



NORTHERN IRELAND ELECTRICITY PLC

DISTRIBUTION METERING CODE

CONSULTATION VERSION

FEBRUARY 2009

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MC1. Introduction

MC1.1 This **Distribution Metering Code** sets out the requirements for **Metering** and for **Generator Metering Circuits** for **Plant** and **Apparatus** with a rating of 70 kVA and above connected to the **Distribution System**. It covers in relation to such **Plant** and **Apparatus**:

- (a) **Metering for Active and Reactive Energy;** and
- (b) **Generator Metering Circuits.**

The **Distribution Metering Code** deals with metering at relevant **Distribution Connection Sites**, as further provided in this **Distribution Metering Code**. It does not deal with **Operational Metering**. Provisions on **Operational Metering** are contained in the **Distribution Connection Conditions**.

MC1.2 The **Distribution Metering Code** does not apply in respect of **Imports at Power Stations** below a certain **Active Power** level and in such circumstances the relevant **Connection Agreement** will specify that the metering will be required to meet the **DNO's** current standards for metering in respect of supplies to large industrial customers and will provide that the **DNO** will provide the **Generator** with a copy of such standards upon request.

MC1.3 Prior to the introduction of the **Single Electricity Market** on the **Island of Ireland** on 1 November 2007, the requirements for **Metering for Users** connected to the **Transmission System** and the **Distribution System** in Northern Ireland were contained in the **Grid Code Metering Code**, which formed part of the **Grid Code**.

MC1.4 With the full licence separation of the **TSO** from the **DNO** at the introduction of the SEM in November 2007, the **DNO** became responsible for a separate **Distribution Code**.

MC1.5 The **Grid Code Metering Code** continues to contain the metering requirements for metering of **Plant** and **Apparatus** connected to the **Transmission System** and also of certain large **Power Stations** connected to the **Distribution System**, as further provided in the **Grid Code**.

MC1.6 Certain **Users** whose **Plant** and **Apparatus** is connected to the **Distribution System** may also be required to comply with the

metering requirements in the **Grid Code Metering Code** in respect of such **Plant** and **Apparatus**. Unless otherwise specifically provided in this **Distribution Code**, the provisions of both the **Grid Code** and the **Distribution Code** have been designed so that compliance with the metering requirements in the **Grid Code Metering Code** should ensure that there will be compliance with the relevant parts of this **Distribution Metering Code**.

- MC1.7 In addition to the requirements for **Metering** and **Generator Metering Circuits** set out in this **Distribution Metering Code** there may be provisions in each of the **Trading and Settlement Code**, **Market Registration Code**, Schedule 7 of the **Order, Connection Agreement**, **Grid Code** and other industry documentation that apply to certain **Users** connected to the **Distribution System** in respect of their **Plant** and **Apparatus**.
- MC1.8 The **Distribution Metering Code** specifies the requirements in respect of:
- (a) technical, design and operational criteria;
 - (b) accuracy and calibration;
 - (c) approval, certification and testing; and
 - (d) meter reading and data management.
- MC1.9 The **Distribution Metering Code** is divided into:
- the **Main Code**;
 - the **Sub-Codes**; and
 - the **Agreed Procedures**.
- MC1.10 In general, the **Main Code** contains the broader principles applying to metering and the **Sub-Codes**, **Agreed Procedures** and, in certain cases, the relevant **Retail Market Procedures** under the **MRC** contain the more detailed technical requirements and/or procedures. The **Sub-Codes**, **Agreed Procedures** and relevant **Retail Market Procedures** cover, amongst other things, the following matters:

(a) **Metering Sub-Codes:**

<u>Sub-Code</u> No.	<u>Subject</u>
1.	for the metering of Circuits > 100 MVA
2.	for the metering of Circuits > 10 MVA to ≤ 100 MVA
3.	for the metering of Circuits > 1 MVA to ≤ 10 MVA
4.	for the metering of Circuits > 70 kVA to ≤ 1 MVA

(b) **Agreed Procedures**

<u>No.</u>	<u>Subject</u>
AP1	Maintenance, testing, inspection and sealing of Metering (Generation) and Generator Metering Circuits .
AP2	Maintenance, testing, inspection and sealing of Metering .
AP3	Meter advance reconciliation (Generation).
AP4	Validation, estimation and substitution rules for half-hourly data (Generation).

MC2. Objectives

MC2.1 The objective of the **Distribution Metering Code** is to ensure that metering requirements are specified for **Users' Plant** and **Apparatus** with a rating of 70 kVA and above connected to the **Distribution System**.

MC3. SCOPE

MC3.1 This **Distribution Metering Code** applies to the **DNO** and to **Users**, which in the Distribution Metering Code means:

- (a) **Generators** in respect of **Plant** and **Apparatus** with a rating of 70 kVA and above connected to the **Distribution System**; and
- (b) **Suppliers** in respect of the **Supply** they make to their **Demand Customers** whose **Plant** and **Apparatus** is of a rating of 70 kVA and above connected to the **Distribution System**.

MC4. PROCEDURE**General**

Distribution Metering Code

- MC4.1 **Active and Reactive Energy** and **Active and Reactive Power** exported or imported by **Users** shall be metered as required by this **Distribution Metering Code**.
- MC4.2 **Metering** must be designed and installed so as to measure both **Exports** to and **Imports** from the **Distribution System** and gross output from each **Generating Unit**.
- MC4.3 Data from **Metering** required under this **Distribution Metering Code** shall be collected:
- (a) in the case of **Users** not subject to **Central Dispatch**, by the **DNO**; and
 - (b) in the case of **Users** subject to **Central Dispatch**, by the **TSO**
- in each case through the relevant **DNO Data Collection System**.
- MC4.4 Description of **Metering**:
- (a) **Metering** subject to this **Distribution Metering Code** shall comply with the requirements set out in the relevant **Metering Sub-Code**.
 - (b) All **Metering** for **Plant** and **Apparatus** connected to the **Distribution System** which is required to comply with the **Grid Code Metering Code** shall be compatible with the **TSO Data Collection System**.
 - (c) All **Generator Metering Circuits** must be compatible with the relevant **Metering**.
- MC5. OWNERSHIP AND METER RESPONSIBLE PERSON**
- MC5.1 All **Metering** shall be owned by the **DNO**. The **DNO** shall ensure that all such **Metering** complies with this **Metering Code**, other than:
- (a) all **Metering** relating to **Demand Customers** which shall, for the purposes of this **Metering Code**, be the responsibility of the relevant **Supplier**.
 - (b) all **Generator Metering Circuits** which shall, for the purposes of this **Distribution Metering Code**, be the responsibility of the

Generator which operates the **Generating Unit** and/or **WFPS** to which they relate; and

- (c) all **Metering** relating to **Interconnectors** , responsibility for which shall be **governed** by the provisions of the relevant **Interconnection Agreement**.

The **DNO** or the **User** responsible for **Metering** shall be known in this **Distribution Metering Code** as the **Meter Responsible Person** in respect of such **Metering**. The relevant **Generator** shall be responsible for **Generator Metering Circuits**.

Metering

- MC5.2(a) Each of the **DNO** and each **User** acting in its capacity as a **Meter Responsible Person** or as a **Generator** shall, by the date such person becomes bound by this **Distribution Metering Code** (and in respect of that **Metering** or those **Generator Metering Circuits** for which it is responsible), ensure such **Metering** or **Generator Metering Circuits** are properly installed and that they comply with the requirements of this **Distribution Metering Code**.
- (b) Details of such **Metering** or **Generator Metering Circuits** shall be provided by the relevant **Meter Responsible Person** or **Generator** to the **DNO** on request for the purposes of maintaining the register pursuant to MC[9.5]. Maintenance and replacement of **Generator Metering Circuits** in the ordinary course shall be the responsibility of the relevant **Generator**.

Position

- MC5.3 All current and voltage transformers associated with **Metering** must be installed as close as reasonably practicable to each **Point of Supply** or **Delivery Point** taking into account physical location and cost.
- MC5.4 **Generator Metering Circuits** and **Metering** installed after the **Effective Date** shall comply with the applicable sections of Sub-Codes Nos. 1 to 4.

MC6. Data Collection

DNO

- MC6.1 The **DNO** shall have the right to collect data relating to **Active Energy** and **Reactive Energy** imported and exported by remote interrogation (either direct or through the **TSO**) or manual on-site interrogation in accordance with the terms of this **Distribution Metering Code**.

Generators

- MC6.2 For the purposes of remote interrogation the **DNO** 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** to the **DNO**. In the event of any fault or failure on such communication lines or any error or omission in such data the **DNO** shall, if possible, retrieve such data by manual on-site interrogation in accordance with Agreed Procedure No.4 or, as the case may be, MP NI 105 failing which it shall estimate the same in accordance with Agreed Procedure No.4 or MP NI 105a as appropriate.
- MC6.3 Each of the **DNO** and all **Users** shall use communications protocols in relation to **Metering** in accordance with the relevant Sub-Code.

MC7. ACCURACY

Metering shall be accurate within the prescribed limits set out in the relevant Sub-Codes. 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 Metering Circuits**.

MC8. CALIBRATION

Each **Meter Responsible Person** shall ensure that all **Metering** for which it is responsible and each **Generator** shall ensure that all **Generator Metering Circuits** for which it is responsible shall be calibrated or compensated in accordance with this **Distribution Metering Code** in order to meet the accuracy requirements in the Sub-Codes. The **Meter Responsible Person** in the case of **Metering** or the **DNO** in the case of **Generator Metering Circuits** shall be granted access to such **Metering** or **Generator Metering Circuits** by the relevant **User** upon reasonable notice and at reasonable times, in order to make or inspect any adjustments to them and to attend any tests or inspection of them required pursuant to this **Distribution Metering Code**.

MC9. PROPER ORDER, TESTING, SEALING AND READING

MC9.1 Proper Order:

- (a) Each **Meter Responsible Person** shall at its own cost and expense keep in good working order, repair and condition all **Metering** in respect of which it is the **Meter Responsible Person** to the extent necessary to ensure the correct recording and transmission of the requisite data relating to or in respect of the quantity of **Active** and **Reactive Energy** measured by the relevant **Metering**.
- (b) Each **Generator** shall at its own cost and expense keep in good working order, repair and condition all **Generator Metering Circuits** for which it is responsible.

MC9.2 Testing:

- (a) Any new or replacement meters shall be calibrated prior to installation in accordance with the provisions of the relevant Sub-Code.
- (b) Any new, replacement or modified **Metering** shall be tested by the **Meter Responsible Person** as soon as is reasonably practicable after installation or modification of such **Metering**. **Metering** for consumers will be tested in accordance with the Meters (Certification) Regulations (NI) 1998.
- (c) No less frequently than every five years (or more frequently if required by the relevant Sub-Code) each **Meter Responsible Person** shall carry out a periodic calibration of all **Metering** in respect of which it is the **Meter Responsible Person**.
- (d) The **Meter Responsible Person** in respect of **Metering** at a **Power Station** shall give the **DNO** or (in the case of **Metering** of which the **DNO** is the **Metering Responsible Person**), the **Generator** 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**. The notice must state 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.

- (e) The **DNO** or the **Generator**, 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.
- (f) If the **DNO** or any **User** has reason to believe that **Metering 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 **DNO**) shall promptly notify the **DNO** accordingly. An ad-hoc test may then be arranged which will only be chargeable to the requesting party if no fault is found.
- (g) The costs and expenses of testing carried out under MC9.2(b) and calibration carried out under MC9.2(c) shall be borne by the **Meter Responsible Person**. The costs and expenses of testing carried out under MC9.2(f) shall to the extent that testing reveals no fault, be borne by the party requesting such test and, to the extent that such test reveals faults, by the **Meter Responsible Person**.
- (h) If all or any part of a **Generator Metering Circuit** is replaced, the relevant **Generator Metering Circuit** shall be recalibrated if calibration is possible. If required, the **DNO** and the **Generator** shall agree any change that may be necessary to the existing compensation for that **Generator Metering Circuit**.
- (i) Calibration certificates for test equipment shall be made available for inspection by the **DNO** and **Generator Metering Circuit** Parties.

MC9.3 Testing: General

- (a) Any testing of any **Metering** or **Generator Metering Circuits** will be carried out by the **Meter Responsible Person** in the case of **Metering**, or by the **Generator** in the case of **Generator Metering Circuits**, on the relevant **Metering** or **Generator Metering Circuits** mounted in their operational position.
- (b) Both the **Generator** and the **Meter Responsible Person** and (where the **DNO** is not the **Meter Responsible Person**) the **DNO** 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 **Metering** will be carried out in accordance with Agreed Procedure No.1 or, as the case may be, Agreed Procedure No. 2. The test performance of any **Metering** or **Generator Metering**

Circuits shall be compared with calibrated test equipment by one of the following methods:

- (i) 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 **DNO** or, where a **Generator** has instigated the test, by that **Generator** to ensure a reliable comparison; or
- (ii) 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 **DNO** or, where an **Generator** has instigated the test, by that **Generator** to ensure a reliable comparison; or
- (iii) in any other circumstances, such other method as may be reasonably specified by the **DNO** or, where an **Generator** has instigated the test, by that **Generator**.

MC9.4 Test Failures

- (a) Any meter which fails any test whilst in its operational position shall be removed by the **Meter Responsible Person** forthwith and tested by the **DNO** under laboratory conditions in accordance with the relevant Sub-Code in the presence of the **Meter Responsible Person** or the **Generator** if either wishes to attend. The **DNO** shall give the **Meter Responsible Person** or the **Generator**, as the case may be, prior notice of such test.
- (b) For meters removed in accordance with MC9.4(a) on circuits that are required to remain in service either:
 - (i) the meter shall be replaced by the **Meter Responsible Person** forthwith with a previously recalibrated meter suitably prepared and compensated for the circuit; or
 - (ii) 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**.

- (iii) 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.

MC9.5 Records:

- (a) Each **Meter Responsible Person** shall at its own cost and expense maintain a register in relation to **Metering** for which it is the **Meter Responsible Person**.
- (b) Each **Generator** shall at its own cost and expense maintain a register in relation to **Generator Metering Circuits** for which it is responsible.
- (c) Each such register shall detail any relevant **Compensation 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 testing and calibration 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 **DNO**.
- (d) Any such records shall be complete and accurate and retained for a minimum period of 7 years whilst the **Metering** or **Generator Metering Circuit** continues to be in service at the **Site** and for 12 months or such longer period as may be required under any other relevant industry document following the permanent removal of the relevant **Metering** or **Generator Metering Circuits**.
- (e) Any data which forms part of such records shall be made available to the **Generator** in the case of **Metering** and the **DNO** in the case of **Generator Metering Circuits**. Copies of the results of all manual readings, adjustments, tests and inspections shall be provided to the **Meter Responsible Person** or **Generator** in accordance, where appropriate, but without limitation, with the **Agreed Procedures**.
- (f) Each **Meter Responsible Person** shall on request pass such records or copies of the same to its successor as **Meter Responsible Person** in relation to any **Metering**.

MC9.6 Sealing:

- (a) All **Metering** as is capable of being made secure shall be sealed by or on behalf of each **Meter Responsible Person** and either the **DNO** or the **Generator** as is appropriate and following any test or inspection thereof in accordance with Agreed Procedure No.1 or, as the case may be, Agreed Procedure No. 2 except, where sealing is impractical in the reasonable opinion of such **Meter Responsible Person** and either the **DNO** or the **Generator** as is appropriate having regard to the physical and electrical configuration at each **Relevant Connection Site**.
- (b) Each **Generator** and the **DNO** shall make arrangements for all **Generator Metering 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 **DNO** having regard to the physical and electrical configuration at each **Relevant Connection Site**.
- (c) The extent and nature of the sealing arrangements shall be agreed by the **DNO** and the **Generator** at the design stage of the main connection
- (d) No seal applied pursuant to this **Distribution Metering Code** shall be broken or removed except in the presence of or with the prior consent of the **DNO** 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 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). Where verbal consent is given it must be confirmed in writing forthwith.
- (e) Neither the **DNO** nor the relevant **User** shall incur any liability under this Distribution Metering Code in the event it cannot perform any of its duties hereunder due to any such consent required by MC9.6(d) being withheld save that it shall promptly inform the **DNO** and the relevant **Meter Responsible Person** or **Generator** accordingly.
- (f) 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.

- (g) Each seal must be uniquely identified in a format previously agreed with the **DNO**. A seal application and removal record must be maintained and signed off by both parties.

MC9.7 Inspection and Readings:

- (a) The **DNO** shall ensure that all meters forming part of Metering which is subject to the terms of this Distribution Metering Code are inspected and read by on-site interrogation by it or on its behalf not less than once every 5 years and shall give the **Meter Responsible Person** or the **Generator** at least 5 Business Days' prior notice thereof or such shorter period as the **DNO** and the relevant **User** may agree.
- (b) A failure to notify in accordance with MC9.7(a) 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** (as that term is defined in the **TSC**).
- (c) The **DNO** shall keep written reports of all such inspections and readings and provide copies to the **Meter Responsible Person** or the **Generator** for the purposes of MC9.5(a). Any resulting discrepancies will be dealt with as provided in the relevant **Agreed Procedure**.
- (d) The **Meter Responsible Person** or **Generator**, 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 **Generator** or **Meter Responsible Person** shall acknowledge the results of any such inspection or reading in the manner required by the **Agreed Procedure**.

MC10. ACCESS

- MC10.1 (a) Each **User** hereby agrees to grant to each other **User** and to the **DNO**, and the **DNO** hereby agrees to grant to each **User**, 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 person's property to the extent necessary for the purposes of this **Distribution Metering Code** subject to the other provisions of MC10.
- (b) Each person so 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.

- MC10.2 Each of the **DNO** and each **User** shall ensure, so far as it is able, that physical access to Metering and **Generator Metering 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 **DNO** or the **User**, as the case may be, on whose land the Metering or **Generator Metering Circuits** are positioned, with copies provided to the **Meter Responsible Person** and the **DNO** pursuant to MC9.5(f). In addition all **Metering** and **Generator Metering Circuits**, where practicable, must be made secure, if necessary by making the lock and keys subject to similar access restrictions.
- MC10.3 Subject to any other arrangements which may be agreed between the relevant **User** and the **DNO** or another **User**, as the case may be, the right of access provided for in MC[10.1] 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 Distribution Metering Code.
- MC10.4 Each of the **DNO** and each **User** 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.
- MC10.5 Each of the **DNO** and each **User** 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 MC[10.1] 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 of the **DNO** and each **User** to make directions or regulations from time to time in relation to a specified matter.
- MC10.6 Matters to be covered by such arrangements and/or provisions include:
- (a) the identification of the relevant Metering or **Generator Metering Circuits**;

- (b) the particular access routes applicable to the land in question having particular regard for the weight and size limits on these routes;
- (c) any limitations on times of exercise of the right of access;
- (d) 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;
- (e) the means of communication to the Invitee of any relevant directions or regulations made by the person granting access; and
- (f) the identification of and arrangements applicable to personnel exercising the right of access granted by MC10.1; and
- (g) 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.

MC10.7 Each Invitee shall ensure that all reasonable steps are taken in the exercise of any right of access by such Invitee to:

- (a) avoid or minimise damage in relation to the property over which it has access; and
- (b) cause as little disturbance and inconvenience as possible to any of the **DNO** or any **User** as the case may be, 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.

MC10.8 For the avoidance of doubt, no **User** or the **DNO** shall incur any liability under this Distribution Metering Code in the event it cannot perform any of its duties hereunder due to access to Metering or **Generator Metering Circuits** being denied to it save that such person (where not the **DNO**) shall promptly inform the **DNO**, the relevant **Meter Responsible Person** and the **Generator** accordingly.

MC11. DISPUTES

MC11.1 Any dispute in relation to the following matters:

- (a) siting of **Metering**;
- (b) technical specifications for **Metering, Generator Metering Circuits** or the **DNO Data Collection System**;
- (c) sealing of **Metering**;
- (d) compliance of Metering or **Generator Metering Circuits** with technical specifications of the **Distribution Metering Code**;
- (e) compensation values;
- (f) such other matters as the relevant persons in dispute under this **Distribution Metering Code** may agree,

shall be referred to an Independent Engineer under MC11.2.

MC11.2 The parties to a dispute under this MC11 agree and shall procure that the **Independent Engineer** shall act as an expert and not as an arbitrator and shall decide those matters referred or reserved to him under this MC11 by reference to **Good Industry Practice** using his skill, experience and knowledge and with regard to such other matters as the **Independent Engineer** in his sole discretion considers appropriate. All references to the **Independent Engineer** shall be made in writing by either party with notice to the other being given contemporaneously as soon as reasonably practicable and in any event, within 14 days of the occurrence of the dispute to be referred to the **Independent Engineer**. The parties shall promptly supply the **Independent Engineer** with such documents and information as he may request when considering such question. The **Independent Engineer** shall use his best endeavours to give his decision upon the question before him as soon as possible following its referral to him and in any event within 21 days of such referral. The fees and expenses of the **Independent Engineer** shall be shared equally the parties to the dispute. The parties to the dispute expressly acknowledge that submission of disputes under this MC11 for resolution by the **Independent Engineer** does not preclude subsequent submission of disputes for resolution by arbitration as provided for in the **Distribution Code**. Pending any such submission the parties shall treat the **Independent Engineer's** decision as final and binding. The **Independent Engineer** will be a Member of the

Association of Consulting Engineers (ACE) and shall be agreed between the parties within 7 days of a dispute being referred or such other period as may be agreed between the parties to the dispute. Failing agreement it shall be referred to the President of the Institution of Electrical Engineers who shall nominate the **Independent Engineer**.

- MC11.2 Any other dispute under this **Distribution Metering Code** shall be dealt with in accordance with the disputes procedure in the relevant **Connection Agreement**.
- MC11.3 Any testing of **Metering** or **Generator Metering Circuits** required to settle a dispute will be carried out in accordance with MC9.3 and MC9.4.
- MC11.4 Notwithstanding MC11.1 to MC11.4, any dispute under this **Distribution Metering Code** in relation to a matter that is also subject to the dispute resolution procedures contained within the **Trading and Settlement Code** and the **Market Registration Code** will be dealt with in accordance with the relevant dispute resolution procedure contained within the **Market Registration Code**.
- MC11.5 If at any time any Metering equipment is destroyed or damaged or otherwise ceases to function, or is found to be outside the prescribed limits of accuracy referred to in the Sub-Codes, the **DNO** will promptly adjust, renew or repair the same. If at any time any Metering circuit not under the ownership of the **DNO** is destroyed or damaged or otherwise ceases to function, or is found to be outside the prescribed limits of accuracy referred to in the Sub-Codes, the **Generator Metering Circuit** Party will promptly adjust, renew or repair the same. In the event that an **Generator Metering Circuit** Party cannot or does not comply with its obligations to repair, adjust or replace or renew any defective component, the **DNO** shall have the right to carry this out and to recover its own costs and expenses from the **Generator Metering Circuit** Party.

MC12. INFORMATION

- MC12.1 Where a relevant **User** has an agreement with the **DNO** to receive electronic data from **Metering**, such **User** 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 such **User** shall be responsible for its own computer equipment and communication lines.

MC12.2 Each **Generator** shall have the right to receive electronic data from **Metering** in respect of which it is the **Generator**. The **DNO** shall not, without good cause, interrupt or otherwise disturb such electronic data. The **Generator** shall be responsible for the maintenance of any communication lines from the **Generator Data Collector** to the relevant **Generator**.

MC12.3 **Demand Customers** shall not have the right to receive electronic data files for **Metering** from the **DNO** in respect of which it is the **Demand Customer**.

MC 12.4 All **Users** shall give to the **DNO** all such information in their possession regarding Metering as the **DNO** 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, wiring diagrams, and the dates and periods when Metering is out of service.

MC13. OWNERSHIP OF METERING DATA

MC13.1 The **Meter Responsible Person** of any **Metering** shall own the data acquired therefrom. Any of the **DNO** and each **User** to whom such data relates shall at all times have the right to and is hereby authorised to have access to such data and to use such data in each case as may be permitted pursuant to this **Distribution Metering Code**.

MC13.2 The **Meter Responsible Person** may make a charge for the provision of such data of an amount reflecting its reasonable costs of providing such data and, if confidential, may only release such data to others to the extent required pursuant to this **Distribution Code** or as permitted by the **Connection Agreement**.

MC13.3 Any person subject to this **Distribution 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 **Distribution 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.

MC14 **NEW CONNECTION REGISTRATION AND CHANGE OF SUPPLIER**

MC14.1 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.

MC15 **NOTICES**

MC15.1 Any notice of a new **Meter Responsible Person** or of a change in **Meter Responsible Person** or any other communication required under this **Distribution Metering Code** to be given to the **DNO** shall if required be sent by facsimile to number: 02890 954 329, at NIE Market Services, Fortwilliam House, attention: Metering Systems 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 **DNO** 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 **DNO** (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.

MC15.2 Any notice or other communication sent by facsimile pursuant to MC[15.1] shall be deemed to have been received when despatched.

MC15.3 A new **Meter Responsible Person** must be notified to the **DNO** at least 20 **Business Days** prior to either:

- (a) the date of the intended commencement of obligations of the **Meter Responsible Person**; or
- (b) the date of simultaneous termination of obligations by the existing **Meter Responsible Person** and the assumption of those obligations by the new **Meter Responsible Person**,

(as the case may be) in connection with the relevant **Metering**.

SUB-CODES**Summary of Technical Requirements for Distribution Connected Metering Systems**

The metering system technical requirements for Distribution connections are similar to those at Transmission level. The fundamental metering attribute which must be specified for different circuit loads or generator outputs is that of meter accuracy.

A summary of these accuracy requirements is given in the table below and the Sub-Codes that follow provide more detailed information;

a) Technical Standards Matrix

>100MVA		
	CTs	0.2S
	VTs	0.2
	Meters	0.2S
	Main/Check Meters	Y
	Main/Check CTs & VTs	Y
	3 Phase 4 Wire Required	Y

10-100MVA		
	CTs	0.2
	VTs	0.5
	Meters	0.5S
	Main/Check Meters	Y
	Main/Check CTs & VTs	Y
	*3 Phase 4 Wire Required	N

1-10MVA		
	CTs	0.5S
	VTs	1.0
	Meters	0.5
	Main/Check Meters	Y
	Main/Check CTs & VTs	N
	*3 Phase 4 Wire Required	N

<1MVA		
	CTs	0.5S
	VTs	1
	Meters	2
	Main/Check Meters	N
	Main/Check CTs & VTs	N
	*3 Phase 4 Wire Required	N

Sub-Codes

a) Technical Design Considerations

Specific design details may on occasions require consideration by the **DNO** and the **User** on a case by case basis depending on the nature of the installed electrical connection and its associated plant.

If any of the above accuracy levels cannot be individually achieved e.g. due to size constraints within switchgear, it may be possible with the permission of the **DNO** to increase the accuracy of other elements such that the overall metering system accuracy remains within the prescribed limits.

The burden of metering CTs and VTs must be determined on a per site basis to ensure that it is adequate for the purpose. CTs must operate at between 25% and 95% of their rated burden and VTs must not exceed 95% of their rating.

Three phase four wire metering installations are required for generation or loads of greater than 100MVA. However if it is anticipated that phase energy will be imbalanced, this system of metering should be used at other levels. MV metered connections are usually used for lower than 1 MW capacity, are considered unbalanced and therefore must be measured using three phase four wire methods of metering.

The star point of metering VTs must be earthed irrespective of the metering system deployed.

All metering CTs must be individually wired out to metering equipment panels i.e. the use of common return conductors is prohibited.

SUB-CODE D1
Demand Customer Connected Load or Generation > 100MVA

Contents

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1. SCOPE

- 1.1 This Sub-Code D1 specifies the metering facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with:
- (a) Suppliers in relation to their Demand Customers; and
 - (b) Generating Units.
- 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 exceeds 100 MVA.

2. STANDARDS

- 2.1 All references to industry standards given in the text of this Sub-Code are to versions which are current as at the date this Distribution Code comes into effect. However, Metering is required to comply with the version of any such standard, equivalent or replacement which is 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) (applicable to Generators only);
- (c) Reactive Energy for Import and Export (kVArh).

3.2.2 The **Meter Responsible Person** shall ensure that Metering for the above measurements shall be provided on the **User's** side of the Connection Point in order to measure required Settlement Values.

3.2.3 Active Energy Meters (kWh)

Active Energy meters shall comply with the relevant part of BS EN 62053 (or the standard current at the date of design of such equipment) for class 0.2S meters.

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;
- (b) check kWh meter;
- (c) two main kVArh meters or one bi-directional kVArh meter for lagging and leading power factors;
- (d) two check kVArh meters or one bi-directional kVArh meter 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 Metering Systems must comply with the appropriate codes etc detailed in Section 2.

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 **DNO** 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 providing the accuracy, and also the longer term accuracy in accordance with this Sub-Code can be verified to the **DNO's** satisfaction.

3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the **User's** side of the Connection Point except where otherwise agreed with the DNO.

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 **DNO** seals.

3.3.5 Current Transformers

(a) Two sets of CTs to IEC 60044-1 (or the standard current at the date of design of such equipment) 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 **DNO** 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 **DNO** 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 **DNO** is sought for the modification, any such request must be made in writing to the **DNO** 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 IEC 60044-2 (or the standard current at the date of design of such equipment) 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 **DNO** 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 **DNO** is obtained in accordance with sub-paragraph (h) below.
- (e) Each meter circuit shall be fed by a separate, fused supply 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 **DNO** is sought for the modification, any such request must be made in writing to the **DNO** 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 installations connected to the Distribution System [prior to 1 January 2010] 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 may be either an integral part of individual circuit meters or stand alone units which collect pulses from one or more individual meters. Duplicate data collectors may also be an integral part of check meters or stand alone units. These will be provided by the **Meter Responsible Person** and used to collect, store and transmit energy values for each **Settlement Period** to a **DNO Data Collection System**.
- 3.4.2 The following is required:
- (a) the data collectors must have sufficient data channels to store all half-hour value types necessary for settlement (e.g. kWh and kVarh import and export per connection) and be capable of storing these values during failure of the AC power supply.
 - (b) on demand from the **DNO Data Collection System** 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 **DNO**.
 - (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 data per connection 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 from unauthorised interference.
- 3.4.3 The settlement period shall be selectable over the following range: 30, 15, and 1 minutes and will be notified by the **DNO**. For any selectable value in this range one Settlement Period shall commence on the hour and half-hour.
- 3.4.4 Monitoring facilities shall be provided for data collector fault conditions and to record any instances of local interrogation which changes data.

3.5 Data Collection System

3.5.1 Communications

The means of communication between the data collector and the central **DNO Data Collection System** must be secure at the remote end. Communication can be via PSTN, PTN, GPRS, GSM networks or by any other technically suitable means which has previously been agreed with the **DNO**.

3.5.2 Central Collection Station

The **DNO Data Collection System** will interrogate each remote meter or data collector. All the **DNO** operations carried out either manually or automatically shall be protected by password protection. The **DNO Data Collection System** will synchronise the outstations during interrogation to a standard reference time. Following receipt of all data channels from the outstation the meter data will be transferred to the **DNOs** billing and settlement systems.

3.5.3 Supply Voltage

Assured Supplies must be used where ever possible. However, where a measurement VT source is used and the outstation is storing data for more than one circuit, a voltage selector 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 voltage free (clean contacts) relay outputs which accurately represent the recorded channel values for:

- (a) kWh (import and export) and kVArh (lagging and leading).
- (b) A 30 minute reset pulse.

4. MEASUREMENT CRITERIA

4.1 Accuracy

4.1.1 Overall Accuracy of Equipment

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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

Conditions of Test	Limits of Error at Power Factor	
	Power Factor	Limits of Error
Current expressed as a percentage of rated measuring current		
120% to 10% inclusive	1.0	+/-0.5%
Below 10% to 5% inclusive	1.0	+/-0.7%
Below 5% to 1% inclusive*	1.0	+/-1.5%
120% to 10% inclusive	0.5 lag and 0.8 lead	+/-1.0%

*This requirement shall only apply where the energy transfers to be measured by the Import meter and/or the Export meter during normal operating conditions are such that the Rated Measuring Current will be below 5% (excluding zero) for periods equivalent to 10% or greater per annum.

(b) Reactive Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
	Power Factor	Limits of Error
Current expressed as a percentage of rated measuring current		
120% - 10% inclusive	0	+/-4.0%
120% - 20% inclusive	0.866 lag and lead	+/-5.0%

4.1.2 Accuracy of Time Keeping

- (a) The time keeping accuracy of metering equipment shall be maintained in accordance with Standard Time.

- (b) The commencement of each Settlement Period shall be within 10 seconds of Standard Time.
- (c) The duration of each Settlement Period shall be within +/- 0.1% of the required duration, except where synchronisation has occurred in a Settlement Period.

4.2 Compensation for errors

4.2.1 Compensation for Instrument Transformer Errors

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 **DNO** 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 all test certificates.

5. CALIBRATION AND TESTING OF METERING

5.1 Meters

Metering Systems shall be calibrated and tested in accordance with the relevant requirements of the [articles listed in Section 2].

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.

5.3 Test Access to Metering Equipment

Metering equipment shall be provided with sealable test terminal blocks both at the meter and if practicable at the switchgear to facilitate meter testing and current / voltage transformer checks in situ. Test terminal block design shall be agreed in advance with the DNO.

5.4 Data Collectors

5.4.1 Maintenance

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

5.4.2 Testing

There is no requirement for routine tests of data collectors other than as a part of an overall metering system test.

5.5 Records

The results of all tests and periodic checks shall be held as a permanent record by the **DNO** and a copy held by the **Generator Metering Circuit** party.

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 Distribution 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 Distribution System. The meter(s) registering this Active Energy should be labelled "Export".

Meters shall be labelled to distinguish between main and check meters.

2. REACTIVE ENERGY

Reactive Energy is considered to be Imported or Exported as follows:

Flow of active Energy	Power Factor	Flow of Reactive Energy
Import	Lagging	Import*
Import	Leading	Export*
Import	Unity	Zero
Export	Lagging	Export
Export	Leading	Import
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where Import for Active Energy is defined as in 1 above.

SUB-CODE D2
Demand Customer Connected Load or Generation greater than 10MVA to 100MVA

Contents

1. Scope

2. Standards

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4. Measurement criteria

4.1 Accuracy

4.2 Compensation for Errors

5. Calibration and testing of metering

5.1 Meters

5.2 Current and Voltage Transformers

5.3 Test Access to Metering Equipment

5.4 Data Collectors

5.5 Records

Appendix

1. **SCOPE**

- 1.1 This Sub-Code D2 specifies the metering facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with:
- (a) Suppliers in relation to their Demand Customers; and
 - (b) Generating Units.
- 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 exceeds 10 MVA and up to and including 100 MVA.
- 1.5 For the purposes of this Sub-Code, the criteria for a Demand 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 Distribution System in each period of 12 consecutive months exceeds 10 MVA. For a new supply, a maximum demand is formally agreed between the Demand Customer and the **DNO** and this is periodically reviewed thereafter.

2. **STANDARDS**

All references to industry standards given in the text of this Sub-Code are to versions which are current as at the date this Distribution Code comes into effect. However, metering is required to comply with the version of any such standard, equivalent or replacement which is 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) (applicable to Generators only);
- (c) Reactive Energy for Import and Export (kVARh).

3.2.2 The **Meter Responsible Person** shall ensure that Metering for the above measurements shall normally be provided on the **User's** side of the Connection Point in order to measure required Settlement Values.

3.2.3 Active Energy Meters (kWh)

Active Energy meters shall comply with the relevant part of BSEN 62053 (or the standard current at the date of design of such equipment) for class 0.5S meters.

3.2.4 Reactive Energy Meters (kVARh)

Reactive Energy meters shall comply with the relevant requirements of IEC Standard 1268 or BS EN 62053 (or the standard current at the date of design of such equipment) Part 4 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;
- (b) Check kWh meter;
- (c) Two main kVARh meters or one bi-directional kVARh meter for lagging and leading power factors;
- (d) Two check kVARh meters or one bi-directional kVARh meter for lagging and leading power factors.

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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 Metering Systems must comply with the appropriate codes etc detailed in Section 2 above.
- 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 **DNO** 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 providing the accuracy, and also the longer term accuracy, in accordance with this Sub-Code can be verified to the **DNO's** satisfaction.
- 3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the **User's** side of the Connection Point.
- 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 **DNO** seals.
- 3.3.5 Current Transformers

- (a) One set of CTs to IEC 60044-1 (or the standard current at the date of design of such equipment) 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 **DNO** 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 **DNO** 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 **DNO** is sought for the modification, any such request must be made in writing to the **DNO** 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 VTs to IEC 60044-2 (or the standard current at the date of design of such equipment) 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 **DNO** 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 **DNO** is obtained in accordance with sub-paragraph (h) below.
- (e) Each meter circuit shall be fed by a separate, fused supply 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 **DNO** is sought for the modification, any such request must be made in writing to the **DNO** 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 installations connected to the Distribution System [prior to 1 January 2010], 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 may be either an integral part of individual circuit meters or stand alone units which collect pulses from one or more individual meters. Duplicate data collectors may also be an integral part of check meters or stand alone units. These will be provided by the **Meter Responsible Person** and used to collect, store and transmit energy values for each Settlement Period to a **DNO Data Collection System**.
- 3.4.2 The following is required:
- (a) The data collectors must have sufficient data channels to store all half-hour value types necessary for settlement (e.g. kWh and kVarh import and export per connection) and be capable of storing these Values during failure of the AC power supply.
 - (b) On demand from the **DNO Data Collection System** 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 **DNO**.
 - (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 data per connection 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 from unauthorised interference.

3.4.3 The settlement period shall be selectable over the following range: 30, 15, and 1 minutes and will be notified by the **DNO**. For any selectable value in this range one Settlement Period shall commence on the hour and half-hour.

3.4.4 Monitoring facilities shall be provided for data collector fault conditions and to record any instances of local interrogation which changes data.

3.5 Data Collection System

3.5.1 Communications

The means of communication between the data collector and the central **DNO Data Collection System** must be secure at the remote end. Communication can be via PSTN, PTN, GPRS, GSM networks or by any other technically suitable means which has previously been agreed with the **DNO**.

3.5.2 Central Collection Station

The **DNO Data Collection System** will interrogate each remote meter or data collector. All the **DNO** operations carried out either manually or automatically shall be protected by password protection. The **DNO Data Collection System** will synchronise the outstations during interrogation to a standard reference time. Following receipt of all data channels from the outstation the meter data will be transferred to the **DNOs** billing and settlement systems.

3.5.3 Supply Voltage

Assured Supplies must be used where ever possible. However, where a measurement VT source is used and the outstation is storing data for more than one circuit, a voltage selector 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 voltage free (clean contacts) relay outputs which accurately represent the recorded channel values for:

- (a) kWh (import and export) and kVArh (lagging and leading).

- (b) A 30 minute reset pulse.

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

Conditions of Test	Limits of Error at Power Factor	
	Power Factor	Limits of Error
Current expressed as a percentage of rated measuring current		
120% to 10% inclusive	1.0	+/-1.0%
Below 10% to 5% inclusive	1.0	+/-1.5%
120% to 10% inclusive	0.5 lag and 0.8 lead	+/-2.0%

(b) Reactive Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
	Power Factor	Limits of Error
Current expressed as a percentage of rated measuring current		
120% - 10% inclusive	0	+/-4.0%
120% - 20% inclusive	0.866 lag and lead	+/-5.0%

4.1.2 Accuracy of Time Keeping

- (a) The time keeping accuracy of metering equipment shall be maintained in accordance with Standard Time.
- (b) The commencement of each Settlement Period shall be within 10 seconds of Standard Time.

- (c) The duration of each Settlement Period shall be within +/- 0.1% of the required duration, except where synchronisation has occurred in a Settlement Period.

4.2 Compensation for Errors

4.2.1 Compensation for Instrument Transformer Errors

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 **DNO** 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 all test certificates.

5. CALIBRATION AND TESTING OF METERING

5.1 Meters

Metering Systems shall be calibrated and tested in accordance with the relevant requirements of the articles listed in Section 2.

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.

5.3 Test Access to Metering Equipment

Metering equipment shall be provided with sealable test terminal blocks both at the meter and if practicable at the switchgear to

facilitate meter testing and current / voltage transformer checks in situ. Test terminal block design shall be agreed in advance with the **DNO**.

5.4 Data Collectors

5.4.1 Maintenance

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

5.4.2 Testing

There is no requirement for routine tests of data collectors other than as a part of an overall metering system test.

5.5 Records

The results of all tests and periodic checks shall be held as a permanent record by the **DNO** and a copy held by the **Generator Metering Circuit** party.

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 Distribution 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 Distribution System. The meter(s) registering this Active Energy should be labelled "Export".

Meters shall be labelled to distinguish between main and check meters.

2. REACTIVE ENERGY

Reactive Energy is considered to be Imported or Exported as follows:

Flow of active Energy	Power Factor	Flow of Reactive Energy
Import	Lagging	Import*
Import	Leading	Export*
Import	Unity	Zero

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Export	Lagging	Export
Export	Leading	Import
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where Import for Active Energy is defined as in 1 above.

SUB-CODE D3
Demand Customer Connected Load or Generation 1MVA to 10MVA

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Appendix

1. **SCOPE**

- 1.1 This Sub-Code D3 specifies the metering facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with:
- (a) Suppliers in relation to their Demand Customers; and
 - (b) Generating Units.
- 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 exceeds 1 MVA and up to and including 10 MVA.
- 1.5 For the purposes of this Sub-Code, the criteria for a Demand Customer supply (import active energy) to be over 1 MVA is that monthly maximum demand in each of the three months of the highest maximum demand on the Distribution System in each period of 12 consecutive months exceeds 1 MVA. For a new supply, a maximum demand is formally agreed between the Demand Customer and the **DNO** and this is periodically reviewed thereafter.

2. **STANDARDS**

All references to industry standards given in the text of this Sub-Code are to versions which are current as at that date that this Distribution Code comes into effect. However, metering is required to comply with the version of any such standard, equivalent or replacement which is 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) (applicable to Generators only);
- (c) Reactive Energy for Import and Export (kVAh).

3.2.2 The **Meter Responsible Person** shall ensure that Metering for the above measurements shall normally be provided on the **DNO** 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 BSEN 60653 (or the standard current at the date of design of such equipment) for class 0.5 meters.

3.2.4 Reactive Energy Meters (kVAh)

Reactive Energy meters shall comply with the relevant requirements of IEC Standard 1268 or BS EN 62053 (or the standard current at the date of design of such equipment) Part 4 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;
- (b) Check kWh meter;
- (c) Two main kVAh meters or one bi-directional kVAh meter for lagging and leading power factors;

- (d) Two check kVArh meters or one bi-directional kVArh meter 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 Metering Systems must comply with the appropriate codes etc detailed in Section 2 above.

- 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 **DNO** 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 providing the accuracy, and also the longer term accuracy, in accordance with this Sub-Code can be verified to the **DNO's** satisfaction.

- 3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the **User's** side of the Connection Point except where otherwise agreed with the DNO.

- 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 **DNO** seals.

3.3.5 Current Transformers

- (a) One set of CTs to IEC 60044-1 (or the standard current at the date of design of such equipment) 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 circuit supplying the meters shall be dedicated to Metering. CT secondary winding may supply both main and check meters as long as this does not put the overall metering system accuracy value outside the limits defined in paragraph 4.1.1 and sub-paragraph (e) below.
- (c) Where a CT circuit has an additional burden not associated with meters, e.g. to improve system accuracy, this additional burden shall not be modified in any way without obtaining the approval of the **DNO** in accordance with sub-paragraph (f) below.
- (d) Common return leads for two or more CT secondary circuits are not permitted.
- (e) The total burden on CTs shall not exceed their rating at the rated secondary current.
- (f) 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 **DNO** is sought for the modification, any such request must be made in writing to the **DNO** 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 VTs to IEC 60044-2 (or the standard current at the date of design of such equipment) 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 the meters shall be dedicated to Metering. VT secondary winding may supply both main and check meters as long as this does not put the overall metering system accuracy value outside the limits defined in paragraph 4.1.1 and sub-paragraph (f) below.
- (d) Where a VT circuit has an additional burden not associated with meters e.g. to improve system accuracy, this additional burden shall not be modified in any way unless the approval of the **DNO** is obtained in accordance with sub paragraph (g) below.
- (e) Each meter circuit shall be fed by a separate, fused supply from the VT.
- (f) The total burden on VTs shall not exceed their rating at the rated secondary voltages.
- (g) 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 **DNO** is sought for the modification, any such request must be made in writing to the **DNO** 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 installations connected to the Distribution System [prior to 1 January 2010], 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 the main and the check meters.

3.4 Data Collectors

- 3.4.1 Data collectors may be either an integral part of individual circuit meters or stand alone units which collect pulses from one or more individual meters. Duplicate data collectors may also be an integral part of check meters or stand alone units. These will be provided by the **Meter Responsible Person** and used to collect, store and transmit energy values for each Settlement Period to a **DNO Data Collection System**.
- 3.4.2 The following is required:
- (a) The data collectors must have sufficient data channels to store all half-hour value types necessary for settlement (e.g. kWh and kVarh import and export per connection) and be capable of storing these Values during failure of the AC power supply.
 - (b) On demand from the **DNO Data Collection System** 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 **DNO**.
 - (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 data per connection 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 from unauthorised interference.
- 3.4.3 The settlement period shall be selectable over the following range: 30, 15, and 1 minutes and will be notified by the **DNO**. For any selectable value in this range one Settlement Period shall commence on the hour and half-hour.
- 3.4.4 Monitoring facilities shall be provided for data collector fault conditions and to record any instances of local interrogation which changes data.

3.5 Data Collection System

3.5.1 Communications

The means of communication between the data collector and the central **DNO Data Collection System** must be secure at the remote end. Communication can be via PSTN, PTN, GPRS, GSM networks or by any other technically suitable means which has previously been agreed with the **DNO**.

3.5.2 Central Collection Station

The **DNO Data Collection System** will interrogate each remote meter or data collector. All the **DNO** operations carried out either manually or automatically shall be protected by password protection. The **DNO Data Collection System** will synchronise the outstations during interrogation to a standard reference time. Following receipt of all data channels from the outstation the meter data will be transferred to the **DNOs** billing and settlement systems.

3.5.3 Supply Voltage

Assured Supplies must be used where ever possible. However, where a measurement VT source is used and the outstation is storing data for more than one circuit, a voltage selector 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 voltage free (clean contacts) relay outputs which accurately represent the recorded channel values for:

- (a) kWh (import and export) and kVA_{rh} (lagging and leading).
- (b) A 30 minute reset pulse.

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

Conditions of Test	Limits of Error at Power Factor	
	Power Factor	Limits of Error
Current expressed as a percentage of rated measuring current		
100% to 20% inclusive	1.0	+/-1.5%
Below 20% to 5% inclusive	1.0	+/-2.5%
100% to 20% inclusive	0.5 lag and 0.8 lead	+/-2.5%

(b) Reactive Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
	Power Factor	Limits of Error
Current expressed as a percentage of rated measuring current		
100% - 20% inclusive	0	+/-4.0%
100% - 20% inclusive	0.866 lag and lead	+/-5.0%

4.1.2 Accuracy of Time Keeping

- (a) The time keeping accuracy of metering equipment shall be maintained in accordance with Standard Time.
- (b) The commencement of each Settlement Period shall be within 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 Errors4.2.1 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 **DNO** 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 all test certificates.

5. **CALIBRATION AND TESTING OF METERING**

5.1 Meters

Metering Systems shall be calibrated and tested in accordance with the relevant requirements of the articles listed in Section 2.

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.

5.3 Test Access to Metering Equipment

Metering equipment shall be provided with sealable test terminal blocks both at the meter and if practicable at the switchgear to facilitate meter testing and current / voltage transformer checks in situ. Test terminal block design shall be agreed in advance with the **DNO**.

5.4 Data Collectors

5.4.1 Maintenance

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

5.4.2 Testing

There is no requirement for routine tests of data collectors other than as a part of an overall metering system test.

5.5 Records

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The results of all tests and periodic checks shall be held as a permanent record by the **DNO** and a copy held by the **Generator Metering Circuit** party.

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 Distribution 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 Distribution System. The meter(s) registering this Active Energy should be labelled "Export".

Meters shall be labelled to distinguish between main and check meters.

2. REACTIVE ENERGY

Reactive Energy is considered to be Imported or Exported as follows:

Flow of active Energy	Power Factor	Flow of Reactive Energy
Import	Lagging	Import*
Import	Leading	Export*
Import	Unity	Zero
Export	Lagging	Export
Export	Leading	Import
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where Import for Active Energy is defined as in 1 above.

SUB-CODE D4
Demand Customer Connected Load or Generation 70 kVA to 1MVA

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Appendix

1. **SCOPE**

- 1.1 This Sub-Code D4 specifies the metering facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with:
- (a) Suppliers in relation to their Demand Customers;
 - (b) Generating Units.
- 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 exceeds 70 kVA and up to and including 1 MVA.
- 1.5 For the purposes of this Sub-Code, the criteria for a Demand Customer supply (import active energy) to be over 70 kVA is that monthly maximum demand in each of the three months of the highest maximum demand on the Distribution System in each period of 12 consecutive months exceeds 70 kVA. For a new supply, a maximum demand is formally agreed between the Demand Customer and the **DNO** and this is periodically reviewed thereafter.

2. **STANDARDS**

All references to industry standards given in the text of this Sub-Code are to versions which are current at the time of drafting. However, metering is required to comply with the version of any such standard, equivalent or replacement which is 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) (applicable to Generators only);
- (c) Reactive Energy for Import and Export (kVAh).

3.2.2 The **Meter Responsible Person** shall ensure that Metering for the above measurements shall normally be provided on the **User's** side of the Connection Point in order to measure required Settlement Values.

3.2.3 Active Energy Meters (kWh)

Active Energy meters shall comply with the relevant part of BS EN 62053 (or the standard current at the date of design of such equipment) for class 2 meters.

3.2.4 Reactive Energy Meters (kVAh)

Reactive Energy meters shall comply with the relevant requirements of IEC Standard 1268 or BS EN 62053 (or the standard current at the date of design of such equipment) Part 4 for class 3 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;
- (b) Two main kVAh meters or one bi-directional kVAh meter 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 Metering Systems must comply with the appropriate codes etc detailed in Section 2 above.
- 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 **DNO** 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 providing the accuracy, and also the longer term accuracy, in accordance with this Sub-Code can be verified to the **DNO's** satisfaction.
- 3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the **User's** side of the Connection Point except where otherwise agreed with the DNO.
- 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 **DNO** seals.
- 3.3.5 Current Transformers
- (a) One set of CTs to IEC 60044-1 (or the standard current at the date of design of such equipment) with a minimum standard of accuracy class 0.5 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 circuit supplying the meters shall be dedicated to Metering. CT secondary winding may supply both main and check meters as long as this does not put the overall metering system accuracy value outside the limits defined in paragraph 4.1.1 and sub-paragraph (e) below.
- (c) Where a CT circuit has an additional burden not associated with meters, e.g. to improve system accuracy, this additional burden shall not be modified in any way without obtaining the approval of the **DNO** in accordance with sub-paragraph (f) below.
- (d) Common return leads for two or more CT secondary circuits are not permitted.
- (e) The total burden on CTs shall not exceed their rating at the rated secondary current.
- (f) 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 **DNO** is sought for the modification, any such request must be made in writing to the **DNO** 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 VTs to IEC 60044-2 (or the standard current at the date of design of such equipment) 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 the meters shall be dedicated to Metering. VT secondary winding may supply both main and check meters as long as this does not put the overall metering system accuracy value outside the limits defined in paragraph 4.1.1 and sub-paragraph (f) below.

- (d) Where a VT circuit has an additional burden not associated with meters e.g. to improve system accuracy, this additional burden shall not be modified in any way unless the approval of the **DNO** is obtained in accordance with sub paragraph (g) below.
- (e) Each meter circuit shall be fed by a separate, fused supply from the VT.
- (f) The total burden on VTs shall not exceed their rating at the rated secondary voltages.
- (g) 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 **DNO** is sought for the modification, any such request must be made in writing to the **DNO** 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 installations connected to the Distribution System [prior to 01 January 2010], 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 the main and the check meters.

3.4 Data Collectors

- 3.4.1 Data collectors may be either an integral part of individual circuit meters or stand alone units which collect pulses from one or more individual meters. Duplicate data collectors may also be an integral part of check meters or stand alone units. These will be provided by the **Meter Responsible Person** and used to collect, store and

transmit energy values for each Settlement Period to a **DNO Data Collection System**.

3.4.2 The following is required:

- (a) The data collectors must have sufficient data channels to store all half-hour value types necessary for settlement (e.g. kWh and kVarh import and export per connection) and be capable of storing these Values during failure of the AC power supply.
- (b) On demand from the **DNO Data Collection System** 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 **DNO**.
- (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 data per connection 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 from unauthorised interference.

3.4.3 The settlement period shall be selectable over the following range: 30, 15, and 1 minutes and will be notified by the **DNO**. For any selectable value in this range one Settlement Period shall commence on the hour and half-hour.

3.4.4 Monitoring facilities shall be provided for data collector fault conditions and to record any instances of local interrogation which changes data.

3.5 Data Collection System

3.5.1 Communications

The means of communication between the data collector and the central **DNO Data Collection System** must be secure at the remote end. Communication can be via PSTN, PTN, GPRS, GSM networks or by any other technically suitable means which has previously been agreed with the **DNO**.

3.5.2 Central Collection Station

Sub-Code D4

The **DNO Data Collection System** will interrogate each remote meter or data collector. All the **DNO** operations carried out either manually or automatically shall be protected by password protection. The **DNO Data Collection System** will synchronise the outstations during interrogation to a standard reference time. Following receipt of all data channels from the outstation the meter data will be transferred to the **DNOs** billing and settlement systems.

3.5.3 Supply Voltage

Assured Supplies must be used where ever possible. However, where a measurement VT source is used and the outstation is storing data for more than one circuit, a voltage selector 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 voltage free (clean contacts) relay outputs which accurately represent the recorded channel values for:-

- (a) kWh (import and export) and kVArh (lagging and leading).
- (b) A 30 minute reset pulse

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

Conditions of Test	Limits of Error at Power Factor	
	Power Factor	Limits of Error
Current expressed as a		

Sub-Code D4

percentage of rated measuring current		
100% to 20% inclusive	1.0	+/-1.5%
Below 20% to 5% inclusive	1.0	+/-2.5%
100% to 20% inclusive	0.5 lag and 0.8 lead	+/-2.5%

(b) Reactive Energy Measurement

Conditions of Test	Limits of Error at Power Factor	
	Power Factor	Limits of Error
Current expressed as a percentage of rated measuring current		
100% - 20% inclusive	0	+/-4.0%
100% - 20% inclusive	0.866 lag and lead	+/-5.0%

4.1.2 Accuracy of Time Keeping

- (a) The time keeping accuracy of metering equipment shall be maintained in accordance with Standard Time.
- (b) The commencement of each Settlement Period shall be within 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 Errors4.2.1 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 **DNO** 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 all test certificates.

5. CALIBRATION AND TESTING OF METERING

5.1 Meters

Metering Systems shall be calibrated and tested in accordance with the relevant requirements of the articles listed in Section 2.

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.

5.3 Test Access to Metering Equipment

Metering equipment shall be provided with sealable test terminal blocks both at the meter and if practicable at the switchgear to facilitate meter testing and current / voltage transformer checks in situ. Test terminal block design shall be agreed in advance with the **DNO**.

5.4 Data Collectors

5.4.1 Maintenance

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

5.4.2 Testing

There is no requirement for routine tests of data collectors other than as a part of an overall metering system test.

5.5 Records

The results of all tests and periodic checks shall be held as a permanent record by the **DNO** and a copy held by the **Generator Metering Circuit** party.

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 Distribution 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 Distribution System. The meter(s) registering this Active Energy should be labelled "Export".

Meters shall be labelled to distinguish between main and check meters.

2. REACTIVE ENERGY

Reactive Energy is considered to be Imported or Exported as follows:

Flow of active Energy	Power Factor	Flow of Reactive Energy
Import	Lagging	Import*
Import	Leading	Export*
Import	Unity	Zero
Export	Lagging	Export
Export	Leading	Import
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where Import for Active Energy is defined as in 1 above.

AGREED PROCEDURE No. 1

MAINTENANCE, TESTING, INSPECTION AND SEALING OF METERING AND GENERATOR METERING CIRCUITS

**for the electricity industry in
Northern Ireland**

AGREED PROCEDURE No. 1

**MAINTENANCE, TESTING , INSPECTION AND SEALING
OF METERING AND GENERATOR METERING CIRCUITS**

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1. SCOPE OF PROCEDURE

- 1.1 This Agreed Procedure (the “Procedure”) outlines the responsibilities of the DNO and the Generator with regard to notification, authorisation and witnessing of the breaking and replacement of seals on generation Metering and Generator Metering 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 Distribution Code and terms and expressions defined in the Distribution Code have the same meaning in the Procedure.

2. USE OF THE PROCEDURE

- 2.1 The Procedure is to be used by the DNO and Generator staff to ensure that the breaking and replacement of seals and the carrying out of routine and emergency maintenance, testing and calibration on generation Metering and Generator Metering 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

- 3.1 Forms set out in the Appendices to this Procedure may be amended from time to time by the DNO upon reasonable notice to all Generators. The DNO shall also take into account reasonable comments of Generators.

4. **INTERFACE AND TIMETABLE INFORMATION**

Section: MAINTENANCE, TESTING AND INSPECTION OF METERING AND GENERATOR METERING CIRCUITS

Subject: Interface and Timetable Information - Maintenance, Testing, Inspection, Calibration and Sealing of Metering

REF	WHEN	ACTION	FROM/BY	TO	METHOD
-----	------	--------	---------	----	--------

EITHER:

1a Routine Inspection, Maintenance, Testing & Calibration

At least 5 days prior to carrying work out	Notify date, time, work required, estimated duration and request breaking of seals (as necessary)	DNO or Generator	Generator or DNO	Fax on standard form (Appendix A)
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OR:

1b Inspection, Maintenance, Testing and Calibration in an Emergency

At the earliest opportunity	Notify, date, time, place, work required, estimated duration and request breaking of seals (as necessary)	DNO or Generator	Generator or DNO	Fax on standard form (Appendix A) or verbally
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2	Prior to work being carried out (Note 1)	Grant permission to break seals (as appropriate) and notify as to attendance	Generator or DNO	DNO or Generator	Fax on standard form (Appendix A) or verbally
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3	Day work carried out	Record meter readings prior to seals being broken and commencing work	DNO or Nominated Party		Manual record (Appendix B)
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4. **INTERFACE AND TIMETABLE INFORMATION**

Section: MAINTENANCE, TESTING AND INSPECTION OF METERING AND GENERATOR METERING CIRCUITS

Subject: Interface and Timetable Information - Maintenance, Testing, Inspection, Calibration and Sealing of Metering

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

4. **INTERFACE AND TIMETABLE INFORMATION**

Section: MAINTENANCE, TESTING AND INSPECTION OF METERING AND GENERATOR METERING CIRCUITS

Subject: Interface and Timetable Information - Maintenance, Testing, Inspection, Calibration and Sealing of Metering

REF	WHEN	ACTION	FROM/BY	TO	METHOD
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8	After work completed	Copy meter record sheet and work sheet and issue to other party	DNO or Generator	Generator or DNO	By hand
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Note 1 In an emergency situation when it is impossible to contact the DNO or the Generator, 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 DNO or Generator prior to the commencement of emergency work. The authorisation procedure to break seals must be followed retrospectively. In an emergency situation when it is impossible to await the required paperwork, verbal consent may be given. In such circumstances written consent must follow forthwith.

APPENDIX A

REQUEST TO BREAK SEALS

TO: [DNO/Generator]

Date: []
 Tel: []
 Fax: []

GENERATOR: _____

SERIAL NO: _____

DETAILS OF WORK TO BE CARRIED OUT:

We request permission to carry out the work described below and to break such seals as are necessary. We estimate the duration of the work to be from [] to [].
 The work is to be carried out at [Site] by [].

The description of the work is as follows: _____

The circuits and meters to be affected are as follows:-

CIRCUIT/METER ID	COMMENTS

FROM:

Name _____

Signature _____

Position _____

Date _____

Continued

SHEET: _____ OF _____
 SERIAL NO: _____

APPENDIX B

METER RECORD SHEET

GENERATOR : _____

READING DATE : _____

SITE NAME : _____

READING TIMES : START _____ :

METER ID : _____

FINISH _____ :

FUNCTION	MAIN METER		CHECK METER	
	BEFORE	AFTER	BEFORE	AFTER
MWh EXPORT				
MWh IMPORT				
MVAr EXPORT				
MVAr IMPORT				

	RECORDER	GENERATOR WITNESS
NAME		
SIGNATURE		
DATE		
COMPANY		
ACTING FOR		

AGREED PROCEDURE No. 2

MAINTENANCE, TESTING, INSPECTION AND SEALING OF METERING (DEMAND CUSTOMER)

**for the electricity industry in
Northern Ireland**

AGREED PROCEDURE No. 2

**MAINTENANCE, TESTING, INSPECTION AND
SEALING OF METERING (DEMAND CUSTOMER)**

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1. SCOPE OF PROCEDURE

- 1.1 This Agreed Procedure (the "Procedure") outlines the responsibilities of the DNO and the Meter Responsible Person with regard to notification, authorisation and witnessing of the breaking and replacement of seals on Demand Customer 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 MC9.6.
- 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 Distribution Code and terms and expressions defined in the Distribution Code have the same meaning in the Procedure.

2. USE OF THE PROCEDURE

- 2.1 The Procedure is to be used by the DNO and the Meter Responsible Person to ensure that the breaking and replacement of seals and the carrying out of routine and emergency maintenance, testing and calibration on Demand Customer 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 MC9.69(c) 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 MC9.5.
- 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

- 3.1 Forms set out in the Appendices to this Procedure may be amended from time to time by the DNO upon reasonable notice to all relevant Parties. The DNO shall also take into account reasonable comments of relevant Parties.

4. INTERFACE AND TIMETABLE INFORMATION

Section: MAINTENANCE, TESTING, INSPECTION AND SEALING OF METERING (DEMAND CUSTOMER)

Subject: Interface and Timetable Information - Maintenance, Testing, Inspection, Calibration and Sealing of Metering.

REF	WHEN	ACTION	FROM/BY	TO	METHOD
EITHER:					
1a	Routine Inspection, Maintenance, Testing & Calibration				
	At least 15 BD prior to carrying work out	Notify date, time, work required, estimated duration and request breaking of seals (as necessary)	DNO or Meter Responsible Person	Meter Responsible Person or DNO	Fax / Post on standard form MT1/1
OR:					
1b.	Inspection, Maintenance, Testing and Calibration in an Emergency				
	At the earliest opportunity	Notify, date, time, place, work required, estimated duration and request breaking of seals (as necessary)	DNO or Meter Responsible Person	Meter Responsible Person or DNO	Fax / Post on standard form MT1/1 or verbally
	Prior to work being carried out	Acknowledge receipt of request to break seals and confirm attendance of party representative	Meter Responsible Person or DNO	DNO or Meter Responsible Person	Fax / Post on standard form MT1/2
3a.	Day work carried out	Record meter readings prior to seals being broken and commencing work	DNO or Meter Responsible Person		Manual record on standard form MT2
3b.	Where possible	Witness recording of meter readings	DNO or Meter Responsible Person		

4. INTERFACE AND TIMETABLE INFORMATION

Section: MAINTENANCE, TESTING, INSPECTION AND SEALING OF METERING (DEMAND CUSTOMER)

Subject: Interface and Timetable Information - Maintenance, Testing, Inspection, Calibration and Sealing of Metering.

REF	WHEN	ACTION	FROM/BY	TO	METHOD
4a.	Day work carried out	Carry out required work. Record details of work done.	DNO or Meter Responsible Person		Manual record on standard form MT1/2
4b.	Where possible	Witness work being carried out	Meter Responsible Person or DNO		
5a.	After work completed	Apply seals and then record meter readings.	DNO or Meter Responsible Person		Manual record on standard form MT2
5b.	Where possible	Witness recording of meter readings and application of seals	DNO or Meter Responsible Person		
	After work completed	Check accuracy of manual record and sign to confirm work completed and seal applied	DNO and Meter Responsible Person		Standard form MT1/2
	After work completed	Copy meter record sheet and work sheet and issue to other party	DNO or Meter Responsible Person	Meter Responsible Person or DNO	By hand

APPENDIX A**GUIDE TO USE OF AP2 FORMS**

AP2	Description	Use Form
4.1a/b	DNO or Meter Responsible Person give notification of work to be carried out /completed on Metering.	MT1 / 1
	DNO or Meter Responsible Person acknowledge receipt of form MT1/1 and confirm attendance of representative during work.	MT1 / 2
4.3a, 4.5a	Record of meter readings before and after doing work	MT2
4.4a, 4.6	Record of work done in relation to metering	MT1 / 2

For forms completed by the Meter Responsible Person, please fax or post to the following address:

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 DNO may notify from time to time.

MT1/1

NOTIFICATION OF WORK TO BE CARRIED OUT/COMPLETED

TO: (DNO/METER RESPONSIBLE PERSON)* _____

SITE NAME: _____

DNO CRN: _____

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:-

CIRCUIT/METER SER NO.	COMMENTS

FROM: (DNO/METER RESPONSIBLE PERSON)*

Name: _____

Signature: _____

Position _____

Date: _____

(* Delete as appropriate)

Continued....

Serial No.....
Page 2 of 2

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: (DNO/METER RESPONSIBLE PERSON)*

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 DNO:

Name: _____ Signature: _____

Position _____ Date: _____

FOR METER RESPONSIBLE PERSON:

Name: _____ Signature: _____

Position _____ Date: _____

(* Delete as appropriate)

Serial No

Page of

MT2

METER READINGS RECORD SHEET

For multiple feeder sites use additional sheets.

METER
RESPONSIBLE
PERSON:

READING DATE:

SITE NAME:

READING TIMES:

START:

FINISH:

METERING ID:

METER SERIAL
NO(S):

FUNCTION	MAIN METER READING		CHECK METER READING	
	BEFORE	AFTER	BEFORE	AFTER
kWh EXPORT				
2kWh IMPORT				
kVArh EXPORT				
kVArh IMPORT				

	PARTY RECORDING	PARTY WITNESSING
NAME		
SIGNATURE		
DATE		
POSITION		
COMPANY		

AGREED PROCEDURE No. 3

METER ADVANCE RECONCILIATION (HALF HOUR METERED GENERATION)

**for the electricity industry in
Northern Ireland**

AGREED PROCEDURE No. 3

METER ADVANCE RECONCILIATION (GENERATION)

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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 MC9.7 and the reconciliation of such meter readings with Settlement Values collected electronically and stored on the DNO Data Collection System. This reconciliation is achieved by comparing the manually read meter register readings with the accumulations recorded in the DNO Data Collection System. Any discrepancies discovered will be processed in accordance with the Trading & Settlement Code.
- 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 Distribution Code and terms and expressions defined in the Distribution Code have the same meaning in the Procedure.
- 1.5 This Procedure applies to half hour metered Generators only. The meter advance reconciliation procedures for Demand Customers are covered by MP NI 105.

2. USE OF THE PROCEDURE

- 2.1 The Procedure shall be used by the DNO and staff of those Generators who are metered on a half-hourly basis who are responsible for meter advance reconciliation readings and processing.

3. AMENDMENTS TO PROFORMAS AND EXAMPLES

- 3.1 3.1 Proformas and examples set out in the Appendices to this Procedure may be amended from time to time by the DNO upon reasonable notice to all

Generators. The DNO shall also take into account reasonable comments of
Generators.

4 **INTERFACE AND TIMETABLE INFORMATION**

Section: METER ADVANCE RECONCILIATION (GENERATION)

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

REF	WHEN	ACTION	FROM/B Y	TO	METHOD
1	Annually	For each calendar month draw up a plan of the meter readings which are to take place and issue to the Generator. Such readings to be scheduled at intervals not exceeding 3 months.	DNO	Generator	Fax
2	At least 5 days before reading date	Advise the Generator of date and time for reading to take place	DNO	Generator	Fax on standard form (Appendix A)
3	Within 3 months of last reading	Read meter registers (in the presence of the Generator 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 DNO and Generator representative sign record sheet. (Note 1)	DNO and Generator		Manual record (Appendix B)
4	Before leaving site	Sign off and hand copy of actual meter values with time and date of reading to the Generator.	DNO	Generator	Manual record (Appendix B)

Section: METER ADVANCE RECONCILIATION (GENERATION)

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

REF	WHEN	ACTION	FROM/B Y	TO	METHOD
5	Within 3 Business Days of meter reading	(i) Input meter register values, time and date of reading to the meter register comparison process of the DNO Data Collection System (ii) Run meter register comparison process which compares the difference between the latest actual and the previous actual reading with the electronically recorded total delivered energy for the known time interval (iii) Print out meter register comparison report (Appendix C)	DNO	Generator	On line entry to the DNO Data Collection System

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 Generator (Note 2)	DNO	Generator	Fax
----	---	--	-----	-----------	-----

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 Generator , together with copies of the relevant meter register comparison reports (Note 2)	Generator	DNO	
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Section: METER ADVANCE RECONCILIATION (GENERATION)

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

REF	WHEN	ACTION	FROM/B Y	TO	METHOD
7a	Within 14 Business Days of receipt of Meter Reconciliation Statement	Review Meter Reconciliation Statement and either: (i) advise the DNO that the Meter Reconciliation Statement is agreed OR (ii) discuss areas of concern with the DNO, providing supporting evidence as necessary	Generator	DNO	
7b		Where revisions to the initial Meter Reconciliation Statement are agreed, prepare a replacement Meter Reconciliation Statement and issue to Generator	DNO	Generator	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 DNO	Generator	DNO	Fax
8b		Where the Meter Reconciliation Statement is disputed, indicate non-agreement on form and sign and return to the DNO. Immediately thereafter raise a formal dispute as per the Disputes Procedure of the Metering Code	Generator	DNO	Fax

Section: METER ADVANCE RECONCILIATION (GENERATION)

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

REF	WHEN	ACTION	FROM/B Y	TO	METHOD
9	Within 14 days of receipt of agreed Meter Reconciliation Statement	Issue invoice for agreed payment adjustment	Generato r	DNO	
10	Within 14 days of receipt of invoice	Make payment	Generato r or DNO	DNO or Generato r	BACS

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: [Generator]

SERIAL NO: _____

METER ADVANCE RECONCILIATION - NOTICE OF METER READING

Northern Ireland Electricity plc hereby notifies the undermentioned Generator 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 Distribution Code on the date and at the approximate time stated below. The person(s) attending on behalf of Northern Ireland Electricity plc is/are indicated below.

Generator:	
Site:	
DNO Representative(s):	
Date/Time	

For DNO:

Signature: _____

Name: _____
(in block capitals)

Position: _____

Date of Issue: _____

APPENDIX B

METER ADVANCE RECONCILIATION RECORD

SHEET: _____ OF: _____

GENERATOR : _____ READING DATE : _____ (DD.MM.YY)
 SITE NAME : _____ READING TIME : _____ (HH.MM)
 METER ID : _____ SERIAL NO : _____

FUNCTION	MAIN METER REGISTER READING	CHECK METER REGISTER READING
MWh EXPORT		
MWh IMPORT		
MVAr EXPORT		
MVAr IMPORT		

	DNO REPRESENTATIVE	GENERATOR WITNESS
PRINT NAME		
SIGNATURE		

APPENDIX C

APPENDIX D

METER ADVANCE RECONCILIATION STATEMENT

SITE NAME: _____ READING DATE: _____

GENERATOR: _____ SERIAL NO: _____

SETTLEMENT VALUE AFFECTED: _____

	Difference Recorded in Meter Register Comparison Report MWh
Metering Point (as appropriate)	
Generator Gross Meter Generator Transformer Meter Unit Transformer Meter Station Transformer Meter	
Net Settlement Value Adjustment MWh	

Associated primary transformer losses are ignored in establishing the Net Settlement Value Adjustment

For DNO:

Signed: _____

Name: _____
(in block capitals)

Position: _____

Date: _____

For Generator:

Signed: _____

Name: _____
(in block capitals)

Position: _____

Date: _____

AGREED/DISAGREED
(Delete as appropriate)

AGREED PROCEDURE No. 4

VALIDATION, ESTIMATION AND SUBSTITUTION RULES FOR HALF-HOURLY DATA

**for the electricity industry in
Northern Ireland**

AGREED PROCEDURE No. 4**VALIDATION, ESTIMATION AND SUBSTITUTION RULES
FOR HALF-HOURLY DATA**

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4. INTRODUCTION

- 4.1 This Agreed Procedure (the "Procedure") describes the rules to be followed for both data validation and data estimation for Generators with remotely read half-hourly Metering.
- 4.2 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.
- 4.3 The Procedure is part of the Grid Code and terms and expressions defined in the Grid Code have the same meaning in the Procedure.
- 4.4 This Procedure applies to half hour metered Generators only. The meter advance reconciliation procedures for Demand Customers are covered by MP NI 105.

5. USE OF THE PROCEDURE

- 5.1 The Procedure shall be used by the DNO and staff of those Generators who are metered on a half-hourly basis who are responsible for meter advance reconciliation readings and processing.

6. VALIDATION OF METER DETAILS

- 6.1 Prior to half-hourly data being accepted and approved for settlement 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.

7. METER ID/SERIAL NUMBER

- 7.1 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.

8. METER REGISTER AND PULSE MULTIPLIERS

- 8.1 The meter Register Reading multiplier and the Pulse Multiplier are verified to ensure data accuracy.

9. METER DATA DATE AND TIME

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

10. VALIDATION OF HALF HOURLY METERING DATA

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

11. METER ID

- 11.1 Each Time a meter is polled the Electronic Serial Number of that meter is compared to the Device ID stored within the data collection level. If they do not match then no data is retrieved and the Failure is reported by the data collection level for investigation.

12. METER CHANNEL DETAILS

- 12.1 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 the DNO Data Collection System for investigation.

13. METER TIME

- 13.1 Each time a meter is polled it's 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.

14. PULSE OVERFLOW

- 14.1 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.

15. EXCLUDED INTERVALS

- 15.1 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.

16. NUMBER OF INTERVALS

- 16.1 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.

17. CUMULATIVE/TOTAL CONSUMPTION COMPARISON

- 17.1 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.

17.1.1 Specifically:

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

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

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

18. ALARMS

- 18.1 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.

19. ZERO INTERVAL TOLERANCE

- 19.1 If a Demand Customer's half hour data profile does not normally register any zero generation on the KW Export 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.

20. DATA ESTIMATION AND SUBSTITUTION

- 20.1 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:

21. CHECK METER

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

22. UPTO TWO HOUR GAP IN DATA

- 22.1 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:

22.1.1 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.

22.1.2 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.

22.1.3 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.

23. OVER TWO HOUR GAP IN DATA

- 23.1 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.

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

23.2.1 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.

- 23.2.2 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.
- 23.2.3 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.
- 23.2.4 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.
- 23.2.5 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.
- 23.2.6 If there is no historical data that can be used, the data should be estimated manually and all assumptions documented fully.

Distribution Metering Code Definitions

[Please Note: The definitions used in the Metering Code will be incorporated into the Glossary and Definitions section of the Distribution Code. For the purposes of consultation, these definitions have been kept separately.]

“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 MC1.10 and set out in this Metering Code;
“Compensation Factors”	loss adjustment factors;
“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;
“DNO Data Collection System”	the data collection system (sometimes referred to as an "instation") operated by the DNO to supply Settlement Values to the Market Operator (as such term is defined in the TSC) 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

	<p>system as the DNO 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 DNO, 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;</p>
“Export”	<p>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;</p>
“Generator data collector”	<p>a data collector available to transmit data directly to the relevant Generator;</p>
“Generator Metering Circuits”	<p>current and voltage transformers in a Power Station and their associated secondary circuits which feed Metering and which may be owned by either the Generator or the DNO;</p>
“Import”	<p>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;</p>
“Independent Engineer”	<p>the person appointed pursuant to MC11.2;</p>
“Main Code”	<p>the part of the Metering Code entitled the "Main Code" and comprising MC1 to MC15;</p>

“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 record produced in accordance with AP3 and/or the statement produced in accordance with AP3;
“Meter Advance Reconciliation Record”	the record produced in accordance with AP3 in the form set out in Appendix B to AP3;
“Meter Reconciliation Statement”	a statement prepared by the DNO and submitted to each Generator and/or a statement prepared by the DNO and submitted to each Generator;
“Metering”	means Tariff Metering;
“Metering Code” or “MC”	The part of the Distribution Code identified as the Metering Code comprising the Main Code, each Sub-Code and each Agreed Procedure;
“Metering System”	means a meter and any associated voltage transformers, current transformers and secondary circuits;
“Operational Metering”	has the meaning given in the Grid Code Metering Code;
“Overall Accuracy”	the accuracy of any Metering as affected by its current and voltage transformers and Generator Metering Circuits;
“Personal Data”	the personal data (as defined in the Data Protection Act 1998) that is collected or processed under the

	Metering Code;
“Point of Supply”	the Connection Point between the Distribution System and the relevant User System, unless another point is agreed between the DNO and the User;
"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 VAr = 1 kVAr; 1000 kVAr = 1 MVar;
“Relevant Connection Site”	a site which includes a Connection Point of a Power Station or Demand Customer to the Distribution System;
“Retail Market Procedure” or “MP”	each of the retail market procedures forming part of the Market Registration Code;
“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 MC1.10 and set out in the Metering Code;

“Supplier”	a holder of 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 DNO 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 Metering Circuits;
“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;
“TSO 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 (as such term is defined in the TSC) 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

	<p>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;</p>
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