

CODE OF PRACTICE FOR THE METERING  
OF ELECTRICITY TRANSFERS BETWEEN EMBEDDED  
GENERATORS AND PUBLIC  
ELECTRICITY SUPPLIERS

Superseded

**CODE OF PRACTICE FOR THE METERING OF ELECTRICITY TRANSFERS BETWEEN  
EMBEDDED GENERATORS AND PUBLIC ELECTRICITY SUPPLIERS**

<u>CONTENTS</u>	<u>PAGE</u>
FOREWORD	1
1. SCOPE	1
2. GENERAL	1
3. REFERENCES	3
4. DEFINITIONS	4
4.1 Electricity	4
4.2 Active Energy	4
4.3 Reactive Energy	4
4.4 Active Power	4
4.5 Reactive Power	4
4.6 Demand Period/Integrating Period	5
4.7 Demand Values	5
4.8 Meter Demand	5
4.9 Total Demand	5
4.10 Export	5
4.11 Import	5
4.12 Summation	5
4.13 Commercial Interface	5
4.14 Metering Point	5
4.15 Meter	6
4.16 Static Meter	6
4.17 Meter Register	6
4.18 Outstation	6
4.19 Raw Data	6
4.20 Verified Data	6

4.21	Validated Data	6
4.22	Collector Station	6
4.23	PSTN/CTN	6
4.24	Embedded Generator	6
4.25	The National Interim Metering Scheme (IMS)	7
4.26	The National Final Metering Scheme (FMS)	7
5.	<b>MEASUREMENT CRITERIA</b>	7
5.1	Quantities to be Measured	7
5.2	Accuracy	7
5.2.1	Overall Accuracy of Equipment	7
5.2.2	Accuracy at the Commercial Interface	9
5.2.3	Accuracy of Records	9
5.2.4	Accuracy of Time Keeping	9
5.3	Compensation for Measuring Transformer Errors	10
6.	<b>FACILITIES TO BE PROVIDED</b>	10
6.1	Meters	10
6.2	Current Transformers	11
6.3	Voltage Transformers	11
6.4	Combined Instrument Transformers	12
6.5	Data Collection Outstations	12
6.6	Ownership	12
7.	<b>CALIBRATION AND TESTING OF EQUIPMENT</b>	12
7.1	Meters	12
7.1.1	Initial Calibration	12
7.1.2	Periodic Calibration Checks	13
7.1.3	Periodic Recalibration	13
7.2	Measuring Transformers	13
7.2.1	Initial Calibration	13
7.2.2	Periodic Calibration	13

7.3	Test Access to Metering Points	14
7.4	Data Logging and Processing Equipment	14
7.4.1	Initial tests	14
7.4.2	Periodic tests/maintenance	14
7.5	Testing Procedures	14
7.6	Tests on New or Replacement Equipment	14
8.	<b>DATA TRANSMISSION ROUTES AND PROCESSING</b>	14
8.1	Meter(s) to Site Outstations	14
8.2	Outstation to Collector Station	14
9.	<b>ACCESS TO DATA</b>	15
9.1	General	15
9.2	At the Metering Point	15
10.	<b>MISSING OR DEFECTIVE DATA AND CONTINGENCY ARRANGEMENTS</b>	15
11.	<b>NOTIFYING/SETTLING DISPUTES</b>	16
Diagram 1	Typical generation arrangements	
Diagram 2	PES Data Collection System for Embedded Generators	
Appendix A	Labelling of Meters for Import and Export	17
Appendix B	Recommendations for Calibration and Testing of Meters	18

CODE OF PRACTICE FOR THE METERING OF ELECTRICITY TRANSFERS BETWEEN  
EMBEDDED GENERATORS AND PUBLIC ELECTRICITY SUPPLIERS

FOREWORD

This document is one of a suite of Codes of Practice which supersedes Engineering Recommendation M24 - "Code of Practice for the Metering of Supplies from the Central Electricity Generating Board", issued in April 1973. It does not include arrangements between The National Grid Company plc ("NGC") and Public Electricity Suppliers ("PESs") or NGC and Grid connected Generators, or the metering of customers of PESs or Generators, or the metering of Externally Interconnected Parties (as defined in the PSA), which are dealt with in other Codes in the suite.

For the purposes of this Code, the terms "Generator", "PES" and "Externally Interconnected Parties" shall have the definitions ascribed to them in the Pooling and Settlement Agreement ("PSA").

NGC Settlements Limited as Settlement System Administrator (as such term is defined in the PSA) shall retain copies of, *inter alia*, all Codes of Practice in this suite, together with copies of documents referred to in them, in accordance with the provisions of the PSA.

1. SCOPE

This Code of Practice determines the practices that shall be employed, and the facilities that shall be provided for the measurement of Electricity transfers between Embedded Generators and PESs and for recording measured quantities for Settlement.

It complements and expands on the metering provisions (Clause 56) of the PSA, to which reference should be made. In particular, it complements provisions relating to accuracy of measurement, and the corresponding Metering Equipment Performance Specifications in Schedule 15 to the PSA.

In the event of an inconsistency between the provisions of this Code of Practice and the PSA, the provisions of the PSA shall prevail.

2. GENERAL

The Specifications contained within this Code of Practice vary as to the category and ownership of the Embedded Generating sites. Rulings by the Secretary of State have decreed that:-

- (a) generating sites with an output of more than 100MW must be Pool Members and must be subject to Central Despatch;



- (b) generating sites with an output of more than 10 MW but less than 100MW must be Pool Members but may or may not opt for Central Despatch;
- (c) generating sites with an output of below 10 MW may or may not opt for Pool Membership (this latter has effect in that Pool Membership is compulsory for those Generators requiring to use the System for the purposes of exercising a Second Tier Licence).

As regards categories (a) and (b), there are several existing sites owned by National Power plc or PowerGen plc or Nuclear Electric plc. These are subject to Central Despatch, are metered using the National Interim Metering Scheme, and thereby have their data collected into the Central Data Collection System by NGC. NGC will similarly collect, via the national arrangements, data from any new Generator opting for Central Despatch (NOTE: "new" can mean an existing Generator opting to become a Pool Member on or shortly after the Effective Date or newly connected sites thereafter).

Similarly, in categories (b) and (c) there are existing Generators who are not Pool Members at the Effective Date who will, after the Effective Date, be required to become Pool Members either by virtue of their size or by their option for use of system purposes. Should there also be an option for Central Despatch ((b) only), then NGC will collect data through the national arrangements. If there is no option for Central Despatch, then PESs have agreed to collect data, on an agency basis for the Settlement System Administrator, through the PES data collection systems being established to cater for customers of Second Tier Suppliers (as provided for in the PSA).

As a consequence of other Generation Codes of Practice (Metering Codes D and E) applying to Embedded Generators owned by the Founder Generators (as defined in the PSA) these Embedded Generators will not be referred to in this Code. However, this Code may in certain circumstances apply to such Embedded Generators, when so agreed with the relevant PES.

As regards that remaining, two further points should be made:-

- (i) there are no common existing standards for metering of "private" generation. Engineering Recommendation G59 refers, in Section 6.6, as follows:-

"Metering equipment must be installed at the point of supply to record measurements to the requirements of the Electricity Board. These may include both the export and import of active and reactive electrical energy to and from the private generator's network. Where the metering is to be supplied and owned by the Electricity Board, the private generator must provide

the facilities for the equipment to be installed by the Board."

In fact, no national standards were produced and the current metering arrangements of such generators will vary according to the Area Board in which they are sited. This Code will therefore specify standards in this respect for new Generators.

- (ii) Size of output will determine the physical arrangements, and hence affect the metering requirements, at each site. These physical arrangements can vary from simple one point connections to large stations having several generating sets and station supply transformers. Diagram 1 indicates some typical physical arrangements.

### 3. REFERENCES

The following documents may be referred to in the text:-

- IEC 687: Precision Watthour Meters of Class 0.5S and 0.2S
- BS 5685 (1989): Watthour Meters of Class 0.5, 1 and 2
- British Standard BS 3938: 1973 Current Transformers
- British Standard BS 3941: 1975 Voltage Transformers
- CEGB Specification EM27 (1986) Static Energy Meters
- CEGB Specification EM31 (1988) Substation Radio Clock
- Engineering Recommendation G59: Recommendations for the Connection of Private Generating Plant to the Electricity Boards' Distribution Systems
- Metering Code D Code of Practice for the Metering of Electricity Transfers between NGC and Generators using the National Interim Metering System
- Metering Code E Code of Practice for the Metering of Electricity Transfers between the National Grid Company plc and Generators using the National Final Metering Scheme
- Metering Code G Code of Practice for the Metering and Data Collection



of Second Tier Supplies of 1MW and above

PTS 261

The technical content of Primary Transmission Scheme 261, which sets out the Interim Metering Scheme ("IMS")

PTS 271

The technical content of Primary Transmission Scheme 271, which sets out the Final Metering Scheme ("FMS")

Note: All references to Standards given in the text are to current versions. Where equipment is in use which was designed and built to earlier versions of these Standards, there is no implied requirement to update this equipment.

#### 4. DEFINITIONS

Except where otherwise specified herein the definitions in British Standards 205, 1991 and 4727 Part 1, and British Standards for equipment, shall apply as appropriate. The following definitions, which also apply, supplement or complement definitions in the PSA and are included for the purposes of clarification.

##### 4.1 *Electricity*

Active Energy and/or Reactive Energy.

##### 4.2 *Active Energy*

Active Energy is that part of the electricity supply capable of performing work. Unless otherwise stated it includes energy flows in both directions.

##### 4.3 *Reactive Energy*

Reactive Energy is that part of the electricity supply which cannot perform work, (the reactive voltampere hours). Unless otherwise stated it includes reactive energy flows in both directions.

##### 4.4 *Active Power*

Active Power is the rate at which Active Energy is supplied.

##### 4.5 *Reactive Power*

Reactive Power is the rate at which Reactive Energy is supplied.



#### 4.6 *Demand Period/Integrating Period*

The period over which Active Energy and Reactive Energy are integrated to produce Demand Values. For Settlement purposes as at the Effective Date, the demand period shall be 30 minutes.

#### 4.7 *Demand Values*

Average values of Active and Reactive Power over a Demand Period. The Demand Values are identified by the time of the end of the demand period.

#### 4.8 *Meter Demand*

A demand registered by a single Meter.

#### 4.9 *Total Demand*

A demand derived either from the Summation of one or more Meter Demands of similar quantities or from other total demands.

#### 4.10 *Export*

This is an Electricity flow from the generating station (ie station transformers outfeed or outfeed from a generator) to the distribution systems of a PES. See also Appendix A. The verb "Export" and its respective tenses shall be construed accordingly.

#### 4.11 *Import*

This is an Electricity flow to the generating station (ie station transformer infeed or infeed to a generator operating as a synchronous compensator) from the distribution system of a PES. See also Appendix A. The verb "Import" and its respective tenses shall be construed accordingly.

#### 4.12 *Summation*

Summation means the algebraic addition of two or more flows of Electricity, either simultaneously, or for impulse Summation, within the minimum number of impulses for correct operation.

For the purposes of addition, Import flows are termed negative and Export flows are termed positive.

#### 4.13 *Commercial Interface*

The point of connection of the generating station of the Generator to the system of the PES.

#### 4.14 *Metering Point*

The physical location at which Electricity is metered.

#### 4.15 Meter

A device for measuring Electricity.

#### 4.16 Static Meter

A device for measuring Electricity which does not have an electro-mechanical measuring element.

#### 4.17 Meter Register

A device, normally associated with a Meter or Summation device from which it is possible to obtain the amount of Active Energy, or the amount of Reactive Energy that has been supplied in a circuit or circuits.

#### 4.18 Outstation

The site equipment which receives and stores pulses from the individual Meters may perform some processing of the data and transmits the metering data to the Collector Station on request.

#### 4.19 Raw Data

Demand Values collected from the Outstations and which have not been altered by either manual or automatic means.

The values may have had automatic checks applied to them and be marked with flags describing their status relative to the checks.

#### 4.20 Verified Data

Demand Values which, having been automatically checked, are considered satisfactory for commercial use.

#### 4.21 Validated Data

Demand Values which are ultimately regarded as being correct on the basis of aligning with the meter register advances.

#### 4.22 Collector Station

The computer based equipment located at selected sites which collects data from the Outstations.

#### 4.23 PSTN/CTN/PTN

The Public Switched Telephone Network/The ESI Corporate Telephone Network/Private Telephone Network.

#### 4.24 Embedded Generator

A Generator connected to the distribution system of a PES at voltages of 132 kV or below.

#### 4.25 *The National Interim Metering Scheme (IMS)*

The National Metering Scheme as set out in PTS 261, which comes into effect from the Effective Date (as defined in the PSA) and continuing until the FMS Date (as defined in the PSA).

#### 4.26 *The National Final Metering Scheme (FMS)*

The National Metering Scheme as set out in PTS 271, which comes into effect on the FMS Date.

### 5. **MEASUREMENT CRITERIA**

#### 5.1 **Quantities to be Measured**

The outputs from current and voltage transformers shall provide, for the majority of circuits:-

- (i) Import kWh
- (ii) Export kWh
- (iii) Import kVArh
- (iv) Export kVArh.

In addition, integration of the measured values over the Demand Period shall provide for each circuit:-

- (a) average value of kW
- (b) average value of kVAr.

#### 5.2 **Accuracy**

##### 5.2.1 **Overall Accuracy of Equipment**

Meters shall be so calibrated, taking account of errors due to measuring transformers, as to achieve the overall accuracy of equipment (comprising Meters and measuring transformers) at the point of measurement within the limits of error as below:-



## (a) Generators Exporting less than 10MW

## (i) Active Energy Measurement

<i>Conditions of Test</i>	<i>Limits of error at Stated Power Factor</i>	
	<i>Power Factor</i>	<i>Limits of Error</i>
<i>Current expressed as percentage of rated measuring current</i>		
100% to 10% inclusive	1.0	+/- 1.0%
Below 10% to 5% inclusive	1.0	+/- 2.0%
100% to 20% inclusive	0.5 lag and lead	+/- 1.5%

## (ii) Reactive Energy Measurement

<i>Conditions of Test</i>	<i>Limits of error at Stated Power Factor</i>	
	<i>Power Factor</i>	<i>Limits of Error</i>
<i>Current expressed as percentage of rated measuring current</i>		
100% to 10% inclusive	Zero	+/- 4.0%
100% to 20% inclusive	0.866 lag and lead	+/- 4.0%

## (b) Generators exporting more than 10MW (including over 100MW)

## (i) Active Energy Measurement

<i>Conditions of Test</i>	<i>Limits of error at Stated Power Factor</i>	
	<i>Power Factor</i>	<i>Limits of Error</i>
<i>Current expressed as percentage of rated measuring current</i>		
100% to 10% inclusive	1.0	+/- 0.5% 1.0
Below 10% to 5% inclusive	1.0	+/- 1.0% 1.5
100% to 20% inclusive	0.5 lag and lead	+/- 1.0% 1.5



### 7.3 Test Access to Metering Points

Facilities for test access will be provided using sealable test blocks.

### 7.4 Data Logging and Processing Equipment (Outstations)

#### 7.4.1 Initial Tests

Equipment for data logging and processing will be supplied and tested according to the required specification arising from the data collection system to which it is connected. Access to the results of these tests will be made available in accordance with the provisions of Clause 56.9.3 of the PSA.

#### 7.4.2 Periodic Tests/Maintenance

Regular maintenance will be carried out by the Operator and the schedules used will be available for inspection.

### 7.5 Testing Procedures

A programme of periodic tests shall be agreed between Registrant and Operator. The intention to conduct particular tests shall be notified to the Settlement System Administrator by the Operator in accordance with the provisions of the PSA.

### 7.6 Tests on New or Replacement Equipment

The opportunity will be given to witness comparable tests on new or replacement equipment (which replaces existing equipment) in accordance with the provisions of Clause 56.9.2(a) of the PSA.

## 8. DATA TRANSMISSION ROUTES AND PROCESSING

(Diagrams 1 and 2 represent the system in block form.)

### 8.1 Meter(s) to Outstations

Data from Meters will be fed continuously to the respective site Outstation.

Summation calculations may be carried out on the data by the Outstations.

The result of the Raw Data and the Processed Data collected will be stored in memory and remain on site after interrogation by the Collector Station for a minimum period of 10 days, after which it will be overwritten.

### 8.2 Outstation to Collector Station

For Generators subject to Central Despatch, data will be

collected by the Settlement System Administrator via NGC's CDCS. For Generators not subject to Central Despatch, it is envisaged that their data will be collected via the PES data collection system in accordance with the relevant Agreed Procedures (which are listed in Schedule 16 to the PSA).

- (a) For NGC data collection systems, reference should be made to Metering Codes D and E and to the Agreed Procedures.
- (b) Figure 2 (which is for information purposes only) indicates the data path for collection by the PES. Reference should also be made to Metering Code G.

In all cases, data collection equipment on site shall be compatible with the requirements of the NGC, or particular PES, data collection systems.

Where a Generator not subject to Central Despatch elects to make its own arrangements for passing data for the purposes of the pooling arrangements, relevant Pool Rules (as set out in Schedule 9 to the PSA) will apply and it will be responsible for contracting directly with NGC in these circumstances.

## **9. ACCESS TO DATA**

### **9.1 General**

Access to data and physical access to Metering Points, Data Collection Systems and the Central Data Collection System shall be in accordance with the provisions of the PSA and the Agreed Procedures.

### **9.2 At the Metering Point**

In addition to collection by automatic means, data at the Metering Point can be accessed by reading Meter Registers or may be accessed from a Site Outstation or a particular Meter by a local interrogation facility. This facility will enable the recording of readings, the examination of status information, demand values and other features, but values held in the Outstation units shall not be altered by the interrogation (ie the integrity of data stored on site shall not be affected).

Only staff both nominated by the Operator and authorised by the Settlement System Administrator may operate a local interrogation facility and interrogation of a given Outstation will require use of a unique Outstation identification number.

## **10. MISSING OR DEFECTIVE DATA AND CONTINGENCY ARRANGEMENTS**

Agreed Procedures are set out in Schedule 16 to the PSA, which cover the following operational considerations of the Data



## (ii) Reactive Energy Measurement

<i>Conditions of Test</i>	<i>Limits of error at Stated Power Factor under primary system balanced conditions</i>	
<i>Current expressed as percentage of rated measuring current</i>	<i>Power Factor</i>	<i>Limits of Error</i>
100% to 10% inclusive	Zero	+/- 1.0% 40
100% to 20% inclusive	0.866 lag and lead	+/- 1.0 to 40 +/- 1.5% 40

These limits shall be maintained for the prescribed calibration period of the Meter, as set out in section 7.1.2.

#### 5.2.2 Accuracy at the Commercial Interface

The point of measurement will be at or close to the Commercial Interface, obviating any need for Meter adjustments. Limits of error as in the Tables above shall apply.

#### 5.2.3 Accuracy of Records

The amount of Active Energy or Reactive Energy supplied during any Demand Period obtained from recorded readings shall be within  $\pm 1\%$  (at full load) of the amount obtained by reading the appropriate Register or Registers at the beginning and end of the declared period.

#### 5.2.4 Accuracy of Time Keeping

The long term time keeping accuracy shall be based upon the Outstation receiving a timing signal from the Collector Station which is synchronised to true time by using a Rugby (Warwickshire) radio clock.

The overall limits of error for the time keeping which must allow for failure to communicate with the Outstation for an extended period of 10 days shall be:-

- (a) the commencement of each Demand Period shall be at a time which is within +/- 10 seconds of the true time;
- (b) The duration of each Demand Period shall be within +/- 0.03% of the true duration.

Note: These values refer both to the NGC and the PES data collection systems as detailed in section 8.2 below.

### 5.3 Compensation for Measuring Transformer Errors

Compensation shall be made for the errors in current and voltage transformers, during the Meter calibration.

Compensation values shall be recorded and included in the details submitted upon Registration of the Metering System pursuant to the PSA and in relevant Connection and Use of System Agreements.

## 6. FACILITIES TO BE PROVIDED

Contractual arrangements will dictate the specific requirements, but those referred to in this section 6 shall be considered the minimum for interfacing with Settlement. Where Class requirements are stated in sections 6.1, 6.2 and 6.3, the reduced requirements of (b) or (bb) are against those of (c) or (cc) shall only be applicable provided that the system accuracy requirements of section 5.2.1 (b) can be achieved using equipment to these Classes.

### 6.1 Meters

Watt-hour Meters shall be in accordance with BS 5685 part 1 or IEC 687 and be to the following Class:-

- (a) Export <10MW - Class 2
- (b) Export 10 - 100MW - Class 0.5 (S)
- (c) Export > 100MW - Class 0.2 (S)

Reactive (var-hour) Meters shall be in accordance with BS 5685 part 4 or comply with the relevant parts of IEC 687 and be to the following Class but with measurement at zero power factor instead of unity power factor:-

- (aa) Export <10MW - Class 3
- (bb) Export 10 - 100MW - Class 0.5 (S)
- (cc) Export > 100MW - Class 0.5 (S)

The following shall normally be provided on each circuit used to furnish supply but account will be taken of specific conditions at each Generating Station:-

- (i) Main Active Energy Meter for Import
- (ii) Check Active Energy Meter for Import



- (iii) Main Active Energy Meter for Export
- (iv) Check Active Energy Meter for Export
- (v) Main Reactive Energy Meter for Import
- (vi) Check Reactive Energy Meter for Import
- (vii) Main Reactive Energy Meter for Export
- (viii) Check Reactive Energy Meter for Export

Two sets of clean contacts shall be provided from each Meter, and Meters shall be labelled according to the criteria of Appendix A.

## 6.2 Current Transformers

Current transformers shall be in accordance with BS 3938 and to the following minimum Class, with minimum rating of 7.5 VA:-

- (a) Export <10MW - Class 0.5
- (b) Export 10 - 100MW - Class 0.2
- (c) Export > 100MW - Class 0.1

For category (c), separate windings shall be provided for main and check Meters. The winding supplying the main Meter shall be dedicated. The winding supplying the check Meter can be used for other purposes so long as such uses do not diminish the accuracy referred to in section 5.2.1

In the respect of categories (a) and (b) above, one winding shall be dedicated for metering purposes.

Metering current transformers shall be used solely for supplying the meters.

The secondary current shall be 1 amp or 5 amps.

Common return leads for two or more current transformer secondary circuits shall not be permitted.

The total burden, including test equipment, shall not exceed the rating of the current transformer.

## 6.3 Voltage Transformers

Voltage transformers shall be in accordance with BS 3941 and to the following minimum Class at the working burden:-

- (a) Export <10MW - Class 1.0,
- (b) Export 10 - 100MW - Class 0.5,

(c) Export > 100MW - Class 0.2,

For category (c), separate windings shall be provided for main and check Meters. The winding supplying the main Meter shall be dedicated. The winding supplying the check Meter can be used for other purposes so long as such uses do not diminish the accuracy referred to in section 5.2.1.

In the case of categories (a) and (c) above, one winding be dedicated for metering purposes.

The metering suite shall be fed by a separate, fused set of leads from the voltage transformer.

#### 6.4 Combined Instrument Transformers

Where appropriate, combined instrument transformers may be used. In this case, these will comply, as a minimum, with the separate requirements above relating to each circuit and quantity measured.

#### 6.5 Data Collection Outstations

Half-hourly (or other agreed lesser period) demands of Active Energy Exported and Imported and Reactive Energy Exported and Imported shall be made available in a manner suitable for processing by the appropriate information collection system.

Data collection shall be by means of a proven system which will collect the required quantities per circuit and transfer them to a central station for processing into total kWh and kVArh lag and lead values for transfer to a mainframe computer.

Section 8 gives further details.

#### 6.6 Ownership

All metering equipment, metering ancillary equipment, instrument transformers, interface and control equipment in connection with the IMS will be registered into Settlement as required by the PSA. Each Metering System must have a Registrant and Operator as required by the provisions of Clause 56 of the PSA. For the purposes of this Code, the terms "Registrant" and "Operator" shall have the definitions ascribed to them in the PSA.

### 7. CALIBRATION AND TESTING OF EQUIPMENT

#### 7.1 Meters

##### 7.1.1 Initial Calibration

Meters shall be supplied calibrated according to the requirements of BS 5685 or IEC 687 and to the accuracy limits as detailed in section 5.2.1.



On site commissioning tests shall be carried out by the Operator in the presence of representatives of both the Generator (where not itself the Operator) and of the Settlement System Administrator. The results of such tests will be made available in accordance with Clause 56.9.3 of the PSA.

#### 7.1.2 Periodic Calibration Checks

The calibration of meters will be checked on site to ensure that the accuracy remains within the limits laid down within this Code of Practice.

These checks shall be carried out as set out in Appendix B.

#### 7.1.3 Periodic Recalibration

Periodic calibration shall be in accordance with Appendix B.

There is currently no experience of the periods after which Static Meters should be replaced. The Operator will take a test sample of 20% of each type of Meter on a rolling schedule during each period of 10 years and then the Settlement System Administrator will from the results of the periodic calibration sample tests agree the period for recalibration for each type of Meter with the Registrant.

Records of checks and the work carried out under recalibration shall be kept to a form approved by the Settlement System Administrator.

### 7.2 Measuring Transformers

#### 7.2.1 Initial Calibration

Measuring transformer equipment shall be supplied with known characteristics within the specifications of relevant Standards to allow calibration of Meters to ensure overall system accuracy within the limits laid down in this Code of Practice.

Records of these characteristics shall be kept, as in section 5.3 above.

#### 7.2.2 Periodic Calibration

Regular calibration tests on this equipment are not considered necessary.

## Collection systems:

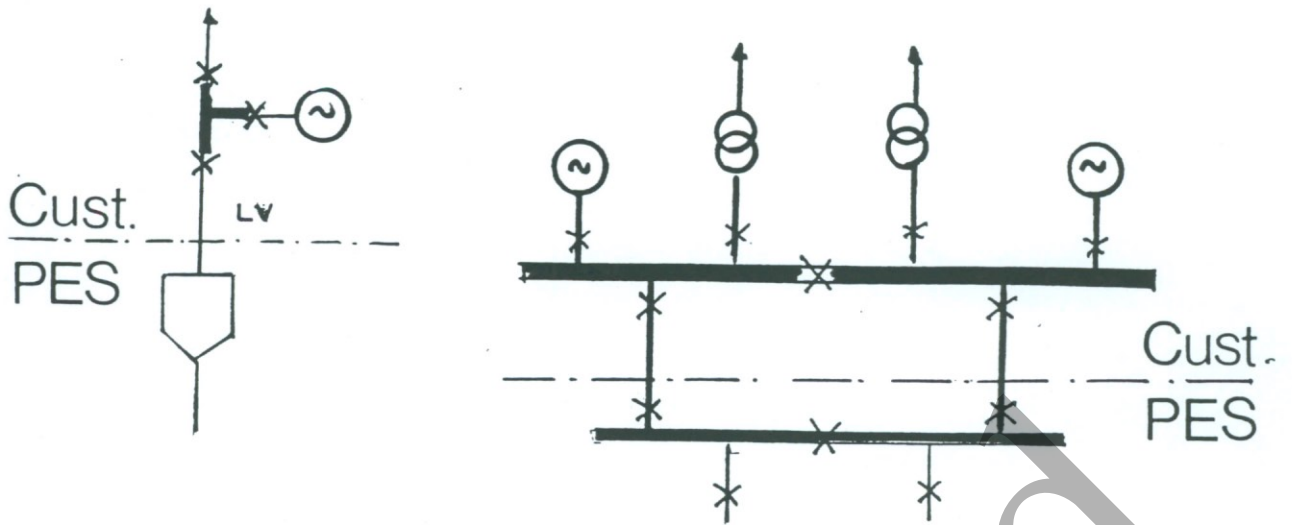
- Sources of missing or defective data
- Detection of defects
- Defect Procedures
- Validation of Data
- Reconciliation of discrepancies
- Estimation Procedures

## 11. NOTIFYING/SETTLING OF DISPUTES

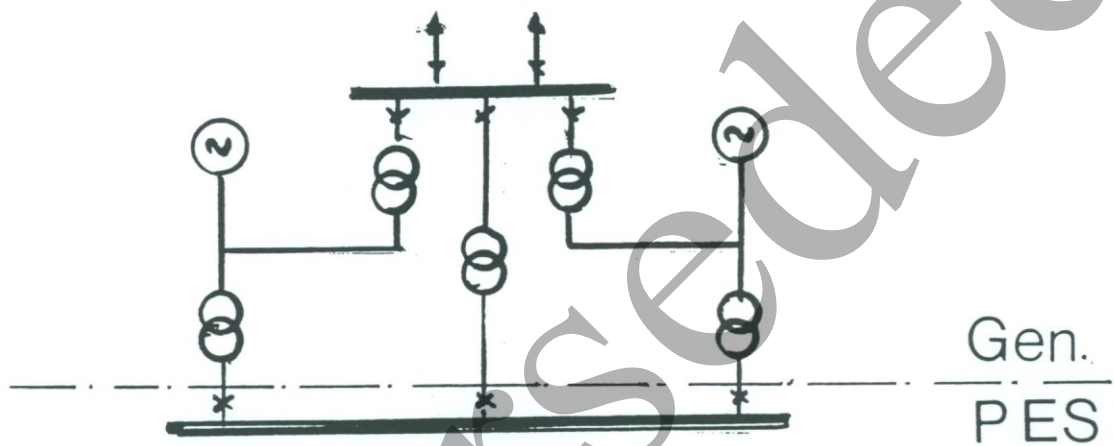
The relevant clauses of the PSA shall govern the procedures for notifying and setting of disputes.

SJXH0023.90T

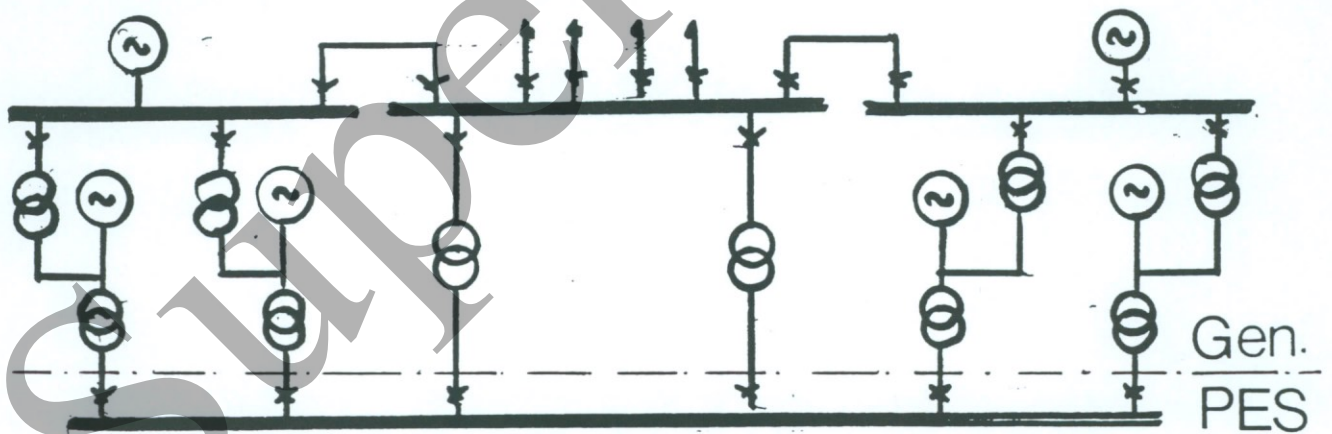




(a) Small Generator (eg Customer with generating ability)



(b) Medium Sized Generator (eg Gas Turbine Site)



(c) Large Generator (eg Gas Fired 300 MW Station)

Figure 1: Typical Generation Arrangements

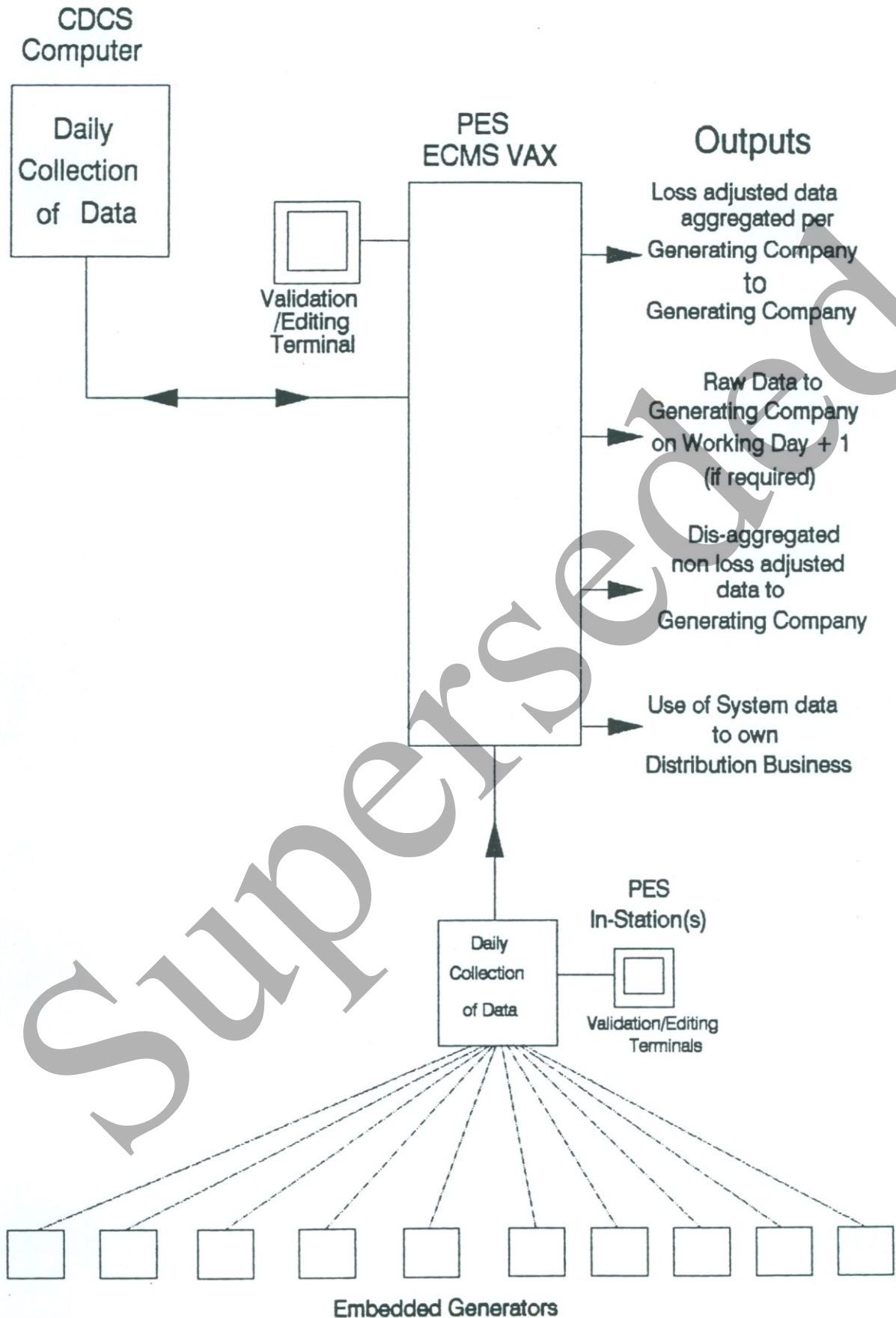


Diagram 2. PES Data Collection System for Embedded Generators

APPENDIX A**LABELLING OF METERS FOR IMPORT AND EXPORT**

A1 The terms Export and Import are defined in sub-section 4.10 and 4.11 and it is considered desirable to recommend a standard method of labelling meters (or suitable labelling panels etc) and to establish the relationship between Import and Export Active Energy, and Import and Export Reactive Energy. Accordingly, Meters (or suitable labelling panels) shall be labelled in accordance with the provisions of this Appendix A.

**A2 ACTIVE ENERGY**

Active Energy is considered to be Exported when it flows from the Generator to the PES to supply the distribution system of the PES. The Meter(s) registering this energy should be labelled "Export".

Active Energy is considered to be Imported when it flows from the PES to the Generator. The Meter(s) registering this energy should be labelled "Import".

**A3 REACTIVE ENERGY**

Within the context of this Code the relationship between Active Energy and Reactive Energy can best be established by means of the power factor. The following table gives the relationship:-

<i>Flow of Active Energy</i>	<i>Power Factor</i>	<i>Flow of Reactive Energy</i>
Import	Lagging	Import
Import	Leading	Export
Import	Unity	Zero
Export	Lagging	Export
Export	Leading	Import
Export	Unity	Zero

Meters for registering Import Reactive Energy should be labelled "Import Reactive" and those for registering Export Reactive Energy should be labelled "Export Reactive".

NOTE: This convention is based on "Import" and "Export" being from the viewpoint of the Registrant of the Metering System.



APPENDIX B**RECOMMENDATIONS FOR CALIBRATION AND TESTING OF METERS****1. Class 2 Meters to BS 5685**

Meters shall be subject to calibration at 10 yearly intervals.

There shall be no requirement for intermediate calibration checks within this period.

**2. Class 0.5 Meters to BS 5685**

Meters shall be subject to calibration at 10 yearly intervals.

There shall be intermediate on site checks to establish overall system accuracy as specified in section 5.2.1 at 5 years after installation.

**3. Class 0.5S and 0.2S Meters to IEC 687****3.1 Test of Calibration (Accuracy Check)**

3.1.1 A routine test of calibration will be carried out on all Meters registered with the Settlement System Administrator at an interval not exceeding 5 years.

3.1.2 Where the test of calibration shown a Meter type not to be capable of sustaining the accuracy class for the period quoted in section 5.2.1 above then the routine test of calibration period for that Meter shall be reviewed.

3.1.2 A test of calibration will be carried out:-

(a) when the Operator of the Meter believes that the Meter is not performing to its required accuracy; or

(b) Under the Metering provisions of the PSA (Clause 56.9.2) where either the Settlement System Administrator or a third party believes that the Meter is not performing to its required accuracy.

**3.2 Recalibration**

There is no currently experience for Meters presently available in this Class to enable recommendations as to specific intervals between recalibration (recalibration in this context might imply complete refurbishment).

**4. Method of Tests**

4.1 Routine tests shall be carried out on site either at the

prevailing load or by injection into the measuring transformer secondary circuits.

- 4.2 In respect of Static Meters, recalibration sampling tests should be carried out over the whole range of the Meter at such test points as the Executive Committee shall determine.

Superseded