



Commission for Energy Regulation

An Coimisiún um Rialáil Fuinnimh

**Metering Code**  
**for the Single Electricity Market**

**27 November 2013**

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## PREFACE

1. The Single Electricity Market (“SEM”) was developed by the Commission for Energy Regulation and the Northern Ireland Authority for Energy Regulation pursuant to a Memorandum of Understanding dated 23 August 2004 and the subsequent All-Island Energy Market Development Framework agreed in November 2004 between Noel Dempsey TD, the Minister for Communications, Marine and Natural Resources and Barry Gardiner MP, the Minister with Responsibility for Enterprise, Trade and Investment in Northern Ireland. This Metering Code constitutes the Republic of Ireland revenue metering arrangements that facilitate the SEM and other commercial requirements in the Republic of Ireland for metered data.
2. The Metering Code specifies the minimum technical, design and operational criteria to be complied with for all revenue metering and data collection equipment and the associated procedures as required for the operation of an efficient electricity market.
3. Metering Equipment shall be provided by the Relevant Meter Operator and shall comply with the provisions of this Metering Code.
4. The Metering Code is divided into six sections:
  - (a) Definitions;
  - (b) General Provisions;
  - (c) Metering Equipment Approval, Certification and Testing;
  - (d) Meter Data Management;
  - (e) General Technical Criteria;
  - (f) Quarter Hourly Metering.
5. This Preface is provided to Users and to prospective Users for information only and does not constitute part of this Metering Code.

## 1.0 DEFINITIONS

All definitions contained in the Distribution Code apply, with the following additions:

<b>Active Energy</b>	The integral with respect to time of the Active Power, which is normally, measured in kilowatt-hours (kWh) or Megawatt-hours (MWh).
<b>Active Power</b>	The product of voltage and the in-phase component of alternating current, which is normally, measured in kilowatts (kW) or Megawatts (MW).
<b>Actual Metering Point</b>	The physical point at which electricity is metered.
<b>Apparatus</b>	Means an item of equipment in which electrical conductors are used, supported or of which they may form a part and includes meters, lines and appliances used or intended to be used for carrying electricity for the purpose of supplying or using electricity.
<b>Business Day</b>	Any day, other than a Saturday or a Sunday or a public holiday or bank holiday, in the Republic of Ireland.
<b>Charging Period</b>	The period over which an electricity trading account is settled.
<b>Check Meter</b>	The meter nominated to provide electrical energy measurements at the Actual Metering Point for verification or substitution.
<b>Connection Point</b>	The physical point where the User's Generator Unit or a constituent of a Supplier Unit or premises as applicable is joined to the Transmission System or the Distribution System as appropriate.
<b>Data Collection System</b>	A computer based system that collects or receives data on a routine basis from Metering Equipment.
<b>Defined Metering Point</b>	The physical location at which the overall accuracy requirements as stated in this Metering Code are to be met. These metering point locations are fully defined in the relevant Connection Agreements.
<b>Demand Period</b>	The time period over which Active Power and Reactive Power is integrated to produce Demand Values. Each Demand Period shall be of 15 minutes duration, one of which shall finish at 24:00 hrs.
<b>Demand Values</b>	Unless otherwise stated, the demand expressed in kW or kVAr of Active Power and Reactive Power respectively. The Demand Values shall be measured over a 15-minute period, and are therefore four times the value of kWh or kVArh recorded during the same time period.
<b>Director of Legal Metrology</b>	Independent Government Body responsible for regulating and supervising weights and measures in Ireland.
<b>Distribution System</b>	Means, in respect of Ireland, all electric lines of ESB and includes any electric plant, transformers and switch gear of ESB which is used for conveying electricity to Final Customers.

<b>Distribution System Operator (DSO)</b>	ESB Networks Ltd. as Distribution System Operator (DSO) licensed pursuant to section 14(1)(g) of the Electricity Regulation Act, 1999.
<b>ESB</b>	The Electricity Supply Board in its capacity as the Transmission System and Distribution System Owner.
<b>ESB Networks Ltd</b>	Distribution System Operator, licensed pursuant to section 14(1)(g) of the Electricity Regulation Act, 1999.
<b>Export</b>	An electricity flow into the Distribution or Transmission System from a User.
<b>Final Customer</b>	A person being supplied with electricity, at a single premises, for consumption on those premises.
<b>Generator</b>	Has the meaning given to the term “Generation Participant” in the Trading and Settlement Code.
<b>Generator Unit</b>	Has the meaning given in the Trading and Settlement Code.
<b>Import</b>	An electricity flow out of the Distribution or Transmission system to a User.
<b>Locally Attached Device</b>	A hand held unit (also known as local interrogation unit) or portable computer (laptop), which can extract metered data and store it for retrieval later at a different location.
<b>Main Meter</b>	The meter nominated to provide electrical energy measurements at the Actual Metering Point for revenue purposes.
<b>Market Operator</b>	Has the meaning given in the Trading and Settlement Code.
<b>Maximum Demand (MD)</b>	The highest Demand Value registered over a period of time for tariff and other purposes.
<b>Maximum Import Capacity (MIC)</b>	The maximum allowed amount of electricity demand expressed in kVA or MVA referred to as being the “Maximum Import Capacity” in the Connection Agreement between the DSO or the TSO as appropriate, and the customer.
<b>Meter</b>	A device for measuring and recording units of electrical demand energy and power.
<b>Meter Advance Reconciliation</b>	The collection and processing of billing meter readings and the reconciliation of such meter readings with settlement values collected electronically and stored in the TSO Data Collection System. This reconciliation is achieved by comparing the meter register readings with the accumulated interval data recorded in the TSO Data Collection System.
<b>Meter Reconciliation Statement</b>	The statement of the comparison of the cumulative energy recorded in the Meter Register with the summated energy derived from the Demand Values.
<b>Metering Equipment</b>	Meters, time-switches, measurement transformers, metering protection and isolation equipment, circuitry and their associated data

	storage and data communications equipment and wiring which are part of the Active Energy and Reactive Energy measuring equipment at or relating to a site.
<b>Meter Registration System Operator (MRSO)</b>	The unit of the DSO which discharges the functions described in condition 8 of the DSO licence and provides the services described in condition 9 of the DSO licence and acts as the Relevant Data Provider for the DSO.
<b>Plant</b>	Fixed and movable items used in the generation and/or supply and/or distribution of electricity, other than Apparatus.
<b>Public Electricity Supplier (PES)</b>	The Electricity Supply Board (or its legal successor in title) licensed pursuant to Section 14(1)(h) of the Electricity Regulation Act 1999.
<b>Rated Measuring Current</b>	The rated current of the Meter used for the purposes of measurement.
<b>Reactive Energy</b>	The integral with respect to time of the Reactive Power, which is normally measured in kilovar-hours (kVArh) or Megavar-hours (MVARh).
<b>Reactive Power</b>	The product of voltage and current and the Sine of the phase angle between them, which is normally measured in kilovars (kVAr) or Megavars (MVAR).
<b>Register</b>	A device, normally associated with a Meter, which records the cumulative amount of Active Energy (kWh), Reactive Energy (kVArh) or Demand Values (kW/kVAr) that have been supplied by a circuit, from which it is possible to obtain readings over specified time periods.
<b>Relevant Data Provider</b>	The entity obliged under the Trading and Settlement Code or obliged under Licence, issued by the Commission, to collect and validate data for a defined set of metering points. The Relevant Data Providers are DSO and TSO.
<b>Relevant Meter Operator</b>	The entity obliged under the Trading and Settlement Code or obliged under Licence, issued by the Commission, to operate and provide for the installation, testing and calibration of a defined set of metering points. The Relevant Meter Operators are DSO and TSO.
<b>SCADA</b>	Means Supervisor Control and Data Acquisition. SCADA refers to a system that collects data from various measuring devices at a generation plant or in other remote locations and then sends this data to a Control Center. In the case of the TSO this is the National control centre.
<b>Supplier</b>	Has the meaning given in the Trading and Settlement Code.
<b>Supplier Unit</b>	Has the meaning given in the Trading and Settlement Code.
<b>Test Certificate</b>	The statement issued by the Relevant Meter Operator confirming that the Meter or Metering Equipment complies with the requirements of this Metering Code.

<b>Commission</b>	The Commission for Energy Regulation.
<b>Trading and Settlement Code</b>	The Code developed pursuant to section 23 of the Northern Ireland (Miscellaneous Provisions) Act 2006 and the Electricity (Single Wholesale Market) (Northern Ireland) Order 2007, and in Ireland pursuant to section 9BA(1) of the Electricity Regulation Act 1999 (Ireland) and as designated pursuant to regulations made under section 9BA(2)(a) of the Electricity Regulation Act 1999 (Ireland).
<b>Transmission System</b>	The System consisting (wholly or mainly) of high Voltage electric lines and cables operated by the TSO for the purpose of transmission of electricity from one Power Station to a sub-station or to another Power Station or between sub-stations or to or from any External Interconnection including any Plant and Apparatus and meters owned or operated by the TSO or ESB in connection with the transmission of electricity.
<b>Transmission System Operator (TSO)</b>	EirGrid plc as operator of the Transmission System, licensed pursuant to Section 14(1)(e) (Licensing of Transmission System Operator) of the Electricity Regulation Act, 1999.
<b>User(s)</b>	Has the meaning provided for in section 2.2.1 of this Metering Code.

## 2.0 General PROVISIONS

### 2.1 Introduction

- 2.1.1 This Metering Code sets out the minimum standards for the measurement and recording of metered quantities of electricity for the purposes of electricity trading and transport in Ireland.
- 2.1.2 The provisions of this Metering Code shall apply equally to Main and Check Meters.

### 2.2 Scope

- 2.2.1 This Metering Code applies to the Transmission System Operator, the Distribution System Operator and the following:

- (a) Generators;
- (b) Suppliers;
- (c) PES;
- (d) Final Customers;

who for the purposes of this Metering Code are deemed to be the Users.

- 2.2.2 Associated documentation underlying policies referred to in the Metering Code are described in more detail in the following documents which can be found on ESB Networks website at [www.esb.ie/esbnetworks](http://www.esb.ie/esbnetworks).

DOCUMENT TITLE	SOURCE
Distribution Code	DSO
ESB Networks Statement of Charges Document	DSO
Rules for Application of DUoS Tariff Groups	DSO

### 2.3 Objective

- 2.3.1 For all Metering Equipment, this Metering Code specifies the conditions governing the following:
- (a) technical, design and operational criteria;
  - (b) accuracy and calibration;
  - (c) approval, certification and testing;
  - (d) meter reading and data management.

### 2.4 Derogations

- 2.4.1 If a User finds that it is, or will be unable to comply with any provision of this Metering Code, then it shall without delay report such non-compliance to the Commission and shall, subject to the provisions of Section 2.4.2 make such reasonable efforts as are required to remedy such non-compliance as soon as reasonably practicable.
- 2.4.2 Where the non-compliance is:
- (a) with reference to User's Plant and/or Apparatus connected to the Distribution System or Transmission System and is caused solely or mainly as a result of a revision to this Metering Code; or
  - (b) with reference to User's Plant and/or Apparatus which is connected, approved to



connect, or for which approval to connect to the Distribution System or Transmission System is being sought;

and the User believes either that it would be unreasonable (including cost and technical considerations) to require it to remedy such non-compliance or that it should be granted an extended period to remedy such non-compliance it shall promptly submit to the Commission a request for a derogation from such provision in accordance with the requirements of Section 2.4.3 and shall provide the Commission with a copy of such application.

- 2.4.3 A request for derogation from any provision of this Metering Code (refer to Annex 1) shall contain:
- (a) the issue number and the date of the Metering Code provision against which compliance or predicted non-compliance was identified;
  - (b) identification of the Plant and/or Apparatus in respect of which a derogation is sought and, if relevant, the nature and extent to which the non-compliance exists;
  - (c) identification of the provision with which the User to this Metering Code is, or will be, unable to comply;
  - (d) the reason for the non-compliance; and
  - (e) the date by which compliance will be achieved (if remedy of the non-compliance is possible) subject to Section 2.4.2 (b).
- 2.4.4 On receipt of any request for derogation, the Commission shall promptly consider such request and provided that the Commission considers that the grounds for the derogation are reasonable, the Commission shall grant such derogation unless the derogation would, or it is likely that it would have a material adverse impact on the security and stability of the Distribution System or Transmission System or imposes unreasonable costs on the operation of the Distribution System or Transmission System. In its consideration of a derogation request by the User, the Commission may contact the User or the Relevant Meter Operator to obtain clarification of the request or to discuss changes to request.
- 2.4.5 To the extent of any derogation granted in accordance with Section 2.4.4 above, the User shall be relieved from its obligation to comply with the applicable provision of the Metering Code and shall not be liable for failure to so comply but shall comply with any alternate provision as set forth in the derogation.
- 2.4.6 The Commission shall:
- (a) keep a register of all derogations which have been granted, identifying the name of the person in respect of whom the derogation has been granted, the relevant provision of the Metering Code, any conditions that apply and the period of the derogation; and
  - (b) on request from the Relevant Meter Operator or any User, provide a copy of such register of derogations to such User.
- 2.4.7 Where a material change in circumstance has occurred, a review of any existing derogations, and any derogations under consideration, may be initiated by the Commission at the request of a User or at the instigation of the Commission.

## **2.5 Modifications**

- 2.5.1 Proposed modifications to this Metering Code shall be forwarded to the Commission for approval.

## **2.6 Meter Provision**

- 2.6.1 Metering Equipment shall be provided and installed as soon as is reasonably practicable and shall be maintained and inspected by Relevant Meter Operator to the standards specified in this Metering Code.
- 2.6.2 Records of relevant Meter data, identification and specification details shall be established and maintained by the Relevant Meter Operator.

## **3.0 Metering Equipment Approval, Certification And Testing**

- 3.1 The Director of Legal Metrology has responsibility for Meter type approval, Meter certification and Meter testing for Active Electricity Energy Meters as defined in Annex MI-003 of EC Directive 2004/22 (as amended). For compliance with the provisions of this Metering Code these functions will be carried out by the Distribution System Operator.
- 3.2 The Relevant Meter Operator shall maintain records relating to the calibration of all Metering Equipment including the dates and results of any tests, readings, adjustments. Any such records shall be complete and accurate and retained for the life of the relevant item of Metering Equipment.
- 3.3 The Relevant Meter Operator shall make arrangements to seal all Metering Equipment (including the date of sealing) and associated modems and telephone links.
- 3.4 Test terminals shall be provided for Main and Check Meters to facilitate on site tests. These terminals shall be in close proximity to the Meters.
- 3.5 Meters shall be tested if a divergence occurs between the Main and Check Meters that is more than 1.5 times the prescribed limit of error.
- 3.6 Any affected User may request a test to be carried out. Tests will be organised such that all relevant Users are aware of the tests, are invited to witness them if required and the test results are made available to the User involved.
- 3.7 Care shall be taken in carrying out tests to ensure that any interruption to measurement is avoided or minimised.
- 3.8 Where a test indicates that an error exceeds the limits of error then these errors shall be recorded before promptly adjusting, repairing or renewing the Metering Equipment (or part thereof) or replacing any defective components. The Metering Equipment shall be restored to service and proved to be operating within the prescribed limits of accuracy as soon, as is reasonably practicable. In such cases, substitute data shall be provided for settlement purposes in accordance with the Trading and Settlement Code agreed procedures.
- 3.9 Records of the pertinent data required for successful testing / calibration shall be established and maintained by the Relevant Meter Operator.

## **4.0 METER DATA MANAGEMENT**

### **4.1 Meter Data Access**

- 4.1.1 Where any User is required to carry out a process necessitating metered data, the Relevant Meter Operator shall specify the form and time period in which such data shall be provided or may be obtained.

### **4.2 Meter Measurement and Data Management**

- 4.2.1 Metering Equipment shall be installed such that metered data held in the metering installation is protected from direct local or remote electronic access by suitable password and security controls.
- 4.2.2 The data will be validated and substituted, or estimated data will be provided where appropriate, by the Relevant Data Provider. The data shall be processed and aggregated to rules set out by the Trading and Settlement Code.
- 4.2.3 As a minimum, for each registered Meter, seven [7] full years of metered data shall be retained.

### **4.3 Metering Equipment Failures**

- 4.3.1 In cases where data is not available due to a failure or in cases where the Main Meter has been proven to have operated outside the prescribed limits of error, data substitution and estimation rules may be used. These data estimation and substitution rules can employ Check Meters, SCADA and for dispatchable Generators instructed quantities and station energy and any other means deemed appropriate. These data substitution and estimation rules will be provided by the Relevant Data Provider for approval by the Commission.

## **5.0 GENERAL TECHNICAL CRITERIA**

### **5.1 Introduction**

This section defines the general technical requirements for the Metering Equipment required for the measurement and recording of electricity transfers at Defined Metering Points (**DMPs**).

### **5.2 References**

The general technical requirements include, but are not limited to the following national and international standards:

- (a) I.S. EN 62053-22 – Alternating Current Static Watt-Hour Meters for Active Energy (Cl. 0.2S and 0.5 S)
- (b) I.S. EN62053-23 – Alternating Current Static Var-Hour Meters for Reactive Energy (Cl. 2 and 3)
- (c) I.S. EN62053-11 – Cl. 0.5, 1.0 and 2.0 for alternating-current watthour Meters.
- (d) I.S. EN 60044-1 – Current Transformers
- (e) I.S. EN 60044-2 – Voltage Transformers
- (f) I.S. EN 60044-3 – Instrument Transformers – Combined Transformers
- (g) IEC Standard 62053-21 - Alternating Current Static Watt-hour Meters for Active Energy (Cl. 1 and 2)
- (h) I.S. EN62056-21 – Data Exchange for Meter reading – direct local data exchange.
- (i) Data Protection Act (1988-2003)

These Standards may be updated, amended, replaced, consolidated, repealed or re-enacted from time to time.

### **5.3 Metering Point**

- 5.3.1 The Defined Metering Point shall be at the Connection Point on the Distribution or Transmission System as applicable, as defined in the relevant connection agreement to the system.
- 5.3.2 The Actual Metering Point may be different from the Defined Metering Point subject to the approval of the Relevant Meter Operator. In these cases the accuracy requirements of this Metering Code shall apply at the Defined Metering Point and Section 5.7.5 shall apply.
- 5.3.3 Metering Equipment shall be capable of determining Active and Reactive Energy flows (as required) during each Demand Period across each Defined Metering Point.

### **5.4 Main and Check Metering**

- 5.4.1 For connections greater than or equal to 10 MVA and for generators with connections below 10MVA who opt to participate in the wholesale market under the Trading and Settlement Code, Main and Check Metering shall be provided. Main and Check Meters shall operate from separate current transformers (CT) and voltage transformers (VT) windings.
- 5.4.2 CT and VT windings and cables connecting such windings to Main Meters shall be dedicated for such purposes and such cables and connections shall be securely sealed.
- 5.4.3 CT and VT windings and cables connecting such windings to Check Meters may be used for other purposes provided the overall accuracy requirements are met and evidence of the value of the additional burden is available for inspection by the Market Operator.
- 5.4.4 The Main Meter, Check Meter and additional burdens shall have separately fused VT supplies.
- 5.4.5 Where sub-metering of certain Generator Units is required, with the agreement of Relevant Meter Operator, a User may supply metering class CTs and VTs for use on the sub-circuits. This equipment must comply with the standards set out in this Metering Code. Such equipment shall be subject to acceptance testing by Relevant Meter Operator for each site.

### **5.5 Measurement Parameters**

- 5.5.1 The Relevant Meter Operator shall at all times have in place policy documents, approved by the Commission, which will specify, but will not be limited to, the following policies:
  - Thresholds for Meters which will measure kWh only
  - Use of Time switches
  - Use of Unmetered connections
  - Thresholds for Maximum Demand Meters
  - Thresholds for Profile Metering

Changes to such policies requested by the Users or Relevant Meter Operator from time to time shall be submitted to the Commission for approval.

- 5.5.2 For each separate circuit the Metering Equipment shall be capable of measuring the following parameters:

- (a) Import kWh;

and, in addition, for connections with an MIC greater than the threshold specified in the Relevant Meter Operator policy document:

- (b) Import kVArh.

5.5.3 For connections with an MIC threshold as specified in the relevant policy the following Maximum Demand (MD) values shall be registered per Charging Period:

- (a) Import kW;

- (b) Import kVA.

The Meters shall register MD over 24 hours and will be capable of separately registering four additional MD values for programmable time periods.

5.5.4 For connections where electricity is charged on a seasonal time of day (STOD) tariff, the metering shall provide the following Registers:

- (a) eight energy Registers selectable over the calendar year for three phase connections;

- (b) four energy Registers selectable over the calendar years for single-phase connections;

5.5.5 For connections with an MIC of less than the threshold specified in the relevant policy document, only import kWh shall be measured (except where supplies are unmetered by agreement as per the threshold specified in the relevant policy document). Where required, Meters shall be suitable for multi or time of use tariffs.

## **5.6 Metering Equipment Standards**

5.6.1 The Meter shall be enclosed in a cabinet or otherwise installed in a manner which shall conform to the manufacturer's stated environmental conditions. The installation shall provide protection from moisture and dust ingress and from physical damage, including vibration. In addition, the cabinet or Meter must be sealed to prevent unauthorised access.

5.6.2 A Current Transformer (CT), in accordance with I.S. EN 60044-1 (or equivalent European Standard) and a Voltage Transformer (VT), in accordance with I.S EN 60044-2 (or equivalent European Standard) shall be provided for Metering as required.

5.6.3 Where a combined unit measurement transformer (VT & CT) is provided the 'Tests for Accuracy' as covered in Clause 8 of IEC Standard 60044-3 covering mutual influence effects shall be met.

5.6.4 Meters in accordance with I.S. EN 62053-22, I.S. EN 62053-21 or I.S. EN 62053-11 as appropriate (or equivalent European Standard) shall be connected to the CT and VT, except where the Meter is directly connected, and shall be located in a secure environment adjacent to any associated data logging and telecommunications equipment.

5.6.5 All Meters shall include a non-volatile Meter Register of cumulative energy for each measured quantity. The Meter Register(s) shall not rollover more than once within the normal Meter reading cycle.

5.6.6 Meters and Metering Equipment shall be installed in accordance with the Relevant Meter Operator's policy. In the case of the DSO, the current policy is set out in the National Code of Practice for Customer Interface document.

## 5.7 Equipment Accuracy and Error Limits

- 5.7.1 The accuracy of the various items of measuring equipment shall conform to the relevant national IEC Standards (or equivalent European Standards).
- 5.7.2 For the purpose of this Metering Code the rated circuit capacity in MVA shall be determined by the lowest rated primary plant (e.g. transformer rating, line rating, etc) of the circuit. The selection of Metering Equipment and accuracy requirements shall take into consideration the installed primary plant maximum continuous ratings.
- 5.7.3 The accuracy class or equivalent, is based on the MVA capacity of the connection and shall as a minimum be as follows (subject to operating within the combined limits of error set out in Section 5.7.6 below):-

**Table 1 – Equipment Accuracy Class – Active and Reactive Energy**

Equipment	Equipment Accuracy Class *				
Equipment Type	For connections				
	Transmission System Connected	Distribution System Connected			
		> 100 MVA	10–100 MVA	1 – 10 MVA	< 1 MVA
Current Transformers	0.2S	0.2S	0.2S	0.5S	0.5S
Voltage Transformers	0.2	0.2	0.5	0.5	0.5
Meters					
- Active Energy	0.2S	0.2S	0.5S	1.0	2.0
- Reactive Energy	2.0	2.0	2.0	2.0	2.0

- 5.7.4 Where the Actual Metering Point and the Defined Metering Point do not coincide then, where necessary, compensation for power transformer and/or line losses shall be provided to meet the overall accuracy requirement at the Defined Metering Point. The compensation may be applied locally within the Metering Equipment or remotely. In both cases, compensation factors and the justification for them must be recorded. These records shall be made available for inspection.
- 5.7.5 For the measurement of Active and Reactive Energy, Metering Equipment shall be tested and calibrated to operate within the overall limits of error as set out below, after taking due account of CT and VT errors and the resistance of cabling or circuit protection. Calibration equipment shall be traceable to a recognised national or international standard.

\* 'S' indicates special application limits of current (ratio) error. These values are found in IEC Standard 60044-1

**Table 2 – Limits of Error at Stated Power Factor – Active Energy**

Condition	Limits of Error at Stated Power Factor ACTIVE ENERGY					
	Power Factor	Limits of Error for Connections				
		Transmission System Connected	Distribution System Connected			
			> 100 MVA	10 – 100 MVA	1 – 10 MVA	< 1 MVA
120% to 10% inclusive	1	±0.5%	±0.5%	±1.0%	±2.0%	±3.0%
Below 10% to 5%	1	±0.7%	±0.7%	±1.5%	±2.5%	±3.5%
Below 5% to 1%	1	±1.5%	±1.5%	±2.5%	±3.5%	±4.0%
120% to 10% inclusive	0.5 lag	±1.0%	±1.0%	±2.0%	±3.0%	±3.5%
120% to 10% inclusive	0.8 lead	±1.0%	±1.0%	±2.0%	±3.0%	±3.5%

**Table 3 – Limits of Error at Stated Power Factor – Reactive Energy**

Condition	Limits of Error at Stated Power Factor REACTIVE ENERGY					
	Power Factor	Limits of Error for Connections				
		Transmission System Connected	Distribution System Connected			
			> 100 MVA	10 – 100 MVA	1 - 10 MVA	< 1 MVA
120% to 10% inclusive	0	±4.0%	±4.0%	±4.0%	±4.0%	±4.0%
120% to 20% inclusive	0.866 lag	±5.0%	±5.0%	±5.0%	±5.0%	±5.0%
120% to 20% inclusive	0.866 lead	±5.0%	±5.0%	±5.0%	±5.0%	±5.0%

5.7.6 Records shall be made of the pertinent data required for a successful test and calibration as per the requirements of Section 5.7.5 above.

5.7.7 Where existing measurement transformers do not comply with all of the conditions of this Metering Code, then these shall be acceptable provided each of the following conditions are met:-

- (a) new measurement transformers are installed (fully compliant with this Metering Code) when a significant electrical plant alteration is to be carried out;

- (b) where the transformers are not wholly dedicated to settlement Metering, then the additional burdens must be quantified and accounted for in calibrations and testing.

The burden should not be changed without notification of the Relevant Meter Operator.

The Main Meter, Check Meter and additional burdens shall have separately fused VT supplies.

## **6.0 QUARTER HOURLY METERING**

### **6.1 Introduction**

This Section describes the technical requirements for Quarter Hourly metering. These requirements are additional to those described in Section 5.

### **6.2 Measurement Parameters**

- 6.2.1 For each separate circuit the Metering Equipment shall be capable of measuring the following parameters:

- (a) Import kWh;
- (b) Import kVArh.

For each separate circuit the Metering Equipment of Generators and customers with their own generation shall be capable of separately measuring the following parameters:

- (c) Export kWh;
- (d) Export kVArh.

- 6.2.2 For each separate circuit, and for each 15 minute Demand Period, the Metering Equipment shall be capable of recording the following Demand Values:

- (a) Import kW;
- (b) Import kVAr.

For each separate circuit, and for each 15 minute Demand Period, the Metering Equipment of Generators and customers with their own generation shall be capable of recording the following Demand Values:

- (c) Export kW;
- (d) Export kVAr.

### **6.3 Data Storage**

- 6.3.1 Data storage facilities for metering data shall be provided as follows:

- (a) a storage capacity of 96 periods per day for a minimum of twenty [20] days for all Demand Values;
- (b) the stored Demand Values shall be integer values of kW or kVAr, or pulse counts, and have a resolution of better than ~ 0.1% (at full load);
- (c) the accuracy of the energy values derived from Demand Values shall be within + 0.1% (at full load) of the amount of energy measured by the associated Meter;



- (d) the value of any energy measured in a Demand Period but not stored in that Demand Period shall be carried forward to the next Demand Period;
- (e) in the event of a Metering Equipment power supply failure, the Metering Equipment shall protect all data stored up to the time of the failure, and maintain the time accuracy in accordance with Section 6.6 below;
- (f) to cater for continuous supply failures, the clock, calendar and all data shall be supported for a period of 10 days without an external supply connected;
- (g) any "read" operation shall not delete or alter any stored metered data;
- (h) Metering Equipment shall provide any portion of the data stored upon request by the Data Collection System.

## **6.4 Data Communications**

- 6.4.1 Load profile metering will be equipped with standard communications ports for local and remote downloading of load profile data and other metered data.
- 6.4.2 All data communications equipment shall conform to the relevant International Telecommunications Union (ITU) standards and recommendations for data transmission over telecommunications systems.
- 6.4.3 Site specific Isolation requirements may also apply in accordance with established good practice and in line with the specific requirements of the telecommunications service provider.
- 6.4.4 Metered data collection systems shall remotely interrogate Metering Equipment to extract data at appropriate intervals as set out by the Relevant Meter Operator.
- 6.4.5 Remote interrogation shall be by means of dial-up telephone, leased line, mains borne, packet switching data networks or other suitable system, using Meter and communications equipment protocols as specified by the Relevant Meter Operator and other data systems required under the Trading and Settlement Code.
- 6.4.6 In the event of failure of communications facilities, metered data shall be read by a Locally Attached Device and transferred to the central Data Collection System as set out by the Relevant Meter Operator.
- 6.4.7 For new and replacement Meters, the following data shall be capable of remote interrogation:
  - (a) Demand Values;
  - (b) Maximum Demand and energy Registers.

## **6.5 Password Security**

- 6.5.1 To prevent unauthorised access to the data in the Metering Equipment a security scheme, as described below, shall be incorporated for both local and remote access. Separate security levels shall be provided for the following activities:

- (1) Level 1 - Password for read only of the following metering data, which shall be transferable on request during the interrogation process:-
  - a) Outstation ID;
  - b) Demand Values;
  - c) Cumulative measured quantities;
  - d) Maximum Demand (MD) for kW or kVAr per programmable Charging Period;
  - e) Multi-rate cumulative Active Energy;
  - f) Alarm indications; and
  - g) Outstation time and date.
  
- (2) Level 2 - Password for:-
  - a) corrections to the time and/or date; and
  - b) resetting of the MD.
  
- (3) Level 3 - Password for programming of:-
  - a) displays, tariff schemes and other functions; and
  - b) the passwords for levels 1, 2 and 3.
  
- (4) Level 4 - Password for removal of Metering Equipment cover(s) necessitating the breaking of a seal for:-
  - a) calibration of the Metering Equipment;
  - b) programming the level 3 password and the level 4 password.

In addition to the functions specified for each level it shall be feasible to undertake the functions at the preceding or lower level.

## **6.6 Timekeeping**

- 6.6.1 Metering Equipment shall be set to Co-ordinated Universal Time (UTC) with the facility to switch annually to Daylight Saving Time (DST). No switching shall occur for quarter hourly data.
- 6.6.2 Time adjustments may be performed as required by communications with the Data Collection System.
- 6.6.3 The commencement of each Demand Period shall be within  $\pm 20$  seconds of true time. The duration of each Demand Period shall be accurate to within  $\pm 0.1\%$  except where time synchronisation has occurred in that period.

## **6.7 Reconciliation of Display Reading for DSO Connected Metering**

- 6.7.1 Cumulative total Active and Reactive Energy Registers from Meters are read remotely each day and are compared with the electronically recorded total energy for the same time period, as part of the ongoing data validation by DSO. This energy tolerance calculation is carried out by the central Data Collection System, and differences greater than  $\pm 2\%$  result in automatic rejection of the metered data.
- 6.7.2 If the cumulative total energy Register **is not** available remotely, then a manual read will be taken at twelve monthly intervals for checking purposes.
- 6.7.3 For meters where the cumulative total energy Register **is** available to be read remotely, a

manual read will be taken at twelve monthly intervals for checking purposes from a random sample of 5% of these metering sites, and:

- (1) Within twenty [20] Business Days from the date of a manual meter reading a meter reconciliation statement shall be produced. The difference between the latest manual meter register readings and the previous manual meter register readings shall be calculated and compared with the electronically recorded total energy for the time interval involved, and
- (2) The calculations shall be recorded and differences greater than 0.1% shall be highlighted and referred for checking. Where the checks confirm the discrepancy the MRSO and other parties as required shall be informed and appropriate actions shall be taken in accordance with the procedures set out by the MRSO.

## **6.8 Reconciliation of Display Reading for TSO Connected Metering**

- 6.8.1 Meter Advance Reconciliation shall be undertaken in accordance with TSO's Metering procedures.

**ANNEX 1: METERING CODE DEROGATION – APPLICATION FORM**

**METERING CODE DEROGATION – APPLICATION FORM**

<b>DEROGATION APPLICATION SUBMITTED BY:</b>	<b>DATE OF SUBMITTING APPLICATION:</b>	<b>DEROGATION APPLICATION NUMBER:</b> (to be assigned by CER)
<b>Contact Details for Derogation Applicant</b>		
<b>NAME:</b>		<b>TELEPHONE NUMBER:</b>
<b>E-MAIL ADDRESS:</b>		
<b>METERING CODE CLAUSE FOR WHICH DEROGATION IS SOUGHT:</b>		
<b>PLANT/APPARATUS FOR WHICH DEROGATION IS SOUGHT:</b>		
<b>EXTENT OF NON-COMPLIANCE:</b>		
<b>REASON FOR NON-COMPLIANCE:</b>		
<b>LENGTH OF TIME FOR WHICH DEROGATION IS SOUGHT:</b>		
<b>PROPOSAL FOR REMEDYING NON-COMPLIANCE:</b>  (MILESTONES FOR REMEDYING NON-COMPLIANCE, COSTS, RISK FACTORS THAT MAY DELAY COMPLIANCE ETC.)		
<b>DETAILS OF SUPPORTING DOCUMENTATION FOR APPLICATION (IF ANY) ATTACHED:</b>		