open Cycle Gas Turbines or CCGTs</td>
</tr>
<tr>
<td>Governor Droop</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>Sustained Response Capability</td>
<td>All PPA CDGUs</td>
</tr>
<tr>
<td>The maximum reserve capability for each category of reserve</td>
<td>All non-PPA CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>Two shifting limitation (limitation on the number of Start-ups per Trading Day)</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>The MW and Mvar capability limits within which the CDGU is able to operate as shown in the relevant Generator Performance Chart</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>Maximum number of on Load cycles per 24 hour period, together with the maximum Load increases involved</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>^Maximum number of changes to the Dispatched Fuel per 24 hour period</td>
<td>All CDGUs, except Aggregated GeneratingUnits</td>
</tr>
<tr>
<td>Maximum quantity of oil in “ready-use tanks” and associated pipework</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>^Maximum number of changes to the Designated Fuel per 24 hour period</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>^Minimum notice to change the Designated Fuel.</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>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</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>Variable</td>
<td>Applies to</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>Time between <strong>De-Synchronising</strong> different CDGUs in a Power Station which, in the case of Coolkeeragh Power Station only, shall be stated for both paired and single CDGUs.</td>
<td>All CDGUs, except <strong>Aggregated Generating Units</strong></td>
</tr>
</tbody>
</table>
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.
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”.

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.

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.

The following paragraph applies in relation to PPA Generation in place of the equivalent provisions of SDC 1.4.4.3.(a).

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 Capacity 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.

In SDC1.4.4.3(a) and (b) the term “reserve capability” shall be construed as “Spinning Reserve Capability”.

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.

<table>
<thead>
<tr>
<th>Terms used in SONI Grid Code</th>
<th>Equivalent terms used in EirGrid Grid Code (where different)</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Support Services</td>
<td>Ancillary Service(s)</td>
<td>The existing arrangements for Ancillary Services and System Support Services are continuing until further notice.</td>
</tr>
<tr>
<td>System Support Services</td>
<td>Ancillary Service(s) Agreement</td>
<td>These agreements will continue to stay in place with their existing names.</td>
</tr>
<tr>
<td>CCGT Module</td>
<td>CCGT Unit</td>
<td>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.</td>
</tr>
<tr>
<td>Prudent Operating Practice</td>
<td>Prudent Utility Practice</td>
<td>Each Code uses a different phrase for this concept.</td>
</tr>
<tr>
<td>Planned Outage</td>
<td>Schedule Outage</td>
<td>Each Code uses a different phrase for this concept.</td>
</tr>
<tr>
<td>Planned Maintenance Outage</td>
<td>Short Term Scheduled Outage</td>
<td>Each Code uses a different phrase for this concept.</td>
</tr>
</tbody>
</table>
### 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.

<table>
<thead>
<tr>
<th>Provision</th>
<th>SONI Grid Code</th>
<th>EirGrid Grid Code</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDC1.4.2.1</td>
<td>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.</td>
<td>No such reference is made.</td>
<td>The provisions of Appendix B are specific to PPA Generation in Northern Ireland.</td>
</tr>
<tr>
<td>SDC1.4.2.2(b)</td>
<td>Reference is made to “PCA2.3.4”</td>
<td>Reference is made to “PCA.4.3 of the Planning Code Appendix”</td>
<td>These are the respective requirements for the provision of the CCGT Installation data.</td>
</tr>
<tr>
<td>SDC1.4.4.2</td>
<td>The following paragraphs are contained at the end of SDC1.4.4.2: “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.”</td>
<td>No such reference is made.</td>
<td>These provisions are specific to the way Users are required to declare reserve characteristics in Northern Ireland.</td>
</tr>
<tr>
<td>SDC1.4.3.6(b)</td>
<td>Reference is made to “OC11”</td>
<td>Reference is made to “OC10”</td>
<td>These are the respective requirements for Testing Monitoring and Investigation</td>
</tr>
<tr>
<td>SDC1.4.3.6(d)</td>
<td>Reference is made to a User acting in accordance with its obligations under “SDC1.4.3 and Appendix B to this SDC1”</td>
<td>Reference is made to a User acting in accordance with its obligations under “SDC1.4.3” only</td>
<td>SONI has separate requirements for Availability and Technical Parameter related issues in respect of PPA Generation.</td>
</tr>
</tbody>
</table>
| 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. |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SDC1.4.8.1</td>
<td>Reference is made to “the Republic of Ireland”.</td>
<td>Reference is being made in each Grid Code to the other jurisdiction.</td>
</tr>
<tr>
<td>SDC1.4.8.3(ii)</td>
<td>Reference is made to the “Transmission System and Distribution System constraints”</td>
<td>EirGrid will not be in a position to take Distribution Constraints into account in determining the IOS.</td>
</tr>
<tr>
<td>SDC1.4.8.3(iv)</td>
<td>Reference is made to “OC3”</td>
<td>These are the respective references to Operating Margin.</td>
</tr>
<tr>
<td>SDC1.4.8.3(xv)</td>
<td>Reference is made to “OC10” and then to “OC8”.</td>
<td>These are the respective references to Testing Monitoring and Investigation and Operational Testing.</td>
</tr>
<tr>
<td>SDC1.4.8.3(xv)</td>
<td>Reference is made to “Commissioning/Acceptance Testing”</td>
<td>These are the respective terms used in each Grid Code</td>
</tr>
<tr>
<td>SDC1.4.8.3(xvi)</td>
<td>Reference is made to “System Tests” only</td>
<td>The EirGrid Grid Code definition of System Tests excludes Operational and Commissioning Tests whereas the SONI definition includes them.</td>
</tr>
<tr>
<td>SDC1.4.8.4</td>
<td>Reference is made to “the Republic of Ireland”.</td>
<td>Reference is being made in each Grid Code to the other jurisdiction.</td>
</tr>
</tbody>
</table>
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.

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.

<table>
<thead>
<tr>
<th>Provisions used in SONI Grid Code only</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDC1.1.4</td>
<td>SONI has extra requirements due to the presence of PPA Generation in Northern Ireland.</td>
</tr>
<tr>
<td>SDC1.4.3: Introductory sentence</td>
<td></td>
</tr>
<tr>
<td>SDC1.4.4: Introductory sentence</td>
<td></td>
</tr>
<tr>
<td>SDC1.4.8: Introductory Sentence</td>
<td></td>
</tr>
<tr>
<td>SDC1.4.8.3(xxiv)</td>
<td></td>
</tr>
<tr>
<td>SDC1 Appendix B</td>
<td></td>
</tr>
<tr>
<td>SDC1.4.2.2(f)</td>
<td>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.</td>
</tr>
<tr>
<td>SDC1.4.2.3/SDC1.4.8.3(xvi)</td>
<td>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.</td>
</tr>
<tr>
<td>SDC1.4.4.2(i)</td>
<td>This provision is necessary to deal with conversion factors applicable to PPA Generators in Northern Ireland.</td>
</tr>
<tr>
<td>SDC1.4.4.3</td>
<td>There are differences in how Reserve capabilities are notified to both SONI and EirGrid.</td>
</tr>
<tr>
<td>Provisions used in EirGrid Grid Code only</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>SDC1.4.4.2 (h)</td>
<td>There are differences in how Operating Reserve capabilities are notified to both SONI and EirGrid.</td>
</tr>
<tr>
<td>SDC1.4.4.2(c)</td>
<td>The SONI Grid Code addresses the issue of conversion factors in a different way by cross-referencing to the Planning Code.</td>
</tr>
</tbody>
</table>
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 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

26 June 2019
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.
(c) 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.

SDC1-360

26 June 2019
(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 Instruction.

(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

SDC1-363

26 June 2019
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 CDGUs 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

26 June 2019
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.

SDC1-369

26 June 2019
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

26 June 2019
issue a new Dispatch Instruction with a Synchronising time equal to the actual time the unit Synchronised.

<table>
<thead>
<tr>
<th>SDC2.A.4.1.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>With regard to synchronisation of CDGU above 10 MW:</td>
</tr>
</tbody>
</table>

(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.

<table>
<thead>
<tr>
<th>SDC2.A.4.2</th>
<th>CDGUs De-Synchronising</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDC2.A.4.2.1</td>
<td>The Dispatch Instruction will normally follow the form, for example:</td>
</tr>
</tbody>
</table>

"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, 50.05 Hz.

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

SDC1.372

26 June 2019
(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.

<table>
<thead>
<tr>
<th>Terms used in SONI Grid Code</th>
<th>Equivalent terms used in EirGrid Grid Code (where different)</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Support Services</td>
<td>Ancillary Service(s)</td>
<td>The existing arrangements for Ancillary Services and System Support Services are continuing until further notice.</td>
</tr>
<tr>
<td>CCGT Module</td>
<td>CCGT Unit</td>
<td>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.</td>
</tr>
<tr>
<td>voltage</td>
<td>Voltage</td>
<td>“Voltage” is a defined term in the EirGrid Grid Code but not in the SONI Grid Code.</td>
</tr>
<tr>
<td>emergency</td>
<td>Emergency</td>
<td>“Emergency” is a defined term in the EirGrid Grid Code but not in the SONI Grid Code.</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Provision</th>
<th>SONI Grid Code</th>
<th>EirGrid Grid Code</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDC2.1.2(a)</td>
<td>Reference is made to “but not Pumped Storage Demand” after the words “Pumped Storage Generation”.</td>
<td></td>
<td>Reference to these words in the SONI Grid Code is made for clarity reasons.</td>
</tr>
</tbody>
</table>

SDC1-376

26 June 2019
<p>| 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 |</p>
<table>
<thead>
<tr>
<th>Provisions used in SONI Grid Code only</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDC2.1.3</td>
<td>This paragraph cross-refers to Appendices C and D which both deal with specific issues applicable to PPA Generation only.</td>
</tr>
<tr>
<td>SDC2.4.1.4</td>
<td>This provision is necessary in the SONI Grid Code to specify that specific CCGT requirements contained in the Generating Unit Agreements,</td>
</tr>
</tbody>
</table>

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.
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDC2.4.2.3</td>
<td>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.</td>
</tr>
<tr>
<td>SDC2.4.2.4(c) – final sentence</td>
<td>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.</td>
</tr>
<tr>
<td>SDC2.4.2.4(n)</td>
<td>This is a SONI Grid Code only requirement in respect of instructions to change Generator Transformer tap positions.</td>
</tr>
<tr>
<td>SDC2.A.1 – second paragraph</td>
<td>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.</td>
</tr>
<tr>
<td>SDC2 Appendix C</td>
<td>This appendix deals with fuel provisions which apply to PPA Generation only.</td>
</tr>
<tr>
<td>SDC2 Appendix D</td>
<td>This appendix deals with additional provisions which apply to PPA Generation only.</td>
</tr>
</tbody>
</table>

**Provisions used in EirGrid Grid Code only**

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDC2.4.2.3</td>
<td>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.</td>
</tr>
<tr>
<td>SDC2.4.2.4(b)(iv)</td>
<td>This paragraph is EirGrid specific as it cross-refers to Appendix B which sets out EirGrid specific requirements for Generator Reactive Power Dispatch.</td>
</tr>
<tr>
<td>SDC2.A.5.1 – second paragraph</td>
<td>This provision deals with EirGrid specific requirements in respect of MW Output adjustment of a CDGU for System Frequency.</td>
</tr>
<tr>
<td>SDC2.A.7 (d) to (h) and final 2 paragraphs</td>
<td>These additional paragraphs deal with EirGrid specific Generator Reactive Power dispatch requirements.</td>
</tr>
<tr>
<td>SDC2.A.11</td>
<td>This additional paragraph deals with EirGrid specific Dispatch Instructions in relation to emergencies.</td>
</tr>
<tr>
<td>SDC2 Appendix B</td>
<td>This appendix deals with the EirGrid specific requirements for the Dispatch of Generator Reactive Power.</td>
</tr>
</tbody>
</table>
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

SDC3-380

26 June 2019
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**.

SDC3-381

26 June 2019
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.

SDC3-382

26 June 2019
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;

DRC-384

26 June 2019
(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

DRC-385

26 June 2019
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.

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.

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.

Other modes of data transfer, such as magnetic tape, may be utilised if the TSO gives its prior written consent.

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.

Data not Supplied

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.

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.

DATA TO BE REGISTERED

Schedules 1 to 8 attached cover the following data areas:

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.

**DRC6.1.8** 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

---

26 June 2019
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**

<table>
<thead>
<tr>
<th>Power Station Name:</th>
<th>Date:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Data Description</th>
<th>Units</th>
<th>Data Cat.</th>
<th>Generating Unit or Power Station Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Power Station Data</strong></td>
<td></td>
<td></td>
<td>G1</td>
</tr>
<tr>
<td>Point of connection to the NI System in terms of geographical and electrical location and System voltage</td>
<td>-</td>
<td>SPD</td>
<td>-</td>
</tr>
<tr>
<td>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.</td>
<td>MW</td>
<td>SPD</td>
<td>-</td>
</tr>
<tr>
<td>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 &quot;rose&quot; format. In the case of PPM that are not WFPS, an equivalent diagram relating to the input resource of that PPM.</td>
<td>SPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum auxiliary Demand (Active Power and Reactive Power)</td>
<td>MW</td>
<td>SPD</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Mvar</td>
<td>SPD</td>
<td>-</td>
</tr>
<tr>
<td>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.</td>
<td>SPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating regime of Generating Units not subject to Central Dispatch (e.g. continuous, intermittent, peak lopping).</td>
<td>SPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General Generating Unit Data</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prime mover type</td>
<td>MVA</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td>Generating Unit type</td>
<td>SPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generating Unit rating and terminal voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generating Unit rated power factor</td>
<td>SPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registered Capacity sent out</td>
<td>MW</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td>Max.Gen. and Min.Gen. capability sent out</td>
<td>MW</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td>Mvar</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td>Maximum Auxiliary Demand</td>
<td>MW</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mvar</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td>Inertia constant</td>
<td>MW</td>
<td>sec</td>
<td>SPD</td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Abbreviations:**

- **SPD** = Standard Planning Data
- **DPD** = Detailed Planning Data
- **Min Gen** = Minimum Generation
- **Max Gen** = Maximum Generation

26 June 2019
% on MVA = & on Rated MVA
% on 100 = % on 100 MVA

RC = Registered Capacity
OC1, SDC1, etc = Grid Code for which data is required
### DATA DESCRIPTION

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CAT</th>
<th>GENERATING UNIT OR POWER STATION DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>G1</td>
</tr>
<tr>
<td>Short circuit ratio</td>
<td>SPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct axis transient reactance</td>
<td>% on</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td>Direct axis sub-transient time constant</td>
<td>S</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td><strong>Generator Transformer</strong> rated MVA, positive sequence reactance and tap change range</td>
<td>MVA</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>% on</td>
<td>MVA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+/-</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td><strong>Sustained Load Diagram</strong></td>
<td>Diagram</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td>In relation to the generators comprised within a <strong>PPM</strong>, such General <strong>Generating Unit</strong> Data equivalent to that listed above as the <strong>TSO</strong> shall reasonably require.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A list of the <strong>CCGT Modules</strong> in the <strong>CCGT Installation</strong> identifying each <strong>CCGT Module</strong>, and the <strong>CCGT Installation</strong> of which it forms part unambiguously, together with other relevant information.</td>
<td>List</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td><strong>Auxiliary Demand</strong></td>
<td>MW</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>The normal <strong>Generating Unit</strong>-supplied auxiliary <strong>Load</strong> for each <strong>Generating Unit</strong> at rated MW output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MW</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>The <strong>Power Station</strong> auxiliary <strong>Load</strong>, if any, additional to the <strong>Generating Unit</strong> supplied auxiliary <strong>Load</strong> where the <strong>Power Station</strong> auxiliary <strong>Load</strong> is supplied from the NI System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Generating Unit</strong> parameters</td>
<td>kW</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Rated terminal voltage</td>
<td>kV</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Rated MVA</td>
<td>MVA</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Rated MW</td>
<td>MW</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Min.Gen.</td>
<td>MW</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Short circuit ratio</td>
<td>SPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct axis synchronous reactance</td>
<td>% on</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Direct axis transient reactance</td>
<td>% on</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Direct axis sub-transient reactance</td>
<td>% on</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Direct axis transient time constant</td>
<td>S</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Direct axis sub-transient time constant</td>
<td>S</td>
<td>DPD</td>
<td></td>
</tr>
</tbody>
</table>

DRC-391

26 June 2019
<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CAT</th>
<th>GENERATING UNIT OR POWER STATION DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>G1</td>
</tr>
<tr>
<td>Quadrature axis synchronous reactance</td>
<td>% on</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quadrature axis transient reactance</td>
<td>% on</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quadrature axis sub-transient reactance</td>
<td>% on</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quadrature axis transient time constant</td>
<td>S</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Quadrature axis sub-transient time constant</td>
<td>S</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Stator time constant</td>
<td>S</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Stator resistance</td>
<td></td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Stator leakage reactance</td>
<td>% on</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbogenerator inertia constant, or, for generators comprised within a PPM, Plant inertia constant</td>
<td>MWsec/ MVA</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Other than for generators comprised within a PPM, rated field current</td>
<td>A</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td>A</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Parameters for Generating Unit Step-Up Transformers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated MVA</td>
<td>MVA</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Voltage ratio</td>
<td></td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Positive sequence reactance (at max., min. &amp; nominal tap)</td>
<td>% on</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive sequence resistance (at max., min. &amp; nominal tap)</td>
<td>% on</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zero phase sequence reactance</td>
<td>% on</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tap changer range</td>
<td>+%/-%</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Tap changer step size</td>
<td>%</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Tap changer type: on Load or off circuit</td>
<td>on/off</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Power Station Transformer Parameters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated MVA</td>
<td>MVA</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Voltage ratio</td>
<td></td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Zero sequence reactance as seen from the higher voltage side</td>
<td>% on</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excitation control system parameters (not for PPMs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC gain of excitation loop</td>
<td></td>
<td>DPD</td>
<td></td>
</tr>
</tbody>
</table>

DRC-392

26 June 2019
<table>
<thead>
<tr>
<th></th>
<th>DPD</th>
<th>DPD</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated field voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum field voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26 June 2019
<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CAT.</th>
<th>GENERATING UNIT OR POWER STATION DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>G1</td>
</tr>
<tr>
<td>Minimum Field Voltage</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Max. rate of change of field voltage (rising)</td>
<td>V/sec</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Max. rate of change of field voltage (falling)</td>
<td>V/sec</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Details of excitation loop described in block diagram form showing transfer functions of individual elements</td>
<td>Diagram</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Dynamic characteristics of over-excitation limiter</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Dynamic characteristics of under-excitation limiter</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Governor Parameters (for Reheat Steam Turbine Units)</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>H.P. governor average gain</td>
<td>MW/Hz</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Speeder motor setting range</td>
<td>Hz</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>H.P. governor valve time constant</td>
<td>S</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>H.P. governor valve opening limits</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>H.P. governor valve rate limits</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Reheater time constant (active energy stored in reheater)</td>
<td>S</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>IP governor average gain</td>
<td>MW/Hz</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>IP governor setting range</td>
<td>Hz</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>IP governor valve time constant</td>
<td>S</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>IP governor valve opening limits</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>IP governor valve rate limits</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Details of acceleration sensitive elements in HP and IP governor loop</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Governor block diagram showing transfer functions of individual elements</td>
<td>Diagram</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Governor Parameters (for Non-Reheat Steam Turbine Units and Gas Turbine Units)</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Governor average gain</td>
<td>MW/Hz</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Speeder motor setting range</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Time constant of steam or fuel governor valve</td>
<td></td>
<td></td>
<td>DPD</td>
</tr>
</tbody>
</table>

DRC-394

26 June 2019
<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CAT.</th>
<th>GENERATING UNIT OR POWER STATION DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governor value opening limits</td>
<td>DPD</td>
<td></td>
<td>G1 G2 G3 G4 G5 G6 G7 STN</td>
</tr>
<tr>
<td>Governor valve rate limits</td>
<td>DPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time constant of turbine</td>
<td>S</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Governor block diagram</td>
<td>Diagram</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Governor parameters (for PPMs)</td>
<td>DPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generator torque/speed controller(s) (if any)</td>
<td>DPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generator blade angle controller(s) (if any)</td>
<td>DPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generator power limitation function(s) (if any)</td>
<td>DPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant Flexibility Performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate of Loading following weekend shutdown (Generating Unit and Power Station)</td>
<td>MW/m</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Rate of Loading following overnight shutdown (Generating Unit and Power Station)</td>
<td>MW/m</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Block Load following Synchronising, or, in the case of PPMs, generating whilst</td>
<td>MW</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>connected to the NI System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate of Deloading from normal rated MW</td>
<td>MW/m</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Regulating range</td>
<td>MW</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>Load rejection capability while still Synchronised, or, in the case of PPMs,</td>
<td>MW</td>
<td>DPD</td>
<td></td>
</tr>
<tr>
<td>generating whilst still connected to the NI System and generating, and able to</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>supply Load</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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: ___________________________________________________________________

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CAT.</th>
<th>GENERATING UNIT OR POWER STATION DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>G1</td>
</tr>
<tr>
<td>Generation Planning Parameters for CDGUs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The minimum notice required to Synchronise a Generating Unit from De-synchronisation</td>
<td>Mins</td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>The minimum time between Synchronising different Generating Units in a Power Station</td>
<td>Mins</td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>The minimum block Load requirements on Synchronising</td>
<td>OC2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Generating Unit Loading rates from Synchronising for the following conditions:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hot</td>
<td>MW/ min</td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>Warm</td>
<td>MW/ min</td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>cold</td>
<td>MW/ min</td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>Minimum time off Load</td>
<td>OC2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Generating Unit Deloading rates for the following conditions:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot</td>
<td>MW/ min</td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>warm</td>
<td>MW/ min</td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>cold</td>
<td>MW/ min</td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>Maximum allowable starts per year:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hot</td>
<td>OC2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DRC-396

26 June 2019
<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CAT.</th>
<th>GENERATING UNIT OR POWER STATION DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>warm</td>
<td></td>
<td>OC2</td>
<td>G1 G2 G3 G4 G5 G6 G7 STN</td>
</tr>
<tr>
<td>cold</td>
<td></td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td><strong>Generation Planning Parameters for Controllable PPMs or Dispatchable PPMs</strong></td>
<td></td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>The minimum time to connect/reconnect the Controllable PPM or Dispatchable PPM (or part thereof) to the NI System following a Dispatch instruction</td>
<td></td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>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)</td>
<td></td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td></td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td>The minimum fault level or voltage at the Connection Point below which the Controllable PPM or Dispatchable PPM cannot be connected</td>
<td></td>
<td>OC2</td>
<td></td>
</tr>
<tr>
<td><strong>Operating Reserve to Frequency change</strong></td>
<td></td>
<td>OC3</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td></td>
<td>Table</td>
<td></td>
</tr>
<tr>
<td><strong>Governor Droop Characteristics</strong></td>
<td></td>
<td>OC3</td>
<td></td>
</tr>
<tr>
<td>Governor Droop</td>
<td></td>
<td>OC3</td>
<td></td>
</tr>
<tr>
<td>Unit Control Options</td>
<td>%</td>
<td>OC3</td>
<td></td>
</tr>
<tr>
<td>Maximum Droop</td>
<td>%</td>
<td>OC3</td>
<td></td>
</tr>
<tr>
<td>Normal Droop</td>
<td>%</td>
<td>OC3</td>
<td></td>
</tr>
<tr>
<td>Minimum Droop</td>
<td>%</td>
<td>OC3</td>
<td></td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Technical Parameter</th>
<th>CDGU</th>
<th>Control PPM</th>
<th>DSU</th>
<th>Agg Gen</th>
<th>ESPS Demand</th>
<th>Pump Storage Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Thermal</td>
<td>Hydr/En Ltd</td>
<td>Disp. PPM</td>
<td>Pump S Gen</td>
<td>Indiv. Demand Site</td>
</tr>
<tr>
<td>Block Load Cold</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Block Load Hot</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Block Load Warm</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Charging Capacity</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cycle Efficiency</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Demand Side Unit =Notice</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Deload Break Point</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Demand Side Unit MW Availability</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Demand Side Unit MW Response Time</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>De-Loading Rate 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>De-Loading Rate 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Up 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Up 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Up 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Down 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Down 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Down 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Up Trigger Point 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dwell Time Up Trigger Point 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

DRC-398

26 June 2019
<table>
<thead>
<tr>
<th>Technical Parameter</th>
<th>CDGU</th>
<th>Control PPM</th>
<th>DSU</th>
<th>Agg. Gen</th>
<th>ESPS Demand</th>
<th>Pump Storage Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thermal</td>
<td>Hydr/ En Ltd</td>
<td>Disp. PPM</td>
<td>Pump S Gen</td>
<td>Indiv. Demand Site</td>
<td>Agg. Demand Sites</td>
</tr>
<tr>
<td>Dwell Time Up Trigger Point 3</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Dwell Time Down Trigger Point 1</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Dwell Time Down Trigger Point 2</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Dwell Time Down Trigger Point 3</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>End Point of Start Up Period</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Energy Limit</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forecast Minimum Output Profile</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forecast Minimum Generation Profile</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Up Break Point Cold (1)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Load Up Break Point Cold (2)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Load Up Break Point Hot (1)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Up Break Point Hot (2)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Up Break Point Warm (1)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Up Break Point Warm (2)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Cold (1)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Loading Rate Cold (2)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Loading Rate Cold (3)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Loading Rate Hot (1)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Hot (2)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Hot (3)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Warm (1)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Warm (2)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading Rate Warm (3)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Ramp Down Rate (shall be a number greater than zero)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Ramp Up Rate (shall be a number greater than zero)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Charge Capacity</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td>ESPS Gen Only</td>
<td></td>
</tr>
<tr>
<td>Maximum Down Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Generation / Registered Capacity</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Maximum On Time</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Storage Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Charge Capacity</td>
<td>✔</td>
<td></td>
<td></td>
<td>ESPS Gen Only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical Parameter</td>
<td>CDGU</td>
<td>Control PPM</td>
<td>DSU</td>
<td>Agg. Gen</td>
<td>ESPS Demand</td>
<td>Pump Storage Demand</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>------</td>
<td>-------------</td>
<td>-----</td>
<td>----------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td></td>
<td>Thermal</td>
<td>Hydr/ En Ltd</td>
<td>Disp. PPM</td>
<td>Pump S Gen</td>
<td>Indiv. Demand Site</td>
<td>Agg. Demand Sites</td>
</tr>
<tr>
<td>Minimum Down Time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Minimum Generation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Minimum Off Time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Minimum On Time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Minimum Storage Capacity</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Off to Generating Time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Off to Spin Pump Time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>(Other relevant technical parameters)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Pumping capacity</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Break Point 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Break Point 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Break Point 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Break Point 4</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Rate 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Rate 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Rate 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Rate 4</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Down Rate 5</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Break Point 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Break Point 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Break Point 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Break Point 4</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Rate 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Rate 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Rate 3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Rate 4</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ramp Up Rate 5</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Short Term Maximisation Capability</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Short Term Maximisation Time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Cold (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Cold (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Hot (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Hot (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Trigger Point Cold (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Trigger Point Cold (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Trigger Point Hot (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Trigger Point Hot (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Soak Time Trigger Point Warm (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

DRC-400

26 June 2019
### Technical Parameter

<table>
<thead>
<tr>
<th>Technical Parameter</th>
<th>CDGU</th>
<th>Control PPM</th>
<th>DSU</th>
<th>Agg. Gen</th>
<th>ESPS Demand</th>
<th>Pump Storage Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thermal</td>
<td>Hydr/ En Ltd</td>
<td>Disp. PPM</td>
<td>Pump S Gen</td>
<td>Indiv. Demand Site</td>
<td>Agg. Demand Sites</td>
</tr>
<tr>
<td>Soak Time Trigger Point Warm (2)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soak Time Warm (1)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soak Time Warm (2)</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spin Pump to Pumping Energy Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Synchronous Start-Up Time Cold</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Synchronous Start-Up Time Hot</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Synchronous Start-Up Time Warm</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start of Restricted Range 1</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>End of Restricted Range 1</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Start of Restricted Range 2</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>End of Restricted Range 2</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

Users should also refer to SDC1.4.5.2 for the submission of revised Technical Parameters data.

### 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:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Applies to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time from initiation of a start to achieving</td>
<td>CDGUs which are Open Cycle Gas Turbines or</td>
</tr>
<tr>
<td>Variable</td>
<td>Applies to</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dispatched Load</td>
<td>CCGTs</td>
</tr>
<tr>
<td>Governor Droop</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>Sustained Response Capability</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>Two shifting limitation (limitation on the number of Start-ups per Trading Day)</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>The MW and Mvar capability limits within which the CDGU is able to operate as shown in the relevant Generator Performance Chart</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>Maximum number of on Load cycles per 24 hour period, together with the maximum Load increases involved</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>^Maximum number of changes to the Dispatched Fuel per 24 hour period</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>Maximum quantity of oil in “ready-use tanks” and associated pipework</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>^Maximum number of changes to the Designated Fuel per 24 hour period</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>^Minimum notice to change the Designated Fuel.</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>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</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>Declared Maximisation Capacity</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
<tr>
<td>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.</td>
<td>All CDGUs, except Aggregated Generating Units</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>CDGU (AND/OR CCGT MODULE, AS PROVIDED IN OC2)/ CONTROLLABLE PPM/DISPATCHABLE PPM/POWER STATION EQUIPMENT/INTERCONNECTOR OUTAGE PROGRAMMES</th>
<th>UNITS</th>
<th>TIME COVERED</th>
<th>UPDATE TIME</th>
<th>DATA CAT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Note: References to CCGT Installations include CCGT Modules as provided in OC2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicative Term Operational Planning: Planning for years 4 to 7 ahead</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested Indicative Outage Programme containing:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) MW concerned (i.e. which will not be Available as a result of the Outage and that which will still be Available);</td>
<td>MW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) duration of Outage;</td>
<td>weeks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) preferred Start Date and Start Time;</td>
<td>date/time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) whether Flexible or Inflexible;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) if Flexible:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) period by which Outage may be deferred;</td>
<td>days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) period by which Outage may be advanced;</td>
<td>days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Note: References to CCGT Installations include CCGT Modules as provided in OC2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Term Operational Planning: Planning for years 2 &amp; 3 ahead</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested Provisional Outage Programme containing:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) MW concerned (i.e. which will not be Available as a result of the Outage and that which will still be Available);</td>
<td>MW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) duration of Outage;</td>
<td>weeks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) preferred Start Date and Start Time;</td>
<td>date/time</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DRC-404

26 June 2019
<table>
<thead>
<tr>
<th>CDGU (AND/OR CCGT MODULE, AS PROVIDED IN OC2)/ CONTROLLABLE PPM/DISPATCHABLE PPM/POWER STATION EQUIPMENT/INTERCONNECTOR OUTAGE PROGRAMMES</th>
<th>UNITS</th>
<th>TIME COVERED</th>
<th>UPDATE TIME</th>
<th>DATA CAT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(v) whether Flexible or Inflexible;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) if Flexible:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) period by which <strong>Outage</strong> may be deferred;</td>
<td>days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) period by which <strong>Outage</strong> may be advanced;</td>
<td>days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vii) if the <strong>Outage</strong> is required to enable the <strong>Generator</strong> or <strong>Interconnector Owner</strong> to comply with statutory obligations and, in such case, the latest date by which the <strong>Outage</strong> must be taken.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(The <strong>TSO</strong>’s response as detailed in OC2)</td>
<td>Year 3</td>
<td>By end Sept.</td>
<td>OC2)</td>
<td></td>
</tr>
<tr>
<td>(Generators’ responses to changes suggested by the <strong>TSO</strong> and resolution of any disputes as set out in OC2)</td>
<td>Year 3</td>
<td>By end Oct.</td>
<td>OC2)</td>
<td></td>
</tr>
<tr>
<td>Up-dated suggested <strong>Provisional Outage Programme</strong> containing:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) <strong>MW</strong> concerned (i.e. which will not be Available as a result of the <strong>Outage</strong> and that which will still be Available);</td>
<td><strong>MW</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) duration of <strong>Outage</strong>;</td>
<td>weeks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) preferred <strong>Start Date</strong> and <strong>Start Time</strong>;</td>
<td>date/time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) whether Flexible or Inflexible;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) if Flexible:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) period by which <strong>Outage</strong> may be deferred;</td>
<td>days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) period by which <strong>Outage</strong> may be advanced.</td>
<td>days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vii) if the <strong>Outage</strong> is required to enable the <strong>Generator</strong> or <strong>Interconnector Owner</strong> to comply with statutory obligations and, in such case, the latest date by which the <strong>Outage</strong> must be taken.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(the <strong>TSO</strong>’s response as detailed in OC2)</td>
<td>Year 2</td>
<td>By end Sept.</td>
<td>OC2)</td>
<td></td>
</tr>
<tr>
<td>(Generators’ and Interconnector Owner’s responses to the <strong>TSO</strong>’s changes and resolution of any disputes as set out in OC2)</td>
<td>Year 2</td>
<td>By end Oct.</td>
<td>OC2)</td>
<td></td>
</tr>
<tr>
<td><strong>Medium Term Operational Planning: Planning for Year 1 ahead</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested <strong>Final Outage Programme</strong> containing:</td>
<td></td>
<td>Year 1</td>
<td>By end March</td>
<td>OC2</td>
</tr>
<tr>
<td>(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;</td>
<td></td>
<td><strong>MW</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) <strong>MW</strong> concerned (i.e. which will not be Available as a result of the <strong>Outage</strong> and that which will still be Available);</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) duration of <strong>Outage</strong>;</td>
<td>weeks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) preferred <strong>Start Date</strong> and <strong>Start Time</strong>;</td>
<td>date/time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDGU (AND/OR CCGT MODULE, AS PROVIDED IN OC2)/ CONTROLLABLE PPM/DISPATCHABLE PPM/ POWER STATION EQUIPMENT/ INTERCONNECTOR OUTAGE PROGRAMMES</td>
<td>UNITS</td>
<td>TIME COVERED</td>
<td>UPDATE TIME</td>
<td>DATA CAT.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>(v) whether Flexible or Inflexible;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) if Flexible:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) period by which Outage may be deferred;</td>
<td>days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) period by which Outage may be advanced.</td>
<td>days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(the TSO's response as detailed in OC2)</td>
<td></td>
<td>By end June</td>
<td>OC2)</td>
<td></td>
</tr>
<tr>
<td>(Generators' or Interconnector Owners' responses to the TSO's changes and resolution of any disputes as set out in OC2)</td>
<td></td>
<td>By end July</td>
<td>OC2)</td>
<td></td>
</tr>
<tr>
<td>(The TSO to notify Generators of any further changes required as detailed in OC2)</td>
<td></td>
<td>By end Sept.</td>
<td>OC2)</td>
<td></td>
</tr>
<tr>
<td>Short Term Operational Planning - Planning for Year 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>During Year 0, OC2 requires notices to be given in respect of the following (the details of which can be found in OC2):</td>
<td></td>
<td>Year 0</td>
<td>-</td>
<td>OC2</td>
</tr>
<tr>
<td>(i) movements of Flexible Planned Outages - on not less than 7 days' notice by the TSO;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) amendments to Planned Outages - request to be made by the TSO by notice in writing;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) MW concerned (i.e. MW which would not be Available as a result of the Outage and that which would still be Available);</td>
<td>MW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) duration of Outage (not exceeding 72 hours);</td>
<td>hours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) preferred Start Date &amp; Start Time;</td>
<td>date/time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(The TSO will respond to a request for a STPMO in accordance with OC2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) Notified Unplanned Outages - to be notified by a Generator as early as possible;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) 24 Hour Recall (in relation to a Notified Unplanned Outage) to be requested by the TSO and, if agreed to by the</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 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.

<table>
<thead>
<tr>
<th>Generator or Interconnector Owner, acknowledged by the Generator or Interconnector Owner by notice in writing;</th>
<th>UNITS</th>
<th>TIME COVERED</th>
<th>UPDATE TIME</th>
<th>DATA CAT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(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;</td>
<td></td>
<td>date &amp; time</td>
<td></td>
<td>OC2</td>
</tr>
<tr>
<td>(viii) Release of CDGUs/Controllable PPM/Dispatchable PPM/Power Station Equipment/Interconnector for Outage – the TSO’s express formal consent required (see Schedule 8);</td>
<td></td>
<td></td>
<td></td>
<td>OC2</td>
</tr>
<tr>
<td>(ix) Return to service from Outage to be notified by the Generator or Interconnector Owner to the TSO;</td>
<td></td>
<td></td>
<td></td>
<td>OC2</td>
</tr>
<tr>
<td>(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:</td>
<td></td>
<td>date &amp; time</td>
<td></td>
<td>OC2</td>
</tr>
<tr>
<td>(a) the reason for the delay; and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) the Generator’s or Interconnector Owner’s best estimate of the date and time of return to service.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## SCHEDULE 4

### DATA REGISTRATION CODE

#### GENERATOR OUTPUT/LOADING DATA AND ENERGY SALES DATA

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>TIMESCALE COVERED</th>
<th>UPDATE TIME</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERATION OUTPUT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where requested by the TSO, the Generator at each Power Station with a Registered Capacity of 2MW, but not exceeding 5MW must provide to the TSO a half-hourly printout of metered output in respect of such Power Station for:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Active Power; and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Reactive Power</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LOADING PROFILES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where requested by the TSO, each Generator with Independent Generating Plant with a Registered Capacity of 2MW and above and in respect of each of its CDGs other than PPA CDGs 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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where requested by the TSO, each Generator with Independent Generating Plant other than PPMs with a Registered Capacity of 2MW and above shall submit an estimate of Loading profiles including the half hourly output.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ENERGY SALES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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.A.1.1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modelling Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modelling data of the <strong>Users Plant</strong> and <strong>Apparatus</strong> at the <strong>Connection Point</strong> in accordance with PC.A2.1.4 and PC.B2.1.3</td>
<td></td>
<td>SPD</td>
</tr>
<tr>
<td><strong>User System layout</strong></td>
<td></td>
<td>SPD/DPD</td>
</tr>
<tr>
<td>Single line diagrams of existing and proposed arrangements of main <strong>Plant</strong> and <strong>Apparatus</strong> including:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) busbar layouts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) electrical circuitry (i.e. lines, cables, transformers, switchgear etc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) phasing arrangements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) earthing arrangements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) switching facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) operating voltages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vii) numbering and nomenclature</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reactive Compensation Equipment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For all independently switched reactive compensation equipment on the <strong>User's System</strong> at 11kV and above, other than power factor correction equipment associated directly with the <strong>User's Plant</strong> and <strong>Apparatus</strong>, the following information is required:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) type of equipment</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>(ii) capacitive and/or inductive rating or its operating range in MVAr</td>
<td></td>
<td>Mvar</td>
</tr>
<tr>
<td>(iii) details of any automatic control logic to enable operating characteristics to be determined</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>(iv) the point of connection to the <strong>User's System</strong> in terms of electrical location and voltage</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Short Circuit Infeed to the NI System</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The total short circuit infeeds calculated in accordance with good industry practice into the NI System from the <strong>User System</strong> at the <strong>Connection Point</strong> as follows:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) maximum 3-phase short circuit infeed including infeeds from any Generating Plant forming part of the <strong>User's System</strong></td>
<td></td>
<td>MVA</td>
</tr>
<tr>
<td>(ii) additional maximum 3-phase short circuit infeed from induction motors via the <strong>User's System</strong></td>
<td></td>
<td>MVA</td>
</tr>
<tr>
<td>(iii) minimum zero sequence impedance of the <strong>User's System</strong> at the <strong>Connection Point</strong></td>
<td></td>
<td>% on 100</td>
</tr>
<tr>
<td><strong>Lumped System Susceptance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Details of equivalent lumped network susceptance of the <strong>User's System</strong> 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:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) independent reactive compensation plant connected to the <strong>User's System</strong>; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) any susceptance of the <strong>User's System</strong> inherent in the <strong>Active and Reactive Power Demand</strong> data given under PC.A.3.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**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.

**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 or 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.

**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:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Data Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>rated voltage</td>
<td>kV</td>
<td>DPD</td>
</tr>
<tr>
<td>operating voltage</td>
<td>kV</td>
<td>DPD</td>
</tr>
<tr>
<td>positive phase sequence reactance</td>
<td>%</td>
<td>DPD</td>
</tr>
<tr>
<td>positive phase sequence resistance</td>
<td>%</td>
<td>DPD</td>
</tr>
<tr>
<td>positive phase sequence susceptance</td>
<td>%</td>
<td>DPD</td>
</tr>
<tr>
<td>zero phase sequence reactance</td>
<td>%</td>
<td>DPD</td>
</tr>
<tr>
<td>zero phase sequence resistance</td>
<td>%</td>
<td>DPD</td>
</tr>
<tr>
<td>zero phase sequence susceptance</td>
<td>%</td>
<td>DPD</td>
</tr>
</tbody>
</table>

(ii) Interconnecting transformers between the User's higher voltage system and the User's primary voltage system:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Data Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>rated MVA</td>
<td>MVA</td>
<td>DPD</td>
</tr>
<tr>
<td>voltage ratio</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>winding arrangement</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>positive sequence reactance (max, min, and nominal tap)</td>
<td>% on MVA</td>
<td>DPD</td>
</tr>
<tr>
<td>positive sequence resistance (max, min, and nominal tap)</td>
<td>% on MVA</td>
<td>DPD</td>
</tr>
<tr>
<td>zero sequence reactance</td>
<td>%</td>
<td>DPD</td>
</tr>
<tr>
<td>tap changer range</td>
<td>+% to -%</td>
<td>DPD</td>
</tr>
<tr>
<td>tap changer step size</td>
<td>%</td>
<td>DPD</td>
</tr>
<tr>
<td>tap changer type: on Load or off circuit</td>
<td></td>
<td>DPD</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Data Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>rated voltage</td>
<td>kV</td>
<td>DPD</td>
</tr>
<tr>
<td>operating voltage</td>
<td>kV</td>
<td>DPD</td>
</tr>
<tr>
<td>rated short circuit breaking current, 3-phase</td>
<td>kA</td>
<td>DPD</td>
</tr>
<tr>
<td>rated short-circuit breaking current, 1-phase</td>
<td>kV</td>
<td>DPD</td>
</tr>
<tr>
<td>rated load-breaking current, 3-phase</td>
<td>kA</td>
<td>DPD</td>
</tr>
</tbody>
</table>

**DATA DESCRIPTION**

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
</table>
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;

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

(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;

(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

(v) the most probable fault clearance time for electrical faults on the User’s System m/Sec

Earthing Arrangements

Full details of the means of permanently connecting the User System to each, including impedance values.

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.

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.

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 PCA.3.3.12.
### 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.

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA FOR FUTURE YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yr 1</td>
</tr>
<tr>
<td><strong>For all types of Demand</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Type and electrical loading of equipment to be connected: number and size of motors; types of drive and control arrangements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) The sensitivity of the Demand to variations in voltage and Frequency on the NI System.</td>
<td>MW/kV</td>
<td></td>
</tr>
<tr>
<td>(iii) The maximum harmonic content which the User would expect its Demand to impose on the NI System</td>
<td>Mvar/kV</td>
<td></td>
</tr>
<tr>
<td>(iv) The average and maximum phase unbalance which the User would expect its Demand to impose on the NI System.</td>
<td>MW/Hz</td>
<td></td>
</tr>
<tr>
<td><strong>For Fluctuating Loads &gt; 5 MVA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Details of the cyclic variation of Demand (Active and Reactive Power)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) The rates of change of Demand (Active and Reactive Power) both increasing and decreasing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) The shortest repetitive time interval between fluctuations in Demand (Active and Reactive Power)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) The magnitude of the largest step changes in Demand (Active and Reactive Power) both increasing and decreasing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) Maximum energy demanded per half hour by the fluctuating Load cycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) Steady state residual Demand (Active Power) occurring between Demand fluctuations</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>For User’s Abnormal Loads</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DRC-412

26 June 2019
SCHEDULE 7
DATA REGISTRATION CODE
DEMAND CONTROL AND GENERAL DATA
PART 1 - DEMAND CONTROL DATA

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>TIME COVERED</th>
<th>UPDATE TIME</th>
<th>DATA CAT.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer Demand Management Initiated by a Supplier</strong></td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>A Supplier which enters into (or amends) an agreement or other arrangement with</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>a Customer allowing Customer Demand Management must notify the TSO in writing</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>in accordance with OC4.4.2.2 of its best estimate of the following (on an</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>aggregated basis) when the aggregate of its possible Customer Demand Management</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>pursuant to all such agreements or arrangements it has effected can equal or</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>exceed 2 MW at any point in time:</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(i) the level of expected and possible Demand Control MW</td>
<td></td>
<td>End of current year to 30th April</td>
<td>By end of March</td>
<td>OC4</td>
</tr>
<tr>
<td>(ii) the circumstances in which the Customer Demand Management is expected to be</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>be and may be utilised</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(iii) the expected duration of Demand Control and the maximum permitted</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(iv) the expected and possible frequency of initiation</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(v) the locations at which it is expected that Demand Control will be exercised</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>A Supplier must notify the TSO in writing on each occasion that any Customer</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>Demand Management of which it has notified the TSO under OC4.4.2.1 and</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>OC4.4.2.2, is planned to be instructed (or has been instructed) by that</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>Supplier and which will in aggregate equal or exceed (or has equalled or</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>exceeded) 2 MW at any point in time other than following an instruction by the</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>TSO. Such notification must be given in accordance with the timing requirements</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>of OC4.4.2.4 and will contain:</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(a) the amount of Customer Demand Management planned to be instructed, or which</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>had been instructed;</td>
<td>MW</td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(b) the length of time which the Customer Demand Management is anticipated to be</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>in force and the time at which it is to commence, or commenced; and</td>
<td>hours/minutes</td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(c) the location on the Total System at which the Customer Demand Management is</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>to be, or has been, implemented.</td>
<td>location</td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>The Supplier must, in addition, notify the Customer Demand Management actually</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>achieved (to the extent it differs from the data already supplied) within 2</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>weeks of initiation, including MW profiles on a half hourly basis and the amount</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>of Demand reduction achieved.</td>
<td>MW</td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
</tbody>
</table>
### DATA DESCRIPTION

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>TIME COVERED</th>
<th>UPDATE TIME</th>
<th>DATA CAT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td><strong>Customer Demand Management Initiated by the TSO</strong></td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>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:</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(i) the amount of the Demand Control reduction available;</td>
<td>MW</td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(ii) how often it can be used;</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(iii) the length of time that Demand Control can be used;</td>
<td>hours/mins</td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(iv) the notice required to be given to the Supplier by the TSO;</td>
<td>hours/mins</td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(v) any situations under which the available Customer Demand Management may be varied or cannot be instructed by the TSO;</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(vi) the duration of the arrangement with the Customer; and</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
<tr>
<td>(vii) any other information which the Supplier reasonably considers would be relevant to the TSO.</td>
<td></td>
<td></td>
<td></td>
<td>OC4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>GRID CODE PROVISION</th>
<th>DATA DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC9.1.3/CC9.1.4</td>
<td><strong>Site Responsibility Schedules/Ownership Diagrams</strong>&lt;br&gt;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:&lt;br&gt;- a Site Responsibility Schedule; and&lt;br&gt;- an Ownership Diagram.</td>
</tr>
<tr>
<td>OC2.6.2(c)(i)</td>
<td><strong>Operational Planning</strong>&lt;br&gt;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.</td>
</tr>
<tr>
<td>OC2.6.3(c)(i)/OC2.6.3(f)(i)</td>
<td>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.</td>
</tr>
<tr>
<td>OC2.6.7.3</td>
<td>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:&lt;br&gt;- the identity of the CDGU, Controllable PPMs or Dispatchable PPMs (or Generating Unit(s) therein) and/or Power Station Equipment and MW concerned;&lt;br&gt;- the duration of the Outage; and&lt;br&gt;- the Start Date and Start Time.</td>
</tr>
<tr>
<td>OC2.7.1</td>
<td>If there is a deficit indicated in any week, the TSO and the Other TSO shall jointly issue a System Capacity Shortfall Warning.</td>
</tr>
<tr>
<td>OC2.7.2</td>
<td>If there is a deficit indicated in any day, the TSO and the Other TSO shall jointly issue a System Capacity Shortfall Warning.</td>
</tr>
<tr>
<td>OC2.8.2</td>
<td>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.</td>
</tr>
<tr>
<td>OC2.8.5(a)(ii)</td>
<td>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.</td>
</tr>
<tr>
<td>SDC1.4.8.9</td>
<td>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.</td>
</tr>
</tbody>
</table>

**Initial Planning Data**

26 June 2019
<table>
<thead>
<tr>
<th>GRID CODE PROVISION</th>
<th>DATA DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC6.4.1</td>
<td>Initial planning data to be submitted on the TSO website including the following information:</td>
</tr>
<tr>
<td></td>
<td>(i) <strong>User</strong>'s name (legal and project name);</td>
</tr>
<tr>
<td></td>
<td>(ii) <strong>User</strong>'s contact details;</td>
</tr>
<tr>
<td></td>
<td>(iii) <strong>User</strong>'s date of completed application;</td>
</tr>
<tr>
<td></td>
<td>(iv) Status of application, for example in progress or issued;</td>
</tr>
<tr>
<td></td>
<td>(v) Specific location, including grid co-ordinates; and</td>
</tr>
<tr>
<td></td>
<td>(vi) The capacity applied for the project; and</td>
</tr>
<tr>
<td></td>
<td>(vii) Interacting group where applicable.</td>
</tr>
</tbody>
</table>

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

GC3.1 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.

GC3.2 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:

GC-419

26 June 2019
(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.

**GC7.4** 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.

**GC7.5** 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.

**GC7.6** 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.

**GC8** **COMMUNICATION BETWEEN THE TSO AND USERS**

**GC8.1** 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.

**GC8.2** 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.
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.

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 (aa) 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 (bb) 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:

26 June 2019
(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
<table>
<thead>
<tr>
<th>CONTENTS OF THE MAIN CODE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC1 DEFINITIONS</td>
<td>3</td>
</tr>
<tr>
<td>MC2 INTRODUCTION AND SCOPE</td>
<td>10</td>
</tr>
<tr>
<td>MC3 GENERAL</td>
<td>13</td>
</tr>
<tr>
<td>MC4 DATA COLLECTION</td>
<td>15</td>
</tr>
<tr>
<td>MC5 DESCRIPTION OF METERING</td>
<td>16</td>
</tr>
<tr>
<td>MC6 ACCURACY</td>
<td>16</td>
</tr>
<tr>
<td>MC7 CALIBRATION</td>
<td>17</td>
</tr>
<tr>
<td>MC8 PROPER ORDER, TESTING, SEALING AND READINGS</td>
<td>17</td>
</tr>
<tr>
<td>MC9 ACCESS</td>
<td>26</td>
</tr>
<tr>
<td>MC10 METER DISCREPANCIRES</td>
<td>28</td>
</tr>
<tr>
<td>MC11 DEFECTIVE EQUIPMENT</td>
<td>29</td>
</tr>
<tr>
<td>MC12 SANCTIONS FOR NON-COMPLIANCE</td>
<td>29</td>
</tr>
<tr>
<td>MC13 METER FAILURE</td>
<td>29</td>
</tr>
<tr>
<td>MC14 COLLECTION, RETRIEVAL, VALIDATION AND ESTIMATION OF DATA</td>
<td>30</td>
</tr>
<tr>
<td>MC15 DISPUTES</td>
<td>31</td>
</tr>
<tr>
<td>MC16 METERING COMMITTEE</td>
<td>32</td>
</tr>
<tr>
<td>MC17 INFORMATION</td>
<td>33</td>
</tr>
<tr>
<td>MC18 OWNERSHIP OF METERING DATA</td>
<td>34</td>
</tr>
<tr>
<td>MC19 NEW CONNECTION REGISTRATION AND CHANGE OF SUPPLIER</td>
<td>35</td>
</tr>
<tr>
<td>MC20 NOTICES</td>
<td>35</td>
</tr>
</tbody>
</table>

26 June 2019
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;

“Agreed Procedure” each of the agreed procedures which are specified in MC2.3 and set out in this Metering Code;

“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 data collectors), 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 data collectors, the Generator data collectors...
and the accounting software known as the contract management system are not part of the Data Collection System;

“Data Protection Legislation”

the Data Protection Act 1998 implementing Directive 95/46/EC on the protection of individuals with regard to the Processing of Personal Data 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;

“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 data collector”
a data collector 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;

“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;

“Non NIE Customer” a person who is supplied with or sold electricity by a Supplier other than NIE Energy Limited;

“Non NIE Supplier” a Supplier other than NIE Energy Limited;

“Northern Ireland Fuel Security Code” the document of that title designated as such by the Department of Economic Development 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 the Data Protection Act 1998) that is collected or processed under the Metering Code;

MC - 429
“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 1998;

“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:

\[
1000 \text{ VAr} = 1 \text{ kVAr};
\]

\[
1000 \text{ kVAr} = 1 \text{ MVAr};
\]

“Registrant” the TSO 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 Non NIE Customer to the Transmission System;

“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 Electricity (Northern Ireland) Order 1992;

“System data collector” a data collector (sometimes referred to as an "outstation") owned by the TO for transmitting data to the Data Collection System for the purpose of providing Settlement Values;

“Tariff Metering” meters, associated current and voltage transformers, metering protection equipment including alarms, electrical circuitry, their associated data collectors (including Generator data collectors) and wiring 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 plc 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” refers to the Single Electricity Market Trading and Settlement Code adopted by the Market Operator and approved by the regulatory authorities.

“TSO” or “Transmission System Operator” refers to 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.

“User” refers to an Interconnector Owner, a Generator, a Non NIE 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 to Non NIE Customers nor 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:**

<table>
<thead>
<tr>
<th>Sub-Code No.</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Generation Tariff Metering for Power Stations existing at the Effective Date;</td>
</tr>
<tr>
<td>2.1</td>
<td>Metering of Circuits with a Rated Capacity exceeding 100 MVA;</td>
</tr>
<tr>
<td>2.2</td>
<td>Metering of Circuits with a Rated Capacity exceeding 10 MVA and up to and including 100 MVA;</td>
</tr>
<tr>
<td>2.3</td>
<td>Metering of Circuits with a Rated Capacity of 70 kVA or more and up to and including 10 MVA;</td>
</tr>
<tr>
<td>2.4</td>
<td>Calibration, Testing and Commissioning Requirements of Metering Equipment;</td>
</tr>
<tr>
<td>3</td>
<td>Generation Operational Metering.</td>
</tr>
</tbody>
</table>

**MC2.3.3 Agreed Procedures**

<table>
<thead>
<tr>
<th>Agreed Procedure No.</th>
<th>Title</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Maintenance, Testing, inspection and Sealing of Tariff Metering (Generation) and Generator Circuits</td>
<td>MC8.7</td>
</tr>
<tr>
<td>3.</td>
<td>Meter Advance Reconciliation</td>
<td>MC10</td>
</tr>
</tbody>
</table>

26 June 2019
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 data collectors or any other data collector 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 Non NIE Customer which shall, for the purposes of this Metering Code, be the responsibility of the relevant Supplier;

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 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 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 2.4, 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 2.4 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 be undertaken by the Interested User, as soon as is reasonably practicable following the request of the TSO, on behalf of and under the supervision 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 Each Interested User shall read each meter register in respect of which it is the Interested User, daily at or around midnight, and pass such readings to the TSO 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 data collectors 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.5 or, as the case may be, No.6 failing which it shall estimate the same in accordance with the relevant Agreed Procedure.

MC4.4 Each of the TSO and all Users shall use communications protocols in relation to Metering specified in Agreed Procedure No.7.

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.

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.

MC - 437

26 June 2019
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 the TSO 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. 2.4 (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 calibration 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 him 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 has 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 the TSO 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 the TSO 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 or, as the case may be, No. 2. 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 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 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 TSO 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 TSO 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 Each Registrant shall at its own cost and expense maintain a register in relation to Metering for which it is the Registrant. 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 TSO 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, 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 or, as the case may be, No. 2 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 TSO 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 TSO 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 TSO 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 and read by it or on its behalf by on-site interrogation not less than once every 12 months and 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. A failure to notify in accordance with MC8.8.1 shall invalidate the results of any such inspection or reading. Each reading shall be taken at, or as close as is practicable to, the end of a Settlement Period. The TSO shall keep written 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 TSO 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 TSO 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 TSO shall procure the maintenance of such Operational Metering on behalf of and under the supervision of the TSO, with the TSO 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 the System data collector 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 TSO 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.5 or, as the case may be, No.6 and, in the case of disputes under Agreed Procedure No. 5, the relevant PPA and, in the case of disputes under Agreed Procedure No. 6, 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. 5 or, as the case may be, Agreed Procedure No.6 and, in the case of disputes under Agreed Procedure No. 5, the relevant PPA and, in the case of disputes under Agreed Procedure No. 6, 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 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...
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 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 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 chairman, 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 chairman 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 via the Generator data collector. 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 from the Generator data collector to the relevant Interested User.

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 MP NI 101 and MP NI 102 respectively. Additional guidance relating to these procedures is set out in the market guide(s) associated with MP NI 101 and MP NI 102.

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 facsimile to number: 01232 707560, at 12 Manse Road, Castlereagh, Belfast BT6 9RT, attention: Systems Operation Manager (with hard copy to follow by first class post) or such other facsimile number and address 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 facsimile to such number at 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 facsimile 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
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SCOPE</td>
<td>34</td>
</tr>
<tr>
<td>2. STANDARDS</td>
<td>37</td>
</tr>
<tr>
<td>3. FACILITIES TO BE PROVIDED AT METERING POINTS</td>
<td>37</td>
</tr>
<tr>
<td>3.1 Meters</td>
<td>37</td>
</tr>
<tr>
<td>3.2 Current Transformers</td>
<td>38</td>
</tr>
<tr>
<td>3.3 Voltage Transformers</td>
<td>38</td>
</tr>
<tr>
<td>3.4 Data Collectors</td>
<td>39</td>
</tr>
<tr>
<td>3.5 Data Compensators</td>
<td>39</td>
</tr>
<tr>
<td>3.6 Data Collection System</td>
<td>39</td>
</tr>
<tr>
<td>3.7 Power Supplies</td>
<td>39</td>
</tr>
<tr>
<td>4. MEASUREMENT CRITERIA</td>
<td>39</td>
</tr>
<tr>
<td>4.1 Accuracy</td>
<td>39</td>
</tr>
<tr>
<td>4.1.1 Overall Accuracy of Equipment</td>
<td>3</td>
</tr>
<tr>
<td>4.1.2 Accuracy of Metering</td>
<td>4</td>
</tr>
<tr>
<td>4.1.2.1 Active Energy Metering</td>
<td>4</td>
</tr>
<tr>
<td>Overall Accuracy</td>
<td>4</td>
</tr>
<tr>
<td>4.1.2.2 Reactive Energy Metering</td>
<td>4</td>
</tr>
<tr>
<td>Overall Accuracy</td>
<td>4</td>
</tr>
<tr>
<td>4.1.2.3 Active Energy Meters</td>
<td>4</td>
</tr>
<tr>
<td>4.1.2.4 Reactive Energy Meters</td>
<td>5</td>
</tr>
<tr>
<td>4.1.3 Accuracy of Time Keeping</td>
<td>5</td>
</tr>
<tr>
<td>4.2 Compensation for Current and Voltage Transformer Errors</td>
<td>41</td>
</tr>
<tr>
<td>4.3 Compensation for Primary Transformer Losses</td>
<td>41</td>
</tr>
<tr>
<td>5. CALIBRATION AND TESTING OF EQUIPMENT</td>
<td>42</td>
</tr>
<tr>
<td>5.1 Meters</td>
<td>42</td>
</tr>
<tr>
<td>5.1.1 Initial Calibration</td>
<td>6</td>
</tr>
<tr>
<td>5.1.2 Periodic Calibration</td>
<td>6</td>
</tr>
<tr>
<td>5.2 Test Access to Metering Equipment</td>
<td>42</td>
</tr>
<tr>
<td>5.3 Data Collectors</td>
<td>42</td>
</tr>
<tr>
<td>5.3.1 Maintenance</td>
<td>7</td>
</tr>
<tr>
<td>5.3.2 Testing</td>
<td>7</td>
</tr>
<tr>
<td>5.4 Records</td>
<td>43</td>
</tr>
<tr>
<td>6. DATA TRANSMISSION ROUTES AND PROCESSING</td>
<td>43</td>
</tr>
<tr>
<td>APPENDIX A</td>
<td>44</td>
</tr>
<tr>
<td>APPENDIX B</td>
<td>45</td>
</tr>
</tbody>
</table>
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, the provisions of the Main Code shall prevail.

1.3 This Sub-Code should also be read in conjunction with any 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 shall be Landis & Gyr ZFA 400 type.

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.

3.2 Current Transformers

Current transformers which are installed after the Effective Date shall comply with BS3938, accuracy class 0.2 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 BS3941, accuracy class 1.0 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 Collectors

Data collectors shall be used to integrate impulses from meters over each Settlement Period, store values and transmit Settlement Values to the Data Collection System. Data collectors installed at the Effective Date shall be Landis & Gyr FAF 22 type. The Settlement Period shall be selectable over the following range: 30, 20, 15, 10, 5 and 1 minute(s). For any selectable value in this range one Settlement Period shall commence on the hour.

3.5 Data Compensators

Where direct measurement of required values cannot be achieved and the required values are calculated using values measured at other points, data compensators of Landis & Gyr type FBS shall be used.

3.6 Data Collection System

The Data Collection System shall include a computer and communications configuration utilising Landis & Gyr C500 software.

3.7 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) but not for primary transformer losses for which (if required to simulate the measurement of energy at the Delivery Point) adjustments will be made in the data compensators attached to the TSO data collectors (see 4.3).

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:

<table>
<thead>
<tr>
<th>Conditions of Test</th>
<th>Limits of error at stated power factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of the rated</td>
<td>Power factor</td>
</tr>
<tr>
<td>Generating Units</td>
<td>125% to 20% inclusive</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Station transformers, unit transformers, auxiliary gas turbines</td>
<td>125% to 20% inclusive</td>
</tr>
</tbody>
</table>

### 4.1.2.2 Reactive Energy Metering Overall Accuracy:

<table>
<thead>
<tr>
<th>Conditions of Test</th>
<th>Limits of error at stated power factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of the rated meter current</td>
<td>Power factor</td>
</tr>
<tr>
<td>All Units</td>
<td>125% to 5% inclusive</td>
</tr>
</tbody>
</table>

### 4.1.2.3 Active Energy Meters:

#### (a) Generating Units:

<table>
<thead>
<tr>
<th>Conditions of test</th>
<th>Limits of error at stated power factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of the rated meter current</td>
<td>Power factor</td>
</tr>
<tr>
<td>125% to 20% inclusive</td>
<td>1.0</td>
</tr>
<tr>
<td>Less than 20% to 10% inclusive</td>
<td>1.0</td>
</tr>
<tr>
<td>Less than 10% to 5% inclusive</td>
<td>1.0</td>
</tr>
<tr>
<td>125% to 20% inclusive</td>
<td>0.5 lag and lead</td>
</tr>
<tr>
<td>Less than 20% to 10% inclusive</td>
<td>0.5 lag and lead</td>
</tr>
</tbody>
</table>

#### (b) Station transformers, unit transformers, auxiliary gas turbines:

<table>
<thead>
<tr>
<th>Conditions of test</th>
<th>Limits of error at stated power factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of the rated meter current</td>
<td>Power factor</td>
</tr>
</tbody>
</table>
4.1.2.4 Reactive Energy Meters:

<table>
<thead>
<tr>
<th>Conditions of test</th>
<th>Limits of error at stated power factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of the rated meter current</td>
<td>Power factor</td>
</tr>
<tr>
<td>125% to 5% inclusive</td>
<td>Zero</td>
</tr>
<tr>
<td>125% to 20% inclusive</td>
<td>0.866 lag and lead</td>
</tr>
<tr>
<td>Less than 20% to 10% inclusive</td>
<td>0.866 lag and lead</td>
</tr>
</tbody>
</table>

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 agreed between the TSO and the Interested User. 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 related data compensator attached to the TSO data collector:

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 agreed between the TSO and the Interested User. 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 in accordance with manufacturer's recommendations and with the requirements of IEC Publication 687. 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 Calibration

Meters shall be tested no less frequently than once every 5 years or such period as otherwise agreed between ME 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 following any adjustment or test.

5.2 Test Access to Metering Equipment

Test terminal blocks in accordance with CEGB Standard 993908 (TPS 9/14) shall be provided to facilitate meter testing and current and/or voltage transformer checks in situ.

5.3 Data Collectors

5.3.1 Maintenance

Data collectors must be maintained in accordance with manufacturer's recommendations.

5.3.2 Testing

Testing of data collectors shall be carried out in accordance with MC8.4. There is no requirement for routine tests of data collectors.
5.4 Records

The results of all calibration tests and recalibrations on meters (including those prior to the Effective Date) carried out in accordance with manufacturer's recommendations and the relevant IEC Publication 687 and 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.

6. DATA TRANSMISSION ROUTES AND PROCESSING

The Interim Metering Scheme and the commercial processes which it serves are shown in Appendix A.

The system provides energy data measured over both one-minute intervals and Settlement Periods, as appropriate. Energy impulses generated from energy meters are recorded by both the TSO data collector and a Generator data collector. Where necessary, measured values are subject to calculation and compensation through a data compensator in order to generate the required Settlement Values. This data compensator works in conjunction with the data held in the TSO data collector. The calculated compensation values are thereafter transferred to the Generator data collector.

The TSO data collector 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 data collector is available to provide the Generator with an independent means of checking the data provided to it by the TSO as the basis for payments.
APPENDIX A

INTERIM METERING SCHEME

DATA TRANSMISSION SYSTEM
APPENDIX B

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:

<table>
<thead>
<tr>
<th>Flow of Active Energy</th>
<th>Power Factor</th>
<th>Flow of Reactive Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Import</td>
<td>Lagging</td>
<td>Import*</td>
</tr>
<tr>
<td>Import</td>
<td>Leading</td>
<td>Export*</td>
</tr>
<tr>
<td>Import</td>
<td>Unity</td>
<td>Zero</td>
</tr>
<tr>
<td>Export</td>
<td>Lagging</td>
<td>Export</td>
</tr>
<tr>
<td>Export</td>
<td>Leading</td>
<td>Import</td>
</tr>
<tr>
<td>Export</td>
<td>Unity</td>
<td>Zero</td>
</tr>
</tbody>
</table>

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
SUB-CODE NO. 2.1 FOR THE METERING OF CIRCUITS WITH A RATED CAPACITY EXCEEDING 100 MVA

CONTENTS

1. SCOPE ................................................................................................................................. 1
2. STANDARDS.......................................................................................................................... 1
3. FACILITIES TO BE PROVIDED AT METERING POINTS...................................................... 1
   3.1 General .............................................................................................................................. 1
   3.2 Meters .............................................................................................................................. 1
   3.3 Instrument Transformers ................................................................................................. 2
   3.4 Data Collectors ............................................................................................................... 4
   3.5 Data Collection System .................................................................................................. 5
   3.6 Facilities ......................................................................................................................... 6

4. MEASUREMENT CRITERIA .................................................................................................... 6
   4.1 Accuracy ......................................................................................................................... 6
   4.2 Compensation for Errors ................................................................................................ 7

5. CALIBRATION AND TESTING OF METERING .................................................................. 7
   5.1 Meters ............................................................................................................................. 7
   5.2 Current and Voltage Transformers ................................................................................ 7
   5.3 Test Access to Metering Equipment .............................................................................. 8
   5.4 Data Collectors ............................................................................................................... 8
   5.5 Records ........................................................................................................................... 8

Appendix ..................................................................................................................................... 9

MC - 467

26 June 2019
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) Non NIE 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 Meters (kWh)**

Active Energy meters shall comply with the relevant part of BSEN60687 for class 0.2S meters.

**MC - 468**

26 June 2019
3.2.4 **Reactive Energy Meters** (kVArh)

Reactive Energy meters shall comply with the relevant requirements of IEC Standard 1268 for class 2 meters.

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 meter fitted with reverse running stop and pulse output;

(b) check kWh meter fitted with reverse running stop and pulse output;

(c) two main kVArh meters fitted with reverse running stop and pulse output or one bi-directional kVArh meter with two pulse outputs for lagging and leading power factors;

(d) two check kVArh meters fitted with reverse running stop and pulse output or one bi-directional kVArh meter with two pulse outputs for lagging and leading power factors.

Paragraph 3.2.9 deals with the situation where Import and/or Export of Active Energy is required at the same point where a single meter can be used.

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 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 the 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'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.

26 June 2019
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 TSO seals and access granted by prior arrangement with the TSO on reasonable request.

3.3.5 **Current Transformers**

(a) Two sets of CTs to BS7626/HD553S1 and ERS3/1 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 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 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 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 VTs, or one VT with two or more secondary winding sets, to BS7625/HD554S1 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 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 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 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 3.3.6 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.

3.4 Data Collectors

3.4.1 Duplicate data collectors will be used and provided by the Registrant to integrate pulses from meters over each Settlement Period, store values and transmit Settlement Values to the Data Collection System.

3.4.2 The following is required:

(a) the data collectors 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 data collector 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;
in the event of failure of communications with the central collection station the data collector will be capable of storing a minimum of five channels of demand values per feeder for a minimum period of 20 days with an integrating period of 30 minutes. This 20 day 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.

3.4.3 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.

3.4.4 Monitoring facilities shall be provided for data collector 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 data collector and the central collection station will be secured, by the TSO, in accordance with the relevant Agreed Procedure, from interference. The normal path will be across PSTN or PTN networks and any modem will be BABT approved. 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 data collector. 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

Where a measurement VT source is used and the outstation is storing data for more than one circuit, a voltage select or relay scheme using each circuit involved shall be provided. 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 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

<table>
<thead>
<tr>
<th>Conditions of Test</th>
<th>Power Factor</th>
<th>Limits of Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of rated measuring current</td>
<td>1.0, 1.0, 1.0</td>
<td>+/-0.5%, +/-0.7%, +/-1.5%</td>
</tr>
<tr>
<td>120% to 10% inclusive</td>
<td>1.0</td>
<td>+/-0.5%</td>
</tr>
<tr>
<td>Below 10% to 5% inclusive</td>
<td>1.0</td>
<td>+/-0.7%</td>
</tr>
<tr>
<td>Below 5% to 1% inclusive*</td>
<td>1.0</td>
<td>+/-1.5%</td>
</tr>
<tr>
<td>120% to 10% inclusive</td>
<td>0.5 lag and 0.8 lead</td>
<td>+/-1.0%</td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th>Conditions of Test</th>
<th>Power Factor</th>
<th>Limits of Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of rated measuring current</td>
<td>0, 0.866 lag and lead</td>
<td>+/-4.0%, +/-5.0%</td>
</tr>
<tr>
<td>120% - 10% inclusive</td>
<td>0</td>
<td>+/-4.0%</td>
</tr>
<tr>
<td>120% - 20% inclusive</td>
<td>0.866 lag and lead</td>
<td>+/-5.0%</td>
</tr>
</tbody>
</table>

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

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 relevant data collector and the formula for calculation shall be agreed between the TSO and the relevant User.

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. 2.4 - "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 Electricity Association Technical (EAT) Specification 50-18.

5.4 Data Collectors

5.4.1 Maintenance

Data collectors must be maintained in accordance with the manufacturer's recommendations or as is otherwise necessary to meet the obligations of this Sub-Code.

5.4.2 Testing

There is no requirement for routine tests of data collectors. Testing of data collectors shall be carried out in accordance with MC8.4.
5.5 **Records**

The results of all calibration tests and recalibration tests on meters carried out in accordance with manufacturer's recommendations and IEC Publication 687 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

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:

<table>
<thead>
<tr>
<th>Flow of active Energy</th>
<th>Power Factor</th>
<th>Flow of Reactive Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Import</td>
<td>Lagging</td>
<td>Import*</td>
</tr>
<tr>
<td>Import</td>
<td>Leading</td>
<td>Export*</td>
</tr>
<tr>
<td>Import</td>
<td>Unity</td>
<td>Zero</td>
</tr>
<tr>
<td>Export</td>
<td>Lagging</td>
<td>Export</td>
</tr>
<tr>
<td>Export</td>
<td>Leading</td>
<td>Import</td>
</tr>
<tr>
<td>Export</td>
<td>Unity</td>
<td>Zero</td>
</tr>
</tbody>
</table>

   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
## CONTENTS

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SCOPE</td>
<td>1</td>
</tr>
<tr>
<td>2. STANDARDS</td>
<td>1</td>
</tr>
<tr>
<td>3. FACILITIES TO BE PROVIDED AT METERING POINTS</td>
<td>1</td>
</tr>
<tr>
<td>3.1 General</td>
<td>1</td>
</tr>
<tr>
<td>3.2 Meters</td>
<td>1</td>
</tr>
<tr>
<td>3.3 Instrument Transformers</td>
<td>3</td>
</tr>
<tr>
<td>3.4 Data Collectors</td>
<td>5</td>
</tr>
<tr>
<td>3.5 Data Collection System</td>
<td>5</td>
</tr>
<tr>
<td>3.6 Facilities</td>
<td>6</td>
</tr>
<tr>
<td>4. MEASUREMENT CRITERIA</td>
<td>6</td>
</tr>
<tr>
<td>4.1 Accuracy</td>
<td>6</td>
</tr>
<tr>
<td>4.2 Compensation for Errors</td>
<td>7</td>
</tr>
<tr>
<td>5. CALIBRATION AND TESTING OF METERING</td>
<td>7</td>
</tr>
<tr>
<td>5.1 Meters</td>
<td>7</td>
</tr>
<tr>
<td>5.2 Current and Voltage Transformers</td>
<td>8</td>
</tr>
<tr>
<td>5.3 Test Access to Metering Equipment</td>
<td>8</td>
</tr>
<tr>
<td>5.4 Data Collectors</td>
<td>8</td>
</tr>
<tr>
<td>5.5 Records</td>
<td>8</td>
</tr>
<tr>
<td>Appendix</td>
<td>9</td>
</tr>
</tbody>
</table>
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) Non NIE 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 where system or plant conditions permit, either the Import or Export quantities may be omitted.

26 June 2019
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 Meters (kWh)**

Active Energy meters shall comply with the relevant clauses of BS5685/IEC521 for class 0.5 meters or the relevant part of BSEN60687 for class 0.5S static meters.

3.2.4 **Reactive Energy Meters (kVArh)**

Reactive Energy meters shall comply with IEC Standard 1268 or BS5685 Part 4 for class 3 meters.

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 Each circuit will be provided with:

(a) main kWh meter fitted with reverse running stop and pulse output;
(b) check kWh meter fitted with reverse running stop and pulse output;
(c) two kVArh meters fitted with reverse running stop and pulse output or one bi-directional kVArh meter with two pulse outputs for lagging and leading power factors.

Paragraph 3.2.9 deals with the situation where Import and/or Export of Active Energy is required at the same point, where a single meter can be used.

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 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 the 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's satisfaction.

MC - 480

26 June 2019
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 TSO close to the meter(s). This facility will be fitted with the TSO seals and access granted by prior arrangement with the TSO on reasonable request.

3.3.5 **Current Transformers**

- (a) One set of CTs to BS7626/HD553S1 and ERS3/1 with a minimum standard of accuracy class 0.2 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 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 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 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 BS7625/HD554S1 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 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 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 3.3.6 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.

3.4 Data Collectors

3.4.1 Data collectors will be used and provided by the Registrant to integrate pulses from meters over each Settlement Period, store values and transmit Settlement Values to the Data Collection System.

3.4.2 The following is required:

(a) the data collectors must have a minimum of sixteen channels and be capable of storing the recorded demand Settlement Values during failure of the AC power supply;

26 June 2019
(b) on demand from the central collection station the data collector 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 data collector will be capable of storing a minimum of five channels of demand values per feeder for a minimum period of 20 days with an integrating period of 30 minutes. This 20 day 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.

3.4.3 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.

3.4.4 Monitoring facilities shall be provided for data collector fault conditions and also to record instances of local interrogation access which changes data and tagged wherever possible to the relevant Settlement Period(s). All the above conditions shall 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 data collector and the central collection station will be secured, by the TSO, in accordance with the relevant Agreed Procedure, from interference. The normal path will be across PSTN or PTN networks and any modem will be BABT approved. 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 data collector. 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

Where a measurement VT source is used and the outstation is storing data for more than one circuit, a voltage select or relay scheme using each circuit involved shall be provided. 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 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

<table>
<thead>
<tr>
<th>Conditions of Test</th>
<th>Limits of Error at Power Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of rated measuring current</td>
<td>Power Factor</td>
</tr>
<tr>
<td>120% to 10% inclusive</td>
<td>1.0</td>
</tr>
<tr>
<td>Below 10% to 5% inclusive</td>
<td>1.0</td>
</tr>
<tr>
<td>120% to 10% inclusive</td>
<td>0.5 lag and 0.8 lead</td>
</tr>
</tbody>
</table>

(b) Reactive Energy Measurement

<table>
<thead>
<tr>
<th>Conditions of Test</th>
<th>Limits of Error at Power Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of rated measuring current</td>
<td>Power Factor</td>
</tr>
<tr>
<td>120% - 10% inclusive</td>
<td>0</td>
</tr>
<tr>
<td>120% - 20% inclusive</td>
<td>0.866 lag and lead</td>
</tr>
</tbody>
</table>

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.

MC - 484

26 June 2019
(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 relevant data collector and the formula for calculation shall be agreed between the TSO and the relevant User.

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. 2.4 - "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 Electricity Association Technical (EAT) Specification 50-18.

5.4 Data Collectors

5.4.1 Maintenance

Data collectors must be maintained in accordance with the manufacturer's recommendations or as is otherwise necessary to meet the obligations of this Sub-Code.

5.4.2 Testing

There is no requirement for routine tests of data collectors. Testing of data collectors shall be carried out in accordance with MC8.4.

MC - 485

26 June 2019
5.5 **Records**

The results of all calibration tests and recalibration tests on meters carried out in accordance with manufacturer's recommendations and IEC Publication 687 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

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:

<table>
<thead>
<tr>
<th>Flow of active Energy</th>
<th>Power Factor</th>
<th>Flow of Reactive Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Import</td>
<td>Lagging</td>
<td>Import*</td>
</tr>
<tr>
<td>Import</td>
<td>Leading</td>
<td>Export*</td>
</tr>
<tr>
<td>Import</td>
<td>Unity</td>
<td>Zero</td>
</tr>
<tr>
<td>Export</td>
<td>Lagging</td>
<td>Export</td>
</tr>
<tr>
<td>Export</td>
<td>Leading</td>
<td>Import</td>
</tr>
<tr>
<td>Export</td>
<td>Unity</td>
<td>Zero</td>
</tr>
</tbody>
</table>

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
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
2. STANDARDS .................................................................................................................... 1
3. FACILITIES TO BE PROVIDED AT METERING POINTS ........................................... 1
   3.1 General .......................................................................................................................... 1
   3.2 Meters .......................................................................................................................... 1
   3.3 Instrument Transformers ............................................................................................ 2
   3.4 Data Collectors ............................................................................................................. 5
   3.5 Data Collection System .............................................................................................. 5
   3.6 Facilities ....................................................................................................................... 6
4. MEASUREMENT CRITERIA .............................................................................................. 6
   4.1 Accuracy ........................................................................................................................ 6
   4.2 Compensation for Errors ............................................................................................ 7
5. CALIBRATION AND TESTING OF METERING ............................................................. 7
   5.1 Meters .......................................................................................................................... 7
   5.2 Current and Voltage Transformers .............................................................................. 8
   5.3 Test Access to Metering Equipment ............................................................................ 8
   5.4 Data Collectors ............................................................................................................. 8
   5.5 Records ......................................................................................................................... 8
Appendix ............................................................................................................................... 9
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) Non NIE 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 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 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 Meters (kWh)**

Active Energy meters shall comply with the relevant clauses of BS5685/IEC521 for class 2.0 meters or the relevant parts of BSEN61036 for class 2.0S static meters.

3.2.4 **Reactive Energy Meters (kVArh)**

Reactive Energy meters shall comply with the relevant requirements of IEC Standard 1268 or BS5685 Part 4 class 3 meters.

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 reverse running stop and 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 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'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 TSO seals and access granted by prior arrangement with the TSO on reasonable request.

3.3.5 Current Transformers

(a) One set of CTs to BS7626/HD553S1 and ERS3/1 where appropriate with a minimum standard of accuracy class 0.5S 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 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 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 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 BS7625/HD554S1 with a minimum standard of accuracy class 1.0 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 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 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 3.3.6 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.

3.4 Data Collectors

3.4.1 Data collectors will be used and provided by the Registrant to integrate pulses from meters over each Settlement Period, store values and transmit Settlement Values to the Data Collection System.

Small generators (NFFO), in this load band, may not require on line data collection and the detailed requirements will be agreed with the TSO.

3.4.2 (a) Data collectors must have a minimum of four channels per feeder 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 data collector 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 data collector will be capable of storing a minimum of four channels of demand values per feeder for a minimum period of 20 days with an integrating period of 30 minutes. This 20 day 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.

3.4.3 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.

3.4.4 Monitoring facilities shall be provided for data collector fault conditions and also to record instances of local interrogation access which changes data and tagged wherever possible to the relevant Settlement Period(s). All the above conditions shall 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 data collector and the central collection station will be secured, by the TSO, in accordance with the relevant Agreed Procedure, from interference. The normal path will be across PSTN or PTN networks and any modem will be BABT approved. 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 data collector. 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

Where a measurement VT source is used and the outstation is storing data for more than one circuit, a voltage select or relay scheme using each circuit involved shall be provided. 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 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

<table>
<thead>
<tr>
<th>Conditions of Test</th>
<th>Limits of Error at Power Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of rated measuring current</td>
<td>Power Factor</td>
</tr>
<tr>
<td>100% to 20% inclusive</td>
<td>1.0</td>
</tr>
<tr>
<td>Below 20% to 5% inclusive</td>
<td>1.0</td>
</tr>
<tr>
<td>100% to 20% inclusive</td>
<td>0.5 lag and 0.8 lead</td>
</tr>
</tbody>
</table>

(b) Reactive Energy Measurement

<table>
<thead>
<tr>
<th>Conditions of Test</th>
<th>Limits of Error at Power Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of rated measuring current</td>
<td>Power Factor</td>
</tr>
<tr>
<td>100% - 20% inclusive</td>
<td>0</td>
</tr>
<tr>
<td>100% - 20% inclusive</td>
<td>0.866 lag and lead</td>
</tr>
</tbody>
</table>

4.1.2 Accuracy of Time Keeping

(a) The time keeping accuracy of metering equipment shall be maintained in accordance with Standard Time.
The commencement of each Settlement Period shall be within 20 seconds of the Standard Time.

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 relevant data collector and the formula for calculation shall be agreed between the TSO and the relevant User.

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 Electricity Association Technical (EAT) Specification 50-18.

5.4 Data Collectors

5.4.1 Maintenance

Data collectors must be maintained in accordance with the manufacturer's recommendations or as is necessary to meet the obligations of this Sub-Code.
5.4.2 Testing

There is no requirement for routine tests of data collectors. Testing of data collectors shall be carried out in accordance with MC8.4.

5.5 Records

The results of all calibration tests and recalibration tests on meters carried out in accordance with manufacturer's recommendations and IEC Publication 687 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

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:

<table>
<thead>
<tr>
<th>Flow of Active Energy</th>
<th>Power Factor</th>
<th>Flow of Reactive Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Import</td>
<td>Lagging</td>
<td>Import*</td>
</tr>
<tr>
<td>Import</td>
<td>Leading</td>
<td>Export*</td>
</tr>
<tr>
<td>Import</td>
<td>Unity</td>
<td>Zero</td>
</tr>
<tr>
<td>Export</td>
<td>Lagging</td>
<td>Export</td>
</tr>
<tr>
<td>Export</td>
<td>Leading</td>
<td>Import</td>
</tr>
<tr>
<td>Export</td>
<td>Unity</td>
<td>Zero</td>
</tr>
</tbody>
</table>

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 CALIBRATION TESTING AND COMMISSIONING REQUIREMENTS OF METERING)

for the electricity industry in Northern Ireland
# CONTENTS

<table>
<thead>
<tr>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SCOPE ...............................................................................................................................</td>
</tr>
<tr>
<td>2. STANDARDS ..........................................................................................................................</td>
</tr>
<tr>
<td>3. DEFINITIONS .......................................................................................................................</td>
</tr>
<tr>
<td>4. REFERENCE STANDARDS ........................................................................................................</td>
</tr>
<tr>
<td>4.1 Temperature tolerances .....................................................................................................</td>
</tr>
<tr>
<td>4.2 Calibration intervals ........................................................................................................</td>
</tr>
<tr>
<td>4.3 Use ......................................................................................................................................</td>
</tr>
<tr>
<td>5. AC/DC TRANSFER STANDARDS ...............................................................................................</td>
</tr>
<tr>
<td>5.1 Temperature tolerance ......................................................................................................</td>
</tr>
<tr>
<td>5.2 Calibration intervals ........................................................................................................</td>
</tr>
<tr>
<td>5.3 Use ......................................................................................................................................</td>
</tr>
<tr>
<td>6. AC TRANSFER STANDARDS .....................................................................................................</td>
</tr>
<tr>
<td>6.1 Temperature tolerance ......................................................................................................</td>
</tr>
<tr>
<td>6.2 Calibration intervals ........................................................................................................</td>
</tr>
<tr>
<td>6.3 Use ......................................................................................................................................</td>
</tr>
<tr>
<td>6.4 Outside specification ........................................................................................................</td>
</tr>
<tr>
<td>7. WORKING STANDARDS ..........................................................................................................</td>
</tr>
<tr>
<td>7.1 Temperature tolerance ......................................................................................................</td>
</tr>
<tr>
<td>7.2 Calibration intervals ........................................................................................................</td>
</tr>
<tr>
<td>7.3 Use ......................................................................................................................................</td>
</tr>
<tr>
<td>7.4 Outside specification ........................................................................................................</td>
</tr>
<tr>
<td>8. MOBILITY ..............................................................................................................................</td>
</tr>
<tr>
<td>9. ACCURACY REQUIREMENTS FOR THE CALIBRATION AND ON-SITE TESTING OF ELECTRICITY METERS ..................................................................................................................</td>
</tr>
<tr>
<td>9.1 Overall uncertainty ..........................................................................................................</td>
</tr>
<tr>
<td>9.2 Calibration .......................................................................................................................</td>
</tr>
<tr>
<td>9.3 On-site accuracy tests ......................................................................................................</td>
</tr>
<tr>
<td>10. FREQUENCY OF CALIBRATION AND TESTING OF METERING .............................................</td>
</tr>
</tbody>
</table>

MC - 500

26 June 2019
10.1 Meters .................................................................................................................. 6
10.2 Current and voltage transformers ................................................................. 8
10.3 Data collectors .................................................................................................. 8

11. COMMISSIONING ................................................................................................. 9

12. RECORDS ............................................................................................................. 9

APPENDIX A .............................................................................................................. 10

TABLE 1 .................................................................................................................. 12

TABLE 2 .................................................................................................................. 14

TABLE 3 .................................................................................................................. 15

TABLE 4 .................................................................................................................. 16
1. **SCOPE**

1.1 This Sub-Code No. 2.4 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 at the manufacturer's works.

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.2.4, 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**

The National Physical Laboratory (NPL), or a calibration laboratory that has been accredited by the National Accreditation Service (NAMAS), or an international laboratory recognized by NPL 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 calibration or accuracy test purposes.

3.5 Reference Standard

Reference Standard means a standard whose measurement traceability to National Standards has been verified either at an Approved Meter Test Station or is directly maintained by radio communication.

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 calibration and 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 Calibration intervals

4.2.1 Reference Standards, other than Reference Standard CTs and VTs, shall, unless its measurement traceability is maintained by radio communication, be verified at an Approved Meter Test Station at intervals dependent on the specification(s) but in no case less frequently than at intervals of 24 months.

4.2.2 Reference Standard CTs and VTs shall be calibrated by an Approved Meter Test Station at intervals not exceeding 5 years. Where records are made available to the TSO which show either a negligible or predictable deviation from previous calibrations, the TSO may, acting reasonably, permit the interval between such calibrations to be increased.

4.3 Use

4.3.1 During periods of use of a Reference Standard (i.e. between calibrations at an Approved Meter Test Station) evidence shall be made available to the TSO to substantiate the stability of that Reference Standard.
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 **Calibration intervals**

5.2.1 AC/DC Transfer Standards shall be verified at an Approved Meter Test Station at intervals dependent on their specifications but in no case less frequently than at intervals of 24 months.

5.2.2 Where records are made available to the TSO which show either negligible or predictable deviation from previous calibrations, the TSO may, acting reasonably, permit the interval between such calibrations to be increased up to an interval of 5 years.

5.3 **Use**

5.3.1 Prior to use of a AC/DC Transfer Standard (i.e. between calibrations at an Approved Meter Test Station) the AC/DC Transfer Standard shall be calibrated against Reference Standard(s).

5.3.2 An AC/DC Transfer Standard need not be calibrated against a Reference Standard prior to use, where records are made available to the TSO which show either negligible or predictable deviation from previous calibrations, the TSO may, acting reasonably, permit an interval between such calibrations of up to 6 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 **Calibration intervals**

6.2.1 AC Transfer Standards need not be verified at an Approved Meter Test Station provided they have been calibrated in accordance with 6.2.2 or 6.2.3.

6.2.2 AC Transfer Standards shall be calibrated against Reference Standards or AC/DC Transfer Standards at monthly intervals.

6.2.3 Where records are made available to the TSO which show either a negligible or predictable deviation from previous calibrations, the TSO may, acting reasonably, permit the interval between such calibrations to be increased up to 6 months.
6.3 Use

6.3.1 Where any AC Transfer Standard is used for on-site calibration or testing it should be calibrated before and after use. Neither the period from calibration to use nor the period from use to next calibration shall exceed one week.

6.4 Outside specification

6.4.1 When an AC Transfer Standard is calibrated 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 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 Calibration intervals

7.2.1 Working Standards need not be verified at an Approved Meter Test Station provided they have been calibrated in accordance with 7.2.2 or 7.2.3.

7.2.2 Working Standards shall be calibrated against Reference or Transfer Standards at monthly intervals.

7.2.3 Where records are made available to the TSO which show either negligible or predictable deviation from previous calibrations, the TSO may, acting reasonably, permit the interval between such calibrations to be increased up to 6 months.

7.3 Use

7.3.1 Where any Working Standard is used for on-site calibration or testing it should be calibrated before and after use. Neither the period from calibration to use nor the period from use to next calibration shall exceed one week.

7.4 Outside specification

7.4.1 When a Working Standard is calibrated 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 THE CALIBRATION AND ON-SITE TESTING OF ELECTRICITY METERS**

9.1 Meters shall be calibrated and 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 calibration or on-site accuracy test shall be calculated in accordance with the NAMAS Directive NIS3003 allowing for all uncertainties in the chain of measurement from true value to the meter under test. The confidence level in the determination of the overall uncertainty shall be 95% or greater.

9.3 **Calibration**

9.3.1 Meters shall be calibrated such that the overall accuracy is within the percentage error limits as defined in Table 1 (for Active Energy meters) or as appropriate Table 3 (for Reactive Energy meters). The overall uncertainty of measurement of the calibration shall not exceed the limits specified in Tables 1 or 3 as appropriate.

9.3.2 All initial calibrations of meters shall be performed in a laboratory or test house (including any meter manufacturer's works).

a) Periodic calibrations of all meters other than Active Energy class 0.2S may be performed on-site provided that the percentage error limits and overall uncertainty requirements as in Tables 1 and 3 are met.

b) Periodic calibration of class 0.2S Active Energy meters shall be performed in a laboratory or test house (including any meter manufacturer's works).

9.3.3 The reference conditions for influence quantities and voltage and current balance shall be as in the appropriate meter specification.

In the case of on-site calibration adequate evidence of the influence quantity conditions applying shall be available to substantiate the calibration.

9.4 **On-site accuracy tests**

9.4.1 Meters shall be on-site tested to demonstrate that the overall accuracy is within the percentage error limit defined in Table 2 (for Active Energy meters), or Table 4 (for Reactive Energy meters). The overall uncertainty of measurement of the on-site accuracy shall not exceed the limits specified in Table 2 or 4 as appropriate.

26 June 2019
9.4.2 For any Active Energy meter an 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 $I_{\text{max}}$ 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 $I_{\text{max}}$ and shall not exceed 100%) of meter rated current, at unity power factor.

9.4.3 For any Reactive Energy meter an on-site accuracy test may be performed only by an injection test.

Injection tests shall be performed at between 20% and 120% (for whole current metering percentage relates to $I_{\text{max}}$ and shall not exceed 100%) of meter rated current at zero power factor.

9.4.4 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 a laboratory or test house 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 CALIBRATION AND TESTING OF METERING

10.1 Meters

10.1.1 Initial Calibration

Meters shall be calibrated such that the overall accuracy is within the percentage error limits as defined in Table 1 (for Active Energy meters) or as appropriate in Table 3 (for Reactive Energy meters). The overall uncertainty of measurement shall not exceed the limits specified in Tables 1 or 3 as appropriate. All initial calibrations shall be performed in a laboratory or test house (including any meter Manufacturer's Works).

Meters shall be calibrated using traceable standards. The results of all calibrations and on-site accuracy tests shall be retained as permanent records in accordance with paragraph 12.
10.1.2 Periodic Testing

(a) Calibration

(i) Subject as provided below, electromechanical meters shall be calibrated and refurbished as necessary at intervals not exceeding 10 years. Specific maximum intervals of less than 10 years relating to particular types of meter of accuracy class 0.5 are as below:

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>METER TYPE</th>
<th>INTERVAL (YEARS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferranti</td>
<td>FLF</td>
<td>3</td>
</tr>
<tr>
<td>Ferranti</td>
<td>FMF</td>
<td>5</td>
</tr>
<tr>
<td>GEC</td>
<td>E72F</td>
<td>5</td>
</tr>
<tr>
<td>C &amp; H</td>
<td>FN</td>
<td>3</td>
</tr>
<tr>
<td>C &amp; H</td>
<td>KTA</td>
<td>3</td>
</tr>
</tbody>
</table>

(ii) For electronic meters the Registrant shall implement an evenly phased calibration schedule for each type of meter on-circuit for which it is responsible. Over a 10 year period at least 20% of the total of each such type of meter for which it is responsible shall be calibrated without adjustment and the results of such calibration shall be recorded in accordance with paragraph 12.

Meters which are so calibrated shall then be adjusted and re-calibrated, where necessary, to comply with this document.

The Registrant shall as a minimum calibrate at least one meter of each type on-circuit for which it is responsible in accordance with this paragraph in any 5 year period.

The results of calibrations shall be sent to the TSO for review, and to assess the need to revise any of the requirements.

(b) On-Site Accuracy Tests

In addition to the requirements to calibrate in (a) above, on-site accuracy tests shall be performed as follows:

For electromechanical meters the following (i) and (ii):

(i) Active Energy meters of accuracy class 0.5 shall have on-site accuracy tests performed at intervals not exceeding 5 years except for the particular meter types listed under paragraph 10.1.2(a) (i) for which no on-site accuracy tests are required.

(ii) On-site accuracy tests are not required for all other types of electromechanical meters.
For electronic Meters the following (iii) to (vi):

(iii) Where the main and check meters employed on a circuit are of the same manufacture and type (i.e. where the meters are likely to have the same failure/fault characteristics), on-site accuracy tests shall be performed on such meters at intervals not exceeding 5 years.

(iv) Where the main and check meters employed on a circuit are of a different manufacture or type, no on-site accuracy tests shall be required on such meters.

(v) Where only a main Active Energy meter is employed on a circuit on-site accuracy tests shall be performed at intervals not exceeding 10 years on such meter.

(vi) Where only a main Reactive Energy meter is employed, on-site accuracy tests shall be performed at intervals not exceeding 10 years on such meter.

(c) **Accuracy Requirement**

The accuracy requirements for calibration and on-site tests are specified in section 9. The errors for on-site accuracy tests are greater than the associated laboratory test figures as this reflects the greater uncertainty in the chain of measurement from true value for the meter under test.

(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 or calibration period for that meter/installation will be reviewed by the TSO.

A test of calibration 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.
10.3 **Data Collectors**

10.3.1 **Maintenance**

Data collectors must be maintained in accordance with the manufacturer's recommendations or as is otherwise necessary to meet the obligations of this Sub-Code.

10.3.2 **Testing**

There is no requirement for routine tests of data collectors. Testing of data collectors shall be carried out in accordance with MC8.4.

11. **COMMISSIONING**

11.1 A commissioning programme shall be performed on all new and replacement metering. The TSO shall be provided with evidence 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 in accordance with manufacturer's recommendations and IEC Publication 687 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.
**TABLE 1:** Standards of accuracy and overall uncertainty for laboratory calibration and testing of Active Energy meters.

### Class of Meter 2.0 and 2.0S

For whole current and transformer operated meters tested with transformer connected:

<table>
<thead>
<tr>
<th>VALUE OF CURRENT %</th>
<th>POWER FACTOR</th>
<th>MAXIMUM OVERALL UNCERTAINTY %</th>
<th>PERCENTAGE ERROR LIMITS OF METER INCLUDING UNCERTAINTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 100</td>
<td>1 unity</td>
<td>± 0.4</td>
<td>± 1.9</td>
</tr>
<tr>
<td>10 to 100</td>
<td>0.5 lagging</td>
<td>± 0.6</td>
<td>± 1.9</td>
</tr>
<tr>
<td>10 to 100</td>
<td>0.8 leading</td>
<td>± 0.6</td>
<td>± 1.9</td>
</tr>
</tbody>
</table>

For transformer operated meters tested without transformers connected:

<table>
<thead>
<tr>
<th>VALUE OF CURRENT %</th>
<th>POWER FACTOR</th>
<th>MAXIMUM OVERALL UNCERTAINTY %</th>
<th>PERCENTAGE ERROR LIMITS OF METER INCLUDING UNCERTAINTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 120</td>
<td>1 unity</td>
<td>± 0.4</td>
<td>± 1.4</td>
</tr>
<tr>
<td>10 to 120</td>
<td>0.5 lagging</td>
<td>± 0.6</td>
<td>± 1.4</td>
</tr>
<tr>
<td>10 to 120</td>
<td>0.8 leading</td>
<td>± 0.6</td>
<td>± 1.4</td>
</tr>
</tbody>
</table>

### Class of Meter 0.5 and 0.5S

<table>
<thead>
<tr>
<th>VALUE OF CURRENT %</th>
<th>POWER FACTOR</th>
<th>MAXIMUM OVERALL UNCERTAINTY %</th>
<th>PERCENTAGE ERROR LIMITS OF METER INCLUDING UNCERTAINTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>(*) 1 to 5</td>
<td>1 unity (*)</td>
<td>± 0.2 (*)</td>
<td>± 1.0 (*)</td>
</tr>
<tr>
<td>5 to 120</td>
<td>1 unity</td>
<td>± 0.1</td>
<td>± 0.5</td>
</tr>
<tr>
<td>10 to 120</td>
<td>0.5 lagging</td>
<td>± 0.12</td>
<td>± 0.6</td>
</tr>
<tr>
<td>10 to 120</td>
<td>0.8 leading</td>
<td>± 0.12</td>
<td>± 0.6</td>
</tr>
</tbody>
</table>

(*) Only applies to 0.5S class meters
### Class of Meter 0.2S

<table>
<thead>
<tr>
<th>VALUE OF CURRENT %</th>
<th>POWER FACTOR</th>
<th>MAXIMUM OVERALL UNCERTAINTY %</th>
<th>PERCENTAGE ERROR LIMITS OF METER INCLUDING UNCERTAINTY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>BLANK CALIBRATED METER</td>
</tr>
<tr>
<td>1 to 5</td>
<td>1 unity</td>
<td>± 0.10</td>
<td>± 0.4</td>
</tr>
<tr>
<td>5 to 120</td>
<td>1 unity</td>
<td>± 0.06</td>
<td>± 0.2</td>
</tr>
<tr>
<td>10 to 120</td>
<td>0.5 lagging</td>
<td>± 0.09</td>
<td>± 0.3</td>
</tr>
<tr>
<td>10 to 120</td>
<td>0.8 leading</td>
<td>± 0.09</td>
<td>± 0.3</td>
</tr>
</tbody>
</table>
TABLE 2: Standards of accuracy and overall uncertainty for on-site accuracy tests of Active Energy meters.

<table>
<thead>
<tr>
<th>CLASS OF METER UNDER TEST</th>
<th>TEST EQUIPMENT MAXIMUM OVERALL UNCERTAINTY %</th>
<th>PERCENTAGE ERROR LIMITS OF METER INCLUDING UNCERTAINTY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BLANK CALIBRATED METER</td>
</tr>
<tr>
<td>0.2</td>
<td>± 0.2</td>
<td>± 0.4</td>
</tr>
<tr>
<td>0.5</td>
<td>± 0.2</td>
<td>± 0.7</td>
</tr>
<tr>
<td>2.0</td>
<td>± 0.6</td>
<td>± 2.0</td>
</tr>
</tbody>
</table>

The above table assumes the meter is working at or about reference conditions.
TABLE 3: Standards of accuracy and overall uncertainty for laboratory calibration and testing of Reactive Energy meters.

Class of Meter 2.0

<table>
<thead>
<tr>
<th>VALUE OF CURRENT %</th>
<th>POWER FACTOR</th>
<th>MAXIMUM OVERALL % UNCERTAINTY</th>
<th>PERCENTAGE ERROR LIMITS OF METER INCLUDING UNCERTAINTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 120</td>
<td>zero</td>
<td>± 0.5</td>
<td>± 2.0</td>
</tr>
<tr>
<td>20 to 120</td>
<td>0.866 lead</td>
<td>± 1.0</td>
<td>± 2.5</td>
</tr>
<tr>
<td>20 to 120</td>
<td>0.866 lag</td>
<td>± 1.0</td>
<td>± 2.5</td>
</tr>
</tbody>
</table>

* for whole current metering percentage relates to $I_{\text{max}}$ and shall not exceed 100%.

Class of Meter 3.0

<table>
<thead>
<tr>
<th>VALUE OF CURRENT %</th>
<th>POWER FACTOR</th>
<th>MAXIMUM OVERALL % UNCERTAINTY</th>
<th>PERCENTAGE ERROR LIMITS OF METER INCLUDING UNCERTAINTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 120</td>
<td>zero</td>
<td>± 1.0</td>
<td>± 3.0</td>
</tr>
<tr>
<td>20 to 120</td>
<td>0.866 lead</td>
<td>± 1.5</td>
<td>± 3.5</td>
</tr>
<tr>
<td>20 to 120</td>
<td>0.866 lag</td>
<td>± 1.5</td>
<td>± 3.5</td>
</tr>
</tbody>
</table>

* for whole current metering percentage relates to $I_{\text{max}}$ and shall not exceed 100%.
TABLE 4: Standards of accuracy and overall uncertainty for on-site accuracy tests of Reactive Energy meters.

<table>
<thead>
<tr>
<th>CLASS OF METER UNDER TEST</th>
<th>TEST EQUIPMENT MAXIMUM OVERALL UNCERTAINTY %</th>
<th>PERCENTAGE ERROR LIMITS OF METER INCLUDING UNCERTAINTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>± 1.0</td>
<td>± 2.5</td>
</tr>
<tr>
<td>3.0</td>
<td>± 1.5</td>
<td>± 3.5</td>
</tr>
</tbody>
</table>

The above table assumes the meter is working at or about reference conditions.
SUB-CODE NO. 3

GENERATION OPERATIONAL METERING

for the electricity industry in Northern Ireland
# Sub-Code No. 3 for Operational Metering for Active and Reactive Power

## Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCOPE</td>
<td>1</td>
</tr>
<tr>
<td>STANDARDS</td>
<td>1</td>
</tr>
<tr>
<td>FACILITIES TO BE PROVIDED</td>
<td>1</td>
</tr>
<tr>
<td>3.1 Operating Characteristics</td>
<td>1</td>
</tr>
<tr>
<td>3.2 Current Transformers</td>
<td>2</td>
</tr>
<tr>
<td>3.3 Voltage Transformers</td>
<td>2</td>
</tr>
<tr>
<td>3.4 Event Recorders</td>
<td>2</td>
</tr>
<tr>
<td>3.5 Power Supplies</td>
<td>3</td>
</tr>
<tr>
<td>MEASUREMENT CRITERIA</td>
<td>3</td>
</tr>
<tr>
<td>4.1 Accuracy</td>
<td>3</td>
</tr>
<tr>
<td>4.1.1 Overall Accuracy of Equipment</td>
<td>3</td>
</tr>
<tr>
<td>4.1.2 Accuracy of Time Keeping</td>
<td>4</td>
</tr>
<tr>
<td>4.1.3 Other Measurements</td>
<td>4</td>
</tr>
<tr>
<td>4.2 Compensation for Current and Voltage Transformer</td>
<td>4</td>
</tr>
<tr>
<td>Test Access to Metering Equipment</td>
<td>5</td>
</tr>
<tr>
<td>CALIBRATION AND TESTING OF EQUIPMENT</td>
<td>4</td>
</tr>
<tr>
<td>5.1 5.1.1 Initial Calibration</td>
<td>4</td>
</tr>
<tr>
<td>5.1.2 Periodic Calibration</td>
<td>4</td>
</tr>
<tr>
<td>5.2 Test Access to Metering Equipment</td>
<td>5</td>
</tr>
</tbody>
</table>

26 June 2019
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:
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 10 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 10 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 24 hours. 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

<table>
<thead>
<tr>
<th>Conditions of test</th>
<th>Limits of Error at Power Factor</th>
<th>Under System Balanced Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of rated measuring current</td>
<td>Power Factor</td>
<td>Limits of Error</td>
</tr>
<tr>
<td>120% to 10% inclusive</td>
<td>1.0</td>
<td>± 0.5%</td>
</tr>
<tr>
<td>Below 10% to 5% inclusive</td>
<td>1.0</td>
<td>± 0.7%</td>
</tr>
<tr>
<td>120% to 10% inclusive</td>
<td>0.5 lag and 0.8 lead</td>
<td>± 1.0%</td>
</tr>
</tbody>
</table>

(b) For circuits with a rated capacity exceeding 1 MVA and up and including 100 MVA

<table>
<thead>
<tr>
<th>Conditions of test</th>
<th>Limits of Error at Power Factor</th>
<th>Under System Balanced Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of rated measuring current</td>
<td>Power Factor</td>
<td>Limits of Error</td>
</tr>
<tr>
<td>120% to 10% inclusive</td>
<td>1.0</td>
<td>± 1.0%</td>
</tr>
<tr>
<td>Below 10% to 5% inclusive</td>
<td>1.0</td>
<td>± 1.5%</td>
</tr>
<tr>
<td>120% to 10% inclusive</td>
<td>0.5 lag and 0.8 lead</td>
<td>± 2.0%</td>
</tr>
</tbody>
</table>

4.1.1.2 Power Measurement

<table>
<thead>
<tr>
<th>Conditions of Test</th>
<th>Limits of Error at Power Factor</th>
<th>Under System Balanced Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expressed as a percentage of rated measuring current</td>
<td>Power Factor</td>
<td>Limits of Error</td>
</tr>
<tr>
<td>120 to 10% inclusive</td>
<td>0</td>
<td>± 4.0%</td>
</tr>
<tr>
<td>120 to 20% inclusive</td>
<td>0.866 lag and lead</td>
<td>± 5.0%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>OPERATIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVR Status</td>
</tr>
<tr>
<td>Tap Position</td>
</tr>
<tr>
<td>Gen Tx Tap Change</td>
</tr>
<tr>
<td>AVR Set Point</td>
</tr>
<tr>
<td>Load Controllers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ALARMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neg. Phase Seq. Op</td>
</tr>
<tr>
<td>Field Fail Op</td>
</tr>
<tr>
<td>Turbine Trip</td>
</tr>
<tr>
<td>Boiler Trip</td>
</tr>
<tr>
<td>Trans Diff Op</td>
</tr>
<tr>
<td>Trans REF Op</td>
</tr>
<tr>
<td>Trans SBEF Op</td>
</tr>
<tr>
<td>Trans Rev Power Op</td>
</tr>
<tr>
<td>Buch Surge Op</td>
</tr>
<tr>
<td>Buch Gas Op</td>
</tr>
<tr>
<td>WT Trip Op</td>
</tr>
<tr>
<td>WT Alarm Op</td>
</tr>
<tr>
<td>Trip Relay Op</td>
</tr>
<tr>
<td>Generational Red. Ah</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ENHANCED MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volts</td>
</tr>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>MWatts</td>
</tr>
</tbody>
</table>
MVAr

MC - 526

26 June 2019
AGREED PROCEDURE NO. 1

MAINTENANCE, TESTING, INSPECTION AND SEALING OF TARIFF METERING (GENERATION) AND GENERATOR CIRCUITS

for the electricity industry in
Northern Ireland

MC - 527
26 June 2019
# AGREED PROCEDURE No. 1

**MAINTENANCE, TESTING, INSPECTION AND SEALING OF TARIFF METERING (GENERATION) AND GENERATOR CIRCUITS**

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Scope of Procedure</td>
<td>1</td>
</tr>
<tr>
<td>2 Use of the Procedure</td>
<td>1</td>
</tr>
<tr>
<td>3 Amendments to Forms</td>
<td>1</td>
</tr>
<tr>
<td>4 Interface and Timetable Information</td>
<td>2</td>
</tr>
<tr>
<td>Appendix A - Request to Break Seals Form</td>
<td>5</td>
</tr>
<tr>
<td>Appendix B - Meter Record Sheet</td>
<td>7</td>
</tr>
</tbody>
</table>

26 June 2019
1. **SCOPE OF PROCEDURE**

1.1 This Agreed Procedure (the “Procedure”) outlines the responsibilities of the TSO 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 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 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: 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

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Routine Inspection, Maintenance, Testing &amp; Calibration</td>
<td>At least 5 days prior to carrying work out</td>
<td>Notify date, time, work required, estimated duration and request breaking of seals (as necessary)</td>
<td>TSO or Interested User</td>
<td>Interested User or TSO</td>
</tr>
<tr>
<td>1b</td>
<td>Inspection, Maintenance, Testing and Calibration in an Emergency</td>
<td>At the earliest opportunity</td>
<td>Notify, date, time, place, work required, estimated duration and request breaking of seals (as necessary)</td>
<td>TSO or Interested User</td>
<td>Interested User or TSO</td>
</tr>
<tr>
<td>2</td>
<td>Prior to work being carried out (Note 1)</td>
<td>Grant permission to break seals (as appropriate) and notify as to attendance</td>
<td>Interested User or TSO</td>
<td>TSO or Interested User</td>
<td>Fax on standard form (Appendix A) or verbally</td>
</tr>
<tr>
<td>3</td>
<td>Day work carried out</td>
<td>Record meter readings prior to seals being broken and commencing work</td>
<td>TSO or Nominated Party</td>
<td>Manual record</td>
<td></td>
</tr>
</tbody>
</table>

26 June 2019
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

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>4a</td>
<td>Day work carried out</td>
<td>Carry out required work. Record details of work done</td>
<td>TSO or Interested User</td>
<td></td>
<td>Manual record (Appendix A)</td>
</tr>
<tr>
<td>4b</td>
<td>Where possible</td>
<td>Witness work being carried out</td>
<td>Interested User or TSO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>After work completed</td>
<td>Apply own seals and read meters</td>
<td>TSO and Interested User</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>After work completed</td>
<td>Check accuracy of manual record and sign to confirm work completed and seal applied</td>
<td>TSO and Interested User</td>
<td></td>
<td>Manual record (Appendix A)</td>
</tr>
<tr>
<td>7</td>
<td>After work completed</td>
<td>Record meter readings</td>
<td>TSO or Interested User</td>
<td></td>
<td>Manual record (Appendix B)</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>After work completed</td>
<td>Copy meter record sheet and work sheet and issue to other party</td>
<td>TSO or Interested User</td>
<td>Interested User or TSO</td>
<td>By hand</td>
</tr>
</tbody>
</table>

Note 1 In an emergency situation when it is impossible to contact the TSO 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 fax or other communication of the intent to break seals will be supplied to the TSO 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.
REQUEST TO BREAK SEALS

TO: [TSO/Interested User] Date: [               ]
    Tel: [               ]
    Fax: [               ]

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:

<table>
<thead>
<tr>
<th>CIRCUIT/METER ID</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FROM:

Name ______________ Signature
Position ______________ Date

Continued ........

26 June 2019
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]
## APPENDIX B

### METER RECORD SHEET

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>MAIN METER</th>
<th>CHECK METER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BEFORE</td>
<td>AFTER</td>
</tr>
<tr>
<td>MWh EXPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MWh IMPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MVAr EXPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MVAr IMPORT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RECORDER</th>
<th>INTERESTED USER WITNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td></td>
</tr>
<tr>
<td>SIGNATURE</td>
<td></td>
</tr>
<tr>
<td>DATE</td>
<td></td>
</tr>
<tr>
<td>COMPANY</td>
<td></td>
</tr>
<tr>
<td>ACTING FOR</td>
<td></td>
</tr>
</tbody>
</table>
AGREED PROCEDURE NO. 2

MAINTENANCE, TESTING, INSPECTION AND SEALING OF TARIFF METERING (NON NIE CUSTOMER)

for the electricity industry in
Northern Ireland
AGREED PROCEDURE No. 2
MAINTENANCE, TESTING, INSPECTION AND SEALING OF TARIFF METERING (NON NIE CUSTOMER)

Contents Page
1 Scope of Procedure ............................................................... 1
2 Use of the Procedure ............................................................. 1
3 Amendments to Forms ........................................................... 1
4 Interface and Timetable Information ........................................ 2
Appendix A - Request to Break Seals Form ................................ 4
1. **SCOPE OF PROCEDURE**

1.1 This Agreed Procedure (the "Procedure") outlines the responsibilities of the TSO and the Registrant with regard to notification, authorisation and witnessing of the breaking and replacement of seals on Non NIE Customer Tariff Metering 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 MC8.7.

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 and the Registrant to ensure that the breaking and replacement of seals and the carrying out of routine and emergency maintenance, testing and calibration on Non NIE Customer Tariff Metering 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 in the event of an emergency as described in MC8.7.3 or non-compliance by a Party with its obligations under the Main Code, authorisation should be sought as soon as possible after the event.

2.3 A record of work and inspections carried out must be maintained in accordance with MC8.6.

2.4 Throughout this Procedure, timetables reflect the number of Business Days (BD) before or after which (as the case may be) an activity should be completed.

3. **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 relevant Parties. The TSO shall also take into account reasonable comments of relevant Parties.

26 June 2019  
MC - 538
4. **INTERFACE AND TIMETABLE INFORMATION**

Section: MAINTENANCE, TESTING, INSPECTION AND SEALING OF TARIFF METERING (NON NIE CUSTOMER])


<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>EITHER:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a</td>
<td></td>
<td>Routine Inspection, Maintenance, Testing &amp; Calibration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>At least 15 BD prior to carrying work out</td>
<td>Notify date, time, work required, estimated duration and request breaking of seals (as necessary)</td>
<td>TSO or Registrant</td>
<td>Registrant or TSO</td>
<td>Fax / Post on standard form MT1/1</td>
</tr>
<tr>
<td>OR:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1b.</td>
<td></td>
<td>Inspection, Maintenance, Testing and Calibration in an Emergency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>At the earliest opportunity</td>
<td>Notify, date, time, place, work required, estimated duration and request breaking of seals (as necessary)</td>
<td>TSO or Registrant</td>
<td>Registrant or TSO</td>
<td>Fax / Post on standard form MT1/1 or verbally</td>
</tr>
<tr>
<td></td>
<td>Prior to work being carried out</td>
<td>Acknowledge receipt of request to break seals and confirm attendance of party representative</td>
<td>Registrant or TSO</td>
<td>TSO or Registrant</td>
<td>Fax / Post on standard form MT1/2</td>
</tr>
<tr>
<td>3a.</td>
<td></td>
<td>Day work carried out</td>
<td>Record meter readings prior to seals being broken and commencing work</td>
<td>TSO or Registrant</td>
<td>Manual record on standard form MT2</td>
</tr>
<tr>
<td>3b.</td>
<td></td>
<td>Where possible</td>
<td>Witness recording of meter readings</td>
<td>TSO or Registrant</td>
<td></td>
</tr>
</tbody>
</table>
4. **INTERFACE AND TIMETABLE INFORMATION**

Section: MAINTENANCE, TESTING, INSPECTION AND SEALING OF TARIFF METERING (NON NIE CUSTOMER])


<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>4a.</td>
<td>Day work carried out</td>
<td>Carry out required work. Record details of work done.</td>
<td>TSO or Registrant</td>
<td>TSO or Registrant</td>
<td>Manual record on standard form MT1/2</td>
</tr>
<tr>
<td>4b.</td>
<td>Where possible</td>
<td>Witness work being carried out</td>
<td>Registrant or TSO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a.</td>
<td>After work completed</td>
<td>Apply seals and then record meter readings.</td>
<td>TSO or Registrant</td>
<td>TSO or Registrant</td>
<td>Manual record on standard form MT2</td>
</tr>
<tr>
<td>5b.</td>
<td>Where possible</td>
<td>Witness recording of meter readings and application of seals</td>
<td>TSO or Registrant</td>
<td>TSO or Registrant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>After work completed</td>
<td>Check accuracy of manual record and sign to confirm work completed and seal applied</td>
<td>TSO and Registrant</td>
<td>TSO and Registrant</td>
<td>Standard form MT1/2</td>
</tr>
<tr>
<td></td>
<td>After work completed</td>
<td>Copy meter record sheet and work sheet and issue to other party</td>
<td>TSO or Registrant</td>
<td>Registrant or TSO</td>
<td>By hand</td>
</tr>
</tbody>
</table>
APPENDIX A

GUIDE TO USE OF AP2 FORMS

<table>
<thead>
<tr>
<th>AP2</th>
<th>Description</th>
<th>Use Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1a/b</td>
<td>TSO or Registrant give notification of work to be carried out/completed on Tariff Metering.</td>
<td>MT1 / 1</td>
</tr>
<tr>
<td></td>
<td>TSO or Registrant acknowledge receipt of form MT1/1 and confirm attendance of representative during work.</td>
<td>MT1 / 2</td>
</tr>
<tr>
<td>4.3a, 4.5a</td>
<td>Record of meter readings before and after doing work</td>
<td>MT2</td>
</tr>
<tr>
<td>4.4a, 4.6</td>
<td>Record of work done in relation to metering</td>
<td>MT1 / 2</td>
</tr>
</tbody>
</table>

For forms completed by the Registrant, please fax or post to the following address:

[SONI Limited/NIE plc] (Attn: Manager, Customer Service Revenue)
Malone Road
Belfast BT9 5HT
FAX NO: 01232 689280

or such other address and/or recipient as the TSO may notify from time to time.
NOTIFICATION OF WORK TO BE CARRIED OUT/COMPLETED

TO: (TSO/REGISTRANT)*

SITE NAME: 

TSO CRN: 

TARIFF METERING ID: 

DETAILS OF WORK TO BE CARRIED OUT:

Notification is hereby given to carry out work described below and to break such seals as are necessary on:

Date: 

We estimate the duration of work to be: Start Time: 

Stop Time: 

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:

<table>
<thead>
<tr>
<th>CIRCUIT/METER SER NO.</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FROM: (TSO/REGISTRANT)*

Name: 

Signature: 

Position 

Date: 

(* Delete as appropriate)
MT1/2

COMMENTS OF RECIPIENTS:

We acknowledge receipt of your notification dated:

Our representative is:

and (will/will not)* be attending when the work is carried out.

FROM: (TSO/REGISTRANT)*

Name: __________________________ Signature: __________________________
Position __________________________ Date: __________________________

CONFIRM COMPLETION OF WORK AND SEALS APPLIED:

Description of completed work:

Confirmation of sealing: ____________________________________________

Date of work: _____________________________________________________

Time work commenced: _____________________________________________

Time work completed: _____________________________________________

FOR TSO:

Name: __________________________ Signature: __________________________
Position __________________________ Date: __________________________

FOR REGISTRANT:

Name: __________________________ Signature: __________________________
Position __________________________ Date: __________________________

(* Delete as appropriate)
# METER READINGS RECORD SHEET

For multiple feeder sites use additional sheets.

<table>
<thead>
<tr>
<th>REGISTRANT:</th>
<th>READING DATE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITE NAME:</td>
<td>READING TIMES:</td>
</tr>
<tr>
<td></td>
<td>START:</td>
</tr>
<tr>
<td></td>
<td>FINISH:</td>
</tr>
<tr>
<td>TARIFF METERING ID:</td>
<td>METER SERIAL NO(S):</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>MAIN METER READING</th>
<th>CHECK METER READING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BEFORE</td>
<td>AFTER</td>
</tr>
<tr>
<td>kWh EXPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2kWh IMPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kVARh EXPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kVARh IMPORT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PARTY RECORDING</th>
<th>PARTY WITNESSING</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td></td>
</tr>
<tr>
<td>SIGNATURE</td>
<td></td>
</tr>
<tr>
<td>DATE</td>
<td></td>
</tr>
<tr>
<td>POSITION</td>
<td></td>
</tr>
<tr>
<td>COMPANY</td>
<td></td>
</tr>
</tbody>
</table>

26 June 2019
AGREED PROCEDURE NO. 3

METER ADVANCE RECONCILIATION
(GENERATION)

for the electricity industry in
Northern Ireland

MC - 545

26 June 2019
**AGREED PROCEDURE No. 3**

**METER ADVANCE RECONCILIATION (GENERATION)**

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Scope of Procedure ........................................................................... 1</td>
<td></td>
</tr>
<tr>
<td>2. Use of the Procedure ........................................................................... 1</td>
<td></td>
</tr>
<tr>
<td>3. Amendments to Proformas and Examples ..................................................... 1</td>
<td></td>
</tr>
<tr>
<td>4. Interface and Timetable Information ....................................................... 2</td>
<td></td>
</tr>
<tr>
<td>Appendix A: Proforma of Meter Advance Reconciliation - Notice of Meter Reading .......... 6</td>
<td></td>
</tr>
<tr>
<td>Appendix B: Proforma of Meter Advance Reconciliation Record ............................. 7</td>
<td></td>
</tr>
<tr>
<td>Appendix C: Example of Meter Register Comparison Report ................................. 8</td>
<td></td>
</tr>
<tr>
<td>Appendix D: Proforma of Meter Advance Reconciliation Statement ........................... 9</td>
<td></td>
</tr>
</tbody>
</table>
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 quarterly 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 manually 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.
### INTERFACE AND TIMETABLE INFORMATION

Section: METER ADVANCE RECONCILIATION (GENERATION)

Subject: Interface and Timetable Information - Reconciliation of Meter Readings with Accumulated Settlement Values

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Annually</td>
<td>For each calendar month draw up a plan of the meter readings which are to take place and issue to the Interested User. Such readings to be scheduled at intervals not exceeding 3 months.</td>
<td>TSO</td>
<td>Interested User</td>
<td>Fax</td>
</tr>
<tr>
<td>2</td>
<td>At least 5 days before reading date</td>
<td>Advise the Interested User of date and time for reading to take place</td>
<td>TSO</td>
<td>Interested User</td>
<td>Fax on standard form (Appendix A)</td>
</tr>
<tr>
<td>3</td>
<td>Within 3 months of last reading</td>
<td>Read meter registers (in the presence of the Interested User representative if attending) as close as is practicable to the end of a Settlement Period. Record time and date of reading and meter register values. The TSO and Interested User representative sign record sheet. (Note 1)</td>
<td>TSO and Interested User</td>
<td></td>
<td>Manual record (Appendix B)</td>
</tr>
<tr>
<td>4</td>
<td>Before leaving site</td>
<td>Sign off and hand copy of actual meter values with time and date of reading to the Interested User.</td>
<td>TSO</td>
<td>Interested User</td>
<td>Manual record (Appendix B)</td>
</tr>
</tbody>
</table>
### Section: METER ADVANCE RECONCILIATION (GENERATION)

**Subject:** Interface and Timetable Information - Reconciliation of Meter Readings with Accumulated Settlement Values

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Within 3 Business Days of meter reading</td>
<td>(i) Input meter register values, time and date of reading to the meter register comparison process of the TSO Data Collection System</td>
<td>TSO</td>
<td>Interested User</td>
<td>On line entry to the Data Collection System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(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</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(iii) Print out meter register comparison report (Appendix C)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EITHER:**

6a Within 5 Business Days of meter reading

Where the relevant meter register comparison report shows a difference of less than 0.02%:
- issue copy of report to the Interested User (Note 2)

**OR:**

6b Within 5 Business Days of meter reading

Where meter register comparison report shows a difference of 0.02% or greater:
- prepare a Meter Reconciliation Statement and issue to the Interested User, together with copies of the relevant meter register comparison reports (Note 2)
## Section: METER ADVANCE RECONCILIATION (GENERATION)

## Subject: Interface and Timetable Information - Reconciliation of Meter Readings with Accumulated Settlement Values

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
</table>
| 7a  | 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 |  |
| 7b  |  | Where revisions to the initial Meter Reconciliation Statement are agreed, prepare a replacement Meter Reconciliation Statement and issue to Interested User | TSO | Interested User | Fax |
| 8a  | 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 | Fax |
| 8b  |  | 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 PPA | Interested User | TSO | Fax |
Section: METER ADVANCE RECONCILIATION (GENERATION)

Subject: Interface and Timetable Information - Reconciliation of Meter Readings with Accumulated Settlement Values

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Within 14 days of receipt of agreed Meter Reconciliation Statement</td>
<td>Issue invoice for agreed payment adjustment</td>
<td>Interested User</td>
<td>TSO</td>
<td>As per PPA</td>
</tr>
<tr>
<td>10</td>
<td>Within 14 days of receipt of invoice</td>
<td>Make payment</td>
<td>Interested User or TSO</td>
<td>TSO or Interested User</td>
<td>BACS</td>
</tr>
</tbody>
</table>

Note 1: time of reading shall be taken from the radio clock or data collector associated with the meter being read

Note 2: 0.02% is the maximum error due to 1 Settlement Period in 3 months (i.e. this tolerance allows for the fact that meter readings will not be taken precisely at the end of a Settlement Period).
This tolerance is in itself tighter than the relevant accuracy of the metering system (0.5%)
APPENDIX A

To: [Interested User]

SERIAL NO:

METER ADVANCE RECONCILIATION - NOTICE OF METER READING

SONI Limited hereby notifies the undermentioned Interested User that all Generation tariff meters at the undermentioned site will be read for the purposes of meter advance reconciliation pursuant to MC8.8 of the Main Metering Code of the Northern Ireland Grid Code on the date and at the approximate time stated below. The person(s) attending on behalf of SONI Limited is/are indicated below.

| Interested User: |
| Site: |
| TSO Representative(s): |
| Date/Time |

For TSO:

Signature: ________________  Name: ________________

Position: ________________________________  (in block capitals)

Date of Issue:

MC - 552

26 June 2019
**APPENDIX B**

**METER ADVANCE RECONCILIATION RECORD**

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>MAIN METER REGISTER READING</th>
<th>CHECK METER REGISTER READING</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWh EXPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MWh IMPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MVar EXPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MVar IMPORT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TSO REPRESENTATIVE</th>
<th>INTERESTED USER WITNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRINT NAME</td>
<td></td>
</tr>
<tr>
<td>SIGNATURE</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX D

METER ADVANCE RECONCILIATION STATEMENT

SITE NAME: ________________   READING DATE:

INTERESTED USER: ____________   SERIAL NO:

SETTLEMENT VALUE AFFECTED:

<table>
<thead>
<tr>
<th>Metering Point (as appropriate)</th>
<th>Difference Recorded in Meter Register Comparison Report MWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generator Gross Meter</td>
<td></td>
</tr>
<tr>
<td>Generator Transformer Meter</td>
<td></td>
</tr>
<tr>
<td>Unit Transformer Meter</td>
<td></td>
</tr>
<tr>
<td>Station Transformer Meter</td>
<td></td>
</tr>
<tr>
<td>Net Settlement Value Adjustment MWh</td>
<td></td>
</tr>
</tbody>
</table>

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)
AGREED PROCEDURE NO. 4

METER ADVANCE RECONCILIATION
(NON NIE CUSTOMER)

for the electricity industry in
Northern Ireland
AGREED PROCEDURE No. 4
METER ADVANCE RECONCILIATION (NON NIE CUSTOMER)

Contents                                                                 Page

1. Scope of Procedure............................................................................................................. 1
2. Use of the Procedure ............................................................................................................. 1
3. Amendments to Forms ........................................................................................................... 1
4. Interface and Timetable Information ..................................................................................... 2

Appendix A: Meter Advance Reconciliation (MAR) Tolerances............................................ 5
Appendix B: Forms..................................................................................................................... 6
1. **SCOPE OF PROCEDURE**

1.1 This Agreed Procedure (the "Procedure") covers the collection and processing of Tariff Metering readings which are taken at intervals as set out in paragraph 2.2 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 manually read meter register readings with the accumulations recorded in the Data Collection System. Financial adjustments are then made pursuant to the terms of the Conditions (applicable to electricity agreements entered into with NIE Energy as Supplier) by the use of the Meter Reconciliation Statement.

1.2 The procedure seeks to ensure that any discrepancy between Tariff Metering register readings and Settlement Values collected electronically from such meters are identified on a regular basis.

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.

1.5 The procedures set out in MP NI 105 are also relevant in relation to the collection and processing of Tariff Metering readings taken at intervals and the reconciliation of such meter readings with Settlement Values collected electronically and stored on the Data Collection System.

2. **USE OF THE PROCEDURE**

2.1 This Procedure shall be used by the TSO and Registrant staff who are responsible for meter advance reconciliation readings and processing.

2.2 Meter advance reconciliation for a Metering system will take place at the start and the end of a supply contract, and at least every 12 months.

2.3 Throughout this Procedure, timetables reflect the number of Business Days (BD) before or after which (as the case may be) an activity should be completed.

2.4 The agreed meter advance reconciliation tolerances allowed for Non NIE Customer Metering are detailed in Appendix A.

3. **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 Registrants. The TSO shall also take into account reasonable comments of Registrants.
**INTERFACE AND TIMETABLE INFORMATION**  
Section: METER ADVANCE RECONCILIATION (NON NIE CUSTOMER)

Subject: Interface and Timetable Information - Reconciliation of Meter Readings with Accumulated Settlement Values

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Annually</td>
<td>For each calendar month draw up a plan of the meter readings which are to take place and issue to the Registrant. Such readings to be scheduled at intervals not exceeding 12 months.</td>
<td>TSO</td>
<td>Registrant</td>
<td>Fax</td>
</tr>
<tr>
<td>2.</td>
<td>At least 5 BD before reading date</td>
<td>Advise the Registrant of date and time for reading to take place.</td>
<td>TSO</td>
<td>Registrant</td>
<td>Fax on standard form MR1</td>
</tr>
<tr>
<td>3.</td>
<td>Within 3 (or 12 as per ref (1)) months of last reading</td>
<td>Read meter registers (in the presence of the Registrant representative if attending) as close as is practicable to the end of a Settlement Period. Record time and date of reading and meter register values. The TSO and Registrant representative sign record sheet. (Note 1)</td>
<td>TSO and Registrant</td>
<td></td>
<td>Manual record on standard form MR2</td>
</tr>
<tr>
<td>4.</td>
<td>Before leaving site</td>
<td>Sign off and hand copy of actual meter values with time and date of reading to the Registrant.</td>
<td>TSO</td>
<td>Registrant</td>
<td>Manual record on standard form MR2</td>
</tr>
</tbody>
</table>
### 4. INTERFACE AND TIMETABLE INFORMATION

Section: METER ADVANCE RECONCILIATION (NON NIE CUSTOMER)

Subject: Interface and Timetable Information - Reconciliation of Meter Readings with Accumulated Settlement Values

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Within 15 BD of meter reading</td>
<td>Input meter register values, time and date of reading to the meter register comparison process of the Data Collection System. 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.</td>
</tr>
<tr>
<td>6</td>
<td>Within 10 BD of comparison process in Ref (5)</td>
<td>Where meter register comparison process shows a discrepancy (as described in Appendix A) - Prepare a Meter Advance Reconciliation Statement and issue to the Registrant.</td>
</tr>
<tr>
<td>7</td>
<td>Within 5 BD of receipt of statement in Ref (6)</td>
<td>Investigate and take corrective action as necessary (refer to Agreed Procedure 2 'Maintenance, Testing, Inspection and Sealing of Tariff Metering (Non NIE Customer) - report back to the TSO).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSO</td>
<td>Registrant</td>
<td>Fax on standard form MR3</td>
</tr>
<tr>
<td>Registrant</td>
<td>TSO</td>
<td>Fax</td>
</tr>
</tbody>
</table>
4. **INTERFACE AND TIMETABLE INFORMATION**

Section: METER ADVANCE RECONCILIATION (NON NIE CUSTOMER)

Subject: Interface and Timetable Information - Reconciliation of Meter Readings with Accumulated Settlement Values

<table>
<thead>
<tr>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>8a</td>
<td>On or before 15 BD after receipt of Meter Advance Reconciliation Statement</td>
<td>Where the Meter Reconciliation Statement can be agreed, indicate agreement on form and sign and return to the TSO.</td>
<td>Registrant</td>
<td>TSO</td>
</tr>
<tr>
<td>8b</td>
<td>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 MC15.</td>
<td>Registrant</td>
<td>TSO</td>
<td>Fax on standard form MR3</td>
</tr>
</tbody>
</table>

Note 1: Time of reading shall be taken from the data collector which is synchronised with the Data Collection System
APPENDIX A

METER ADVANCE RECONCILIATION TOLERANCES

The acceptance limit for the Meter Advance Reconciliation between the main register advance and the instation aggregated demand 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.

Where check meters are installed a main / check meter advance comparison shall be undertaken and the tolerance shall be within ± 1.5%.
GUIDE TO USE OF AP4 FORMS

<table>
<thead>
<tr>
<th>AP4</th>
<th>Description</th>
<th>Use Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR1</td>
<td>TSO gives Registrant notice of meter reading for MAR in order that attendance by Registrant's representative can be planned</td>
<td></td>
</tr>
<tr>
<td>MR2</td>
<td>TSO and Registrant take readings at site, then complete and sign MAR Record</td>
<td></td>
</tr>
<tr>
<td>MR3</td>
<td>4.6/4.8a/b TSO advises Registrant of MAR difference recorded using comparison process</td>
<td></td>
</tr>
</tbody>
</table>

For forms completed by the Registrant, please fax or post to the following address:

[SONI Limited/NIE plc] (Attn: Manager, Customer Service Revenue)
Malone Road
Belfast BT9 5HT
FAX NO: 01232 689280

or such other address and/or recipient as the TSO may notify from time to time.
Serial No .................

MR1

METER ADVANCE RECONCILIATION - NOTICE OF METER READING

To: (Registrant)  ________________________________________________

SONI Limited hereby notifies the undermentioned Registrant that all Non NIE Customer tariff meters at the undermentioned site will be read for the purposes of meter advance reconciliation pursuant to MC8.8 of the Main Metering Code of the Northern Ireland Grid Code on the date and at the approximate time stated below. The person(s) attending on behalf of SONI Limited is/are indicated below.

<table>
<thead>
<tr>
<th>Registrant Representative:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Site:</td>
<td></td>
</tr>
<tr>
<td>TSO Representative:</td>
<td></td>
</tr>
<tr>
<td>Date/Time:</td>
<td></td>
</tr>
</tbody>
</table>

For TSO:

Signature: ___________________ Name: ___________________ (in block capitals)

Position: ___________________ Date of Issue: ___________________
MR2

METER ADVANCE RECONCILIATION RECORD

For multiple feeder sites use additional sheets.

REGISTRANT: ___________________________ READING DATE: ___________________________

SITE NAME: ___________________________ READING TIMES: ___________________________

TARIFF METERING ID: __________________ METER SERIAL NO(S): __________________________

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>MAIN METER READING</th>
<th>CHECK METER READING*</th>
</tr>
</thead>
<tbody>
<tr>
<td>kWh EXPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kWh IMPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kVArh EXPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kVArh IMPORT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Where applicable

<table>
<thead>
<tr>
<th>NAME</th>
<th>TSO REPRESENTATIVE</th>
<th>PARTY WITNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGNATURE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DATE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POSITION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPANY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26 June 2019
**METER ADVANCE RECONCILIATION STATEMENT**

**SITE NAME:** ______________________ **READING DATE:** ________________

**REGISTRANT:** __________________________________________________________

**TARIFF METERING ID:** _________________________________________________

**METER SERIAL NO:** ____________________________________________________

**SETTLEMENT VALUE AFFECTED:**

<table>
<thead>
<tr>
<th></th>
<th>(kWh/kVArh) *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Import</td>
</tr>
</tbody>
</table>

- Difference Recorded using Meter Register
- Comparison Process
- Settlement Value Adjustment

**For TSO:**

Signature: __________________________ Name: ____________________________

(in block capitals)

Position __________________________ Date: __________________________

**For Registrant:**

Signature: __________________________ Name: ____________________________

(in block capitals)

Position __________________________ Date: __________________________

Confirm agreement: (AGREED/DISAGREED)*

(* Delete as appropriate)
AGREED PROCEDURE NO. 5

SETTLEMENT VALUES ESTIMATION
(GENERATION)

for the electricity industry in
Northern Ireland
AGREED PROCEDURE No. 5

SETTLEMENT VALUES ESTIMATION (GENERATION)

Contents

1. Scope of Procedure ................................................................. 1

2. Use of the Procedure ............................................................ 1

3. Determination of Settlement Values ........................................ 1

4. Amendments to Forms .......................................................... 3

5. Interface and Timetable Information ....................................... 4

Appendix A: Authorisation Form - Settlement Values Estimation and Substitution ........................................ 6

Appendix B: Settlement Values Estimation/Substitution Sheet .................................................. 7
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. 3.

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 data collector (being the TSO data collector for the IMS) 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.

4. **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.
5. **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 relevant data collector (being the TSO data collector for the IMS), 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 Data Collector failure

In the event of the TSO data collector ceasing to function, Settlement Values shall be retrieved by reference to the main meter registers in the relevant Generator data collector.

If both data collectors fail, meter advances shall be recorded manually every 24 hours and Settlement Values derived there from. Such "daily" Settlement Values shall be entered into the Data Collection System for the Settlement Period 24:00 hrs.

Where primary transformer compensation values cannot be retrieved, such values shall be computed using the agreed loss factors.

3.3.3 Automatic compensation device failure

In the event of failure of the automatic compensation device which feeds the estimated primary transformer loss values to the data collectors, the meter values in the data collector shall be computed using the agreed loss factors.

3.3.4 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.

3.3.5 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.
## INTERFACE AND TIMETABLE INFORMATION

**Section:** SETTLEMENT VALUES ESTIMATION (GENERATION)

**Subject:** Interface and Timetable Information - Agreement of Estimated Settlement Values

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ASAP</td>
<td>On becoming aware of an equipment malfunction likely to have resulted in missing or incorrect data identify the possible cause and inform the other party, as appropriate</td>
<td>Interested User or TSO</td>
<td>Interested User</td>
<td>Fax</td>
</tr>
<tr>
<td>2</td>
<td>ASAP</td>
<td>Prepare Data Collection System report identifying missing or incorrect Settlement Values and issue to Interested User</td>
<td>TSO</td>
<td>Interested User</td>
<td>Fax</td>
</tr>
<tr>
<td>3a</td>
<td>ASAP</td>
<td>Investigate equipment malfunction and determine whether readings are retrievable. Retrieve if retrievable and send data to Interested User</td>
<td>TSO</td>
<td>Interested User</td>
<td>Fax</td>
</tr>
<tr>
<td>3b</td>
<td>ASAP</td>
<td>Where data is not retrievable, substitute data if available and send substitute data to Interested User</td>
<td>TSO</td>
<td>Interested User</td>
<td>Fax</td>
</tr>
<tr>
<td>3c</td>
<td>ASAP</td>
<td>Where neither retrieval or substitution is possible estimate data and send estimated data to Interested User together with supporting documentation</td>
<td>TSO</td>
<td>Interested User</td>
<td>Fax</td>
</tr>
</tbody>
</table>
## SETTLEMENT VALUES ESTIMATION (GENERATION)

### Subject: Interface and Timetable Information - Agreement of Estimated Settlement Values

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>4a</td>
<td>ASAP and in any event within 7 Business Days of receipt of data</td>
<td>Review data supplied under (3) above by the TSO and either:</td>
<td>Interested</td>
<td>User</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(i) advise the TSO that the data is accepted and can be used as substitute Settlement Values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii) discuss areas of concern with the TSO, providing supporting evidence as necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4b</td>
<td>No later than the 7th Business Day after receipt of data</td>
<td>Where revisions to the initial data under (3) above are agreed, prepare revised data and send to Interested User</td>
<td>TSO</td>
<td>Interested User</td>
<td>Fax</td>
</tr>
<tr>
<td>5a</td>
<td>No later than the 7th Business Day after receipt of data</td>
<td>Where the data under (4) above is accepted, indicate acceptance on form, sign and return to the TSO</td>
<td>Interested</td>
<td>TSO</td>
<td>Fax</td>
</tr>
<tr>
<td></td>
<td>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</td>
<td>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</td>
<td>Interested</td>
<td>TSO</td>
<td>(1) Fax</td>
</tr>
<tr>
<td></td>
<td>Where the data is accepted, use data in Final Confirmation Statement</td>
<td>Where the data is accepted, use data in Final Confirmation Statement</td>
<td>TSO</td>
<td></td>
<td>(2) As per PPA</td>
</tr>
</tbody>
</table>

MC - 573
APPENDIX A
AUTHORISATION FORM
SETTLEMENT VALUES ESTIMATION AND SUBSTITUTION - GENERATION

PART A
SERIAL NO: [Date]

To: Interested User

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:
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:
Position:
Date:

NOTE: * Delete as necessary
## APPENDIX B

### SETTLEMENT VALUES ESTIMATION/SUBSTITUTION SHEET

**CONNECTION SITE:**

**IDENTITY OF METER AFFECTED:**

**INTERESTED USER:**

**TRADING DAY DATE:**

<table>
<thead>
<tr>
<th>Half Hour</th>
<th>TSO</th>
<th>Interested Party</th>
<th>Half Hour</th>
<th>TSO</th>
<th>Interested Party</th>
<th>Half Hour</th>
<th>TSO</th>
<th>Interested Party</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>00:30</td>
<td>08:30</td>
<td>16:30</td>
<td>09:00</td>
<td>17:00</td>
<td>18:00</td>
<td>19:00</td>
<td>20:00</td>
<td>21:00</td>
</tr>
<tr>
<td>01:00</td>
<td>09:00</td>
<td>17:00</td>
<td>09:30</td>
<td>17:30</td>
<td>18:30</td>
<td>19:00</td>
<td>20:00</td>
<td>21:30</td>
</tr>
<tr>
<td>01:30</td>
<td>10:00</td>
<td>18:00</td>
<td>10:30</td>
<td>18:30</td>
<td>19:00</td>
<td>19:30</td>
<td>20:00</td>
<td>22:00</td>
</tr>
<tr>
<td>02:00</td>
<td>11:00</td>
<td>19:00</td>
<td>11:30</td>
<td>19:30</td>
<td>20:00</td>
<td>20:30</td>
<td>21:00</td>
<td>22:30</td>
</tr>
<tr>
<td>02:30</td>
<td>12:00</td>
<td>20:00</td>
<td>12:30</td>
<td>20:30</td>
<td>21:00</td>
<td>21:30</td>
<td>23:00</td>
<td>23:30</td>
</tr>
<tr>
<td>03:00</td>
<td>13:00</td>
<td>21:00</td>
<td>13:30</td>
<td>21:30</td>
<td>23:00</td>
<td>23:30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03:30</td>
<td>14:00</td>
<td>22:00</td>
<td>14:30</td>
<td>22:30</td>
<td>24:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04:00</td>
<td>15:00</td>
<td>23:00</td>
<td>15:30</td>
<td>23:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04:30</td>
<td>16:00</td>
<td>24:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26 June 2019

MC - 575
AGREED PROCEDURE NO. 6

SETTLEMENT VALUES ESTIMATION
(NON NIE CUSTOMER)

for the electricity industry in
Northern Ireland
### AGREED PROCEDURE No. 6

**SETTLEMENT VALUES ESTIMATION**  
(NON NIE CUSTOMER)

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Scope of the Procedure</td>
<td>1</td>
</tr>
<tr>
<td>2. Use of the Procedure</td>
<td>1</td>
</tr>
<tr>
<td>3. Validation, Estimation and Substitution Rules for Half-Hourly Data</td>
<td>1</td>
</tr>
<tr>
<td>4. Amendments to Forms</td>
<td>4</td>
</tr>
<tr>
<td>5. Interface and Timetable Information</td>
<td>5</td>
</tr>
</tbody>
</table>

Appendix A: Authorisation Form-Settlement Values Estimation & Substitution | 7
1. **SCOPE OF PROCEDURE**

1.1 This Agreed Procedure (the "Procedure") describes the key interfaces and timetable responsibilities of the TSO and the Registrant 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. 4.

1.2 The Procedure only applies to Non NIE Customer Tariff Metering. For a given Connection Site/meter for a Business Day, it covers the following:

(a) notification of missing or incorrect Settlement Values;

(b) determination of substitute values from check meters, where applicable, by retrieval of Settlement Values locally at the data collector or by estimation;

(c) agreement and confirmation of Settlement Values to be used.

1.3 The Procedure excludes a procedure in the event that the TSO and the Registrant 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 stated under MC15.

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 the Registrant for the collection of or submission of and agreement of the appropriate Settlement Values.

3. **VALIDATION, ESTIMATION AND SUBSTITUTION RULES FOR HALF-HOURLY DATA**

3.1 The rules to be followed for both data validation and data estimation for customers with remotely read half-hourly metering are set out in this paragraph 3.

3.2 Validation of Meter Details

Prior to half-hourly data being accepted and approved for billing purposes the meter details are validated. This occurs for new meter installations, meter changes, meters that have been re-programmed or for existing meters moving to half-hourly profiling.

3.2.1 Meter ID/Serial Number

The meter serial number registered to the metering installation is verified against the meter ID retrieved during polling to ensure the correct meter has been polled.

3.2.2 Meter Register and Pulse Multipliers
The meter register reading multiplier and the pulse multiplier are verified to ensure data accuracy.

3.2.3 **Meter Data Date and Time**

The date and time held by the meter and stamped on the data collected is checked to ensure its accuracy.

3.3 **Validation of Half Hourly Metering Data**

After polling each meter the half-hourly data retrieved from the meter is validated by MV90 and the following checks are performed.

3.3.1 **Meter ID**

Each time a meter is polled the electronic serial number of that meter is compared to the device ID stored within MV90. If they do not match then no data is retrieved and the failure is reported by MV90 for investigation.

3.3.2 **Meter Channel Details**

Each time a meter is polled the number of channels of data expected is compared against the number actually received. If they do not agree then no data is retrieved and the failure is reported by MV90 for investigation.

3.3.3 **Meter Time**

Each time a meter is polled its time is checked to ensure it falls within two minutes of the actual time. If the time is out by more than two minutes then the data is retrieved and the time difference is investigated. The meter will be programmed with the correct time.

3.3.4 **Pulse Overflow**

Each channel status for each interval is checked for pulse overflows. If a pulse overflow is reported the data is marked for estimation and the cause is investigated and resolved.

3.3.5 **Excluded Intervals**

Each channel status for each interval is checked for any interval data that may be excluded. If excluded intervals are reported then those intervals are marked for estimation and the cause is investigated.

3.3.6 **Number of Intervals**

Each time a meter is polled the number of expected half-hour time intervals between the start and stop times of the load profile data is calculated and compared with the actual number of time intervals found in the load profile data file. Any difference in the number of time intervals is investigated and resolved.

3.3.7 **Cumulative/Total Consumption Comparison**

When a meter is polled and it provides an electronic cumulative reading of the prime register equivalent to the total consumption of the meter, then the difference between successive cumulative readings is compared to the total of the meter period data for the same period of time.
Specifically:

- The sum of pulses * pulse multiplier for all the recording intervals collected is compared to the meter advance * meter multiplier for the time interval.

- If the difference between these values is greater than the meter register multiplier then a secondary check is performed.

- If the difference between actual reading and the calculated reading is more than 2% then the problem is investigated and resolved.

3.3.8 Alarms

When a meter is polled and significant meter alarms are flagged in the data file, e.g. long/short intervals etc. each alarm is investigated.

3.3.9 Zero Interval Tolerance

If a customer’s half hour data profile does not normally register any zero consumption on the kW import channel then the total number of zero half hour data intervals retrieved for the kW channel will be counted. If it exceeds 20 intervals then the data is flagged for investigation.

3.4 Data Estimation and Substitution

Data estimation is required in situations where meter data is incomplete, has been irretrievably lost or cannot be obtained within the timeframes required. Data substitution is required where the data obtained is erroneous. Data will be estimated/substituted when required using one of the following methods in the order specified below:

3.4.1 Check Meter

Where a check meter is installed and functional, data requiring estimation/substitution will be taken directly from the check meter.

3.4.2 Up to Two Hour Gap in Data

If the gap in data is 2 hours or less point-to-point linear interpolation will be used to estimate/substitute the data. Intervals containing a power outage are not used as end points for interpolation:

(a) If the data gap occurs in the middle of the data, the first point is the last valid interval before the gap and the second point is the first valid interval after the gap.

(b) If the gap occurs at the beginning of the span the last interval from the historical data is used as the first point if the historical data is available and valid. Otherwise the second point (the first valid interval after the section) is used as the first point – this will cause the load to be estimated as a flat load.

(c) If the gap occurs at the end of the span the first point (the last valid interval before the section) is used as the second point – this will cause the load to be estimated as a flat load.

3.4.3 Over Two Hour gap in Data
If the gap in data is greater than 2 hours then the interval data is constructed using the average load shape based on the three most recent “similar” periods with valid data (i.e. data that has not been estimated). A “similar” period means the same time period of week and can be chosen from the previous 90 days. If the period needing estimation is a holiday, then the “similar days” should be holidays rather than the same day of week.

If adequate data is not available to perform this then one of the methods outlined below will be employed in the order given:

(a) Where actual meter readings are available an adjustment factor shall be calculated and applied to the data to ensure that the total estimated consumption is equal to the total actual consumption.

(b) If only two “similar” periods are available within 90 days, the average is calculated of these two. Similarly, if only one “similar” period is available the data for this period is used for estimation.

(c) If no “similar” periods are available in the previous 90 days, the three “like” periods that are closest chronologically prior to the period requiring estimation are used. A “like” period means a weekday or weekend/holiday.

(d) If no “similar” periods are available and three “like” periods are not available then the average of the two “like” periods that are closest chronologically prior to the period requiring estimation is used.

(e) If no “similar” periods are available and two “like” periods are not available then the data for the “like” period that is closest chronologically prior to the period requiring estimation is used.

(f) If there is no historical data that can be used, the data should be estimated manually and all assumptions documented fully.

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 Registrants. The TSO shall also take into account reasonable comments of such Registrants.
5. INTERFACE AND TIMETABLE INFORMATION

Section: SETTLEMENT VALUES ESTIMATION (NON NIE CUSTOMER)

Subject: Interface and Timetable Information - Agreement of Estimated Settlement Values

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ASAP</td>
<td>On becoming aware of an equipment malfunction likely to have resulted in missing or incorrect data identify the possible cause, prepare a Data Collection System report and send to the other party.</td>
<td>Registrant or TSO</td>
<td>TSO or Registrant</td>
<td>Fax / Post on standard form SE1</td>
</tr>
<tr>
<td>2a</td>
<td>ASAP</td>
<td>Investigate equipment malfunction and determine whether readings are retrievable. Inform other party.</td>
<td>Registrant or TSO</td>
<td>TSO or Registrant</td>
<td>Fax / Post on standard form SE1</td>
</tr>
<tr>
<td>2b</td>
<td>ASAP</td>
<td>Retrieve if retrievable.</td>
<td>TSO</td>
<td>Registrant</td>
<td>Fax / Post on standard forms SE2/SE3</td>
</tr>
<tr>
<td>2c</td>
<td>ASAP</td>
<td>Where data is not retrievable, substitute data if available and send substitute data to Registrant.</td>
<td>TSO</td>
<td>Registrant</td>
<td>Fax / Post on standard forms SE2/SE3</td>
</tr>
<tr>
<td>2d</td>
<td>ASAP</td>
<td>Where neither retrieval or substitution is possible estimate data and send estimated data to Registrant together with supporting documentation.</td>
<td>TSO</td>
<td>Registrant</td>
<td>Fax / Post on standard forms SE2/SE3</td>
</tr>
</tbody>
</table>
Section: SETTLEMENT VALUES ESTIMATION (NON NIE CUSTOMER)

Subject: Interface and Timetable Information - Agreement of Estimated Settlement Values

<table>
<thead>
<tr>
<th>REF</th>
<th>WHEN</th>
<th>ACTION</th>
<th>FROM/BY</th>
<th>TO</th>
<th>METHOD</th>
</tr>
</thead>
</table>
| 3a  | ASAP and in any event within 7 Business Days of receipt of data. | Review data supplied under (2) 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. | Registrant | TSO | Fax / Post on standard forms SE2/SE3 |
| 3b  | | Where revisions to the initial data under (2) above are agreed, prepare revised data and send to Registrant. | TSO | Registrant | Fax / Post on standard forms SE2/SE3 |
| 4a  | No later than the 7th Business Day after receipt of data. | Where the data under (3) above is accepted, indicate acceptance on form, sign and return to the TSO. | Registrant | TSO | Fax / Post on standard forms SE2/SE3 |
| 4b  | | Where the data under (3) above is rejected, indicate non-agreement on form, sign and return to the TSO. Immediately thereafter raise a formal dispute as per MC15 | Registrant | TSO | Fax / Post on standard forms SE2/SE3 |
# APPENDIX A

## GUIDE TO USE OF AP6 FORMS

<table>
<thead>
<tr>
<th>AP6</th>
<th>Description</th>
<th>Use Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>TSO or Registrant inform other party of meter malfunction</td>
<td>SE1</td>
</tr>
<tr>
<td>5.2a</td>
<td>Registrant or the TSO informs other party of reason for malfunction after investigation</td>
<td>SE1</td>
</tr>
<tr>
<td>5.2c</td>
<td>TSO substitutes data and sends to Registrant along with supporting documentation</td>
<td>SE2/SE3</td>
</tr>
<tr>
<td>5.2d</td>
<td>TSO estimates data and sends to Registrant along with supporting documentation</td>
<td>SE2/SE3</td>
</tr>
<tr>
<td>5.3a</td>
<td>Registrant advises acceptance of substituted or estimated data from the TSO as Settlement Values</td>
<td>SE2/SE3</td>
</tr>
<tr>
<td>5.3a</td>
<td>Registrant suggests revisions to substituted or estimated data sent by the TSO</td>
<td>SE2/SE3</td>
</tr>
<tr>
<td>5.3b</td>
<td>TSO sends revised data to Registrant for acceptance</td>
<td>SE2/SE3</td>
</tr>
<tr>
<td>5.4a</td>
<td>Registrant advises acceptance of revised data from the TSO as Settlements Values</td>
<td>SE2/SE3</td>
</tr>
<tr>
<td>5.4b</td>
<td>Registrant rejects substituted or estimated data from the TSO as Settlements Values</td>
<td>SE2/SE3</td>
</tr>
</tbody>
</table>

For forms completed by the Registrant, please fax or post to the following address:

[SONI Limited/NIE plc] (Attn: Manager, Customer Service Revenue)  
120 Malone Road  
Belfast BT9 5HT  
FAX NO: 01232 689280  

or such other address and/or recipient as the TSO may notify from time to time.
PART A

To:  (TSO/Registrant)*

Please find below details of missing / incorrect* meter values in respect of:

Connection Site: 

Meter Serial No: TSO CRN: 

Nature of Problem: 

The date and times affected are: 

For (TSO/Registrant)*

Signed: Name: (in block capitals)

Position: Date: 

PART B

To:  (TSO/Registrant)*

I have investigated the circumstances causing the above mentioned missing/incorrect* meter values. The reason(s) for this are 

The readings are/ are not* retrievable.

For Registrant

Signed: Name: (in block capitals)

Position: Date: 

(*Delete as appropriate)
SE2

AUTHORIZATION FORM
SETTLEMENT VALUES ESTIMATION AND SUBSTITUTION

Note that form SE3 must accompany this to give details of Settlement Values.

PART A

To:  (Registrant)

Please find, for authorization, attached details of substituted/estimated* meter values in respect of:

Connection Site:  

Meter Serial No:  TSO CRN:  

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/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 Registrant

Signed:  Name:  (in block capitals)

Position:  Date:  

(*Delete as appropriate)
<table>
<thead>
<tr>
<th>Half Hour</th>
<th>TSO</th>
<th>Registrant</th>
<th>TSO</th>
<th>Registrant</th>
<th>TSO</th>
<th>Registrant</th>
</tr>
</thead>
<tbody>
<tr>
<td>00.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01.00</td>
<td>09.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01.30</td>
<td>09.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02.00</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02.30</td>
<td>10.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03.00</td>
<td>11.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03.30</td>
<td>11.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04.00</td>
<td>12.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04.30</td>
<td>12.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05.00</td>
<td>13.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05.30</td>
<td>13.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06.00</td>
<td>14.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06.30</td>
<td>14.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07.00</td>
<td>15.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07.30</td>
<td>15.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08.00</td>
<td>16.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
AGREED PROCEDURE NO. 7

COMMUNICATION PROTOCOLS

for the electricity industry in
Northern Ireland
AGREED PROCEDURE No. 7
COMMUNICATION PROTOCOLS

Contents

1. Scope of Procedure .................................................................................................................................................. 1
2. Use of the Procedure ............................................................................................................................................... 1
3. Communication Protocols .................................................................................................................................. 1
4. Communication Routes ........................................................................................................................................ 1
1. **SCOPE OF THE AGREED PROCEDURE**

1.1 This Agreement 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, Registrant 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 TSO data collectors and the Data Collection System and Generator data collectors and data collection apparatus operated by any Interested User shall be formatted and executed through Landis & Gyr's proprietary SCTM (Serial Coded Tele-Metering) communications protocol.

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.

3.4 Non NIE Customer Tariff Metering

Determination of communication protocols is dependent on detailed design and procurement of Non NIE Customer Tariff Metering.

4. **COMMUNICATION ROUTES**

A range of communication routes may be used for transferring data, including but not limited to dial-up modems across PSTN or PTN, direct cabling or virtual data links through other communications media (e.g. X25).

In each case, the prime considerations shall be 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's telecommunications specialists prior to implementation.