G20 – Capacity Market Metering Statement

EMRS Guidance

Public

Version: 5.0

Date: 12 August 2019

EMR SETTLEMENT LIMITED

Electricity Settlements Company

1. Contents

Change Amendment Record

Version	Date	Description
1.0	20 February 2017	Go Live Version.
2.0	13 October 2017	Document transfer to new template.
3.0	11 December 2017	Section 3 updated to provide additional guidance on the format to be used, version control and additional items required. Section 3 (e) updated to confirm time format for CSV file and HHDA uses the D0357 flow. Section 3 (f) updated to include an example where the Meter doesn't have to have the time synchronised. Section 3 (l) updated to include Certificates of Conformity for Meters. Section 3 (m) Additional guidance provided to highlight the difference between Working Burden and Rated Burden; and information to consider when estimating.
4.0	20 July 2018	Section 3 updated for Rules changes in Schedule 6; sections (b), (c), (k), (l), (n), (p) and (q).
5.0	12 August 2019	Review and Updates for Ofgem changes (CR213).

2. Introduction

To be able to participate in the Electricity Market Reform (EMR) Capacity Market (CM) all Capacity Providers must have a Metering System installed that is compliant with the CM Regulations and Rules. This Metering System must be from an Approved Metering Solution and be able to measure the Metered Volume of the Capacity Market Unit (CMU).

Following completion of a Metering Assessment on the Delivery Body Portal,[1] the Delivery Body will inform the Capacity Provider if the CMU or CMU Component requires a Metering Test. A Metering Statement will then have to be completed for that CMU or CMU Component.

Where a Metering Test is not required a Metering Statement does not have to be submitted for that CMU or CMU Component.

EMR Settlement (EMRS) is the Management Services Provider for Electricity Settlements Company (ESC) and therefore carries out Metering Tests on their behalf.

3. Purpose

The purpose of this guidance is to provide Capacity Providers with assistance to complete a Metering Statement that is compliant with Schedule 6 of the Capacity Market Rules and allows it to be progressed to a Metering Test without being rejected.

This is based on frequently asked questions, common rejection reasons and feedback from the Transitional Arrangements Auction process completed in August 2016.

EMRS are available to provide assistance with the process and can be contacted at metering@emrsettlement.co.uk.

We recommend submitting an early draft of a Metering Statement for review rather than waiting until all the information required is available. This way you can be given early warning of potential issues with the setup of the metering and the evidence submitted. It can take up to 16 working days for EMRS to complete a Metering Test and issue a Metering Test Certificate or non-compliance notice. If the Metering Test identifies an issue that requires a site visit to resolve it this can take time to arrange; so it is in the interests of the Capacity Provider to have as much notice as possible to be able to resolve any issue identified.

4. Metering Statement Guidance

A Metering Statement should be completed for every metered circuit, which is subject to a Metering Test, used to determine Net Output for a generating unit. For a Demand Side Response (DSR) CMU, a metering statement should be completed for every metered circuit, which measures the import or export of electricity to or from that DSR CMU Component. For example, for a generating CMU, in

[1] https://www.emrdeliverybody.com/cm/home.aspx

addition to the generator Meter, this could include Unit Transformer and/or Station Transformer metering if those circuits are used to provide Auxiliary Load for that generating unit.

It is preferable to complete a single Metering Statement for each site and per CMU or CMU Component. So if a site has two CMUs on it we would expect two Metering Statements to be submitted; however, if the site has two Components and they are part of the same CMU we would expect both to be included in one Metering Statement.

As part of the request for EMRS to carry out a Metering Test (as detailed in WP197 – Capacity Market Metering Test2) we need to know the identifiers of all Components making up the CMU and the relevant Metering Configuration Solution used and which of those require a Metering Test.

In addition, should a Component be using a Balancing Services Metering Configuration Solution we need to know which Balancing Services Agreement (i.e. STOR, FCDM or FFR) so we can test against the correct governing documents.

The relevant governing documents (in addition to the Rules) for all the approved Metering Configuration Solutions can be found in Table 1.

Table 1: Approved Metering Configuration Solutions Governing Documents.

Approved Metering Configuration Solution		Governing Document
Settlement Metering (Balancing Mechanism Unit (BMU) and Supplier).		Codes of Practice (CoPs)[3]
Bespoke		Schedule 7 of the CM Rules.
Balancing Services	STOR	Short-Term Operating Reserve (STOR).
	FCDM	Despatch Procedure v1.3
	FFR	Frequency Control by Demand Management.

Schedule 6 of the CM Rules states what needs to be included in a Metering Statement. There is no format for the Metering Statement defined in the Rules. EMRS recommend having a table with all sections of the Metering Statement [(a) to (r)] included; the information should be provided in an adjacent column; if this is not possible a reference should be included to a separate attachment (e.g. copies of Meter and Measurement Transformer Test Certificates); or where it is not applicable this should be stated in the adjacent column.

In the example in Table 2, below, for section (c) Metering Technical Details the required information has been provided in an adjacent column.

[2] https://www.emrsettlement.co.uk/publications/working-practices/
[3] https://www.elexon.co.uk/bsc-related-documents/related-documents/codes-of-practice/

Table 2: Metering Statement Example – Section (c).

(c) Metering Technical details (to include the following):	
(i) Meter Point Administration Numbers or Metering System Identifier(s);	**AI 1300012345678 / AE 1300012345689**
(ii) Meter serial numbers;	**Main AB17Z12345; Check AB17Z12346**
(iii) Outstation ID;	**Main 001; Check 002**
(iv) number of channels;	**4**
(v) measurement quantity ID;	**AI, AE, RI, RE**
(vi) Meter and pulse multipliers;	**1 (both)**
(viii) Current and voltage transformer ratios applied;	**11kV/110V 200/5A**
(ix) Communications numbers and confirm method for remote communication;	**Number 01111 111 111 Method GSM**
(x) Metering dispensations for the Metering Site (if applicable);	**Not applicable**
(xi) Complex Site Supplementary Form (if applicable). In respect of an SMRS registered CMU: the D0268, in respect of a CMRS CMU: the BSCP20/4.3a, b and c forms and in respect of a Metering Site using the Bespoke Metering Configuration Solution the Key Meter Technical Details form; and	**Not applicable**
(xii) If the CMU is identical to the BM Unit, the completed Aggregation Rule Form BSCP75/4.2. If the CMU is different from the BM Unit, the Capacity Provider must provide details of the metered data values to be aggregated to the appropriate Metered Volume for the CMU.	**Not applicable**

In the example in Table 3, below, for section (l) Meters the required information is in a separate attachment and the details for it have been provided in the adjacent column.

Table 3: Metering Statement Example – Section (l).

(l) Meters	
A Capacity Provider must provide either:	
(i) A Manufacturers test certificate;	**See Appendix Meter Test Certificates.pdf**
(ii) A letter from the manufacturer confirming the typical errors of the device; or	
(iii) A calibration test certificate tested at the calibration testing points set out in the table below performed by a third party	

Where a separate attachment is used please ensure that it is named correctly and is consistent with the Metering Statement.

The use of relevant names helps, so in the example for Section (l) an attachment named 'Metering Test Certificates.pdf' is relevant and easy to identify.

Please check that all attachments have been included with the submission. If it hasn't been included it can delay the Metering Test or result in a failed Metering Test.

Please don't embed attachments in the Metering Statement document as they can become corrupted when sent via email. If the embedded attachment cannot be opened it can delay the Metering Test or result in a failed Metering Test.

Version Control

Where a Metering Test has been failed and a Metering Statement has been resubmitted, EMRS recommend identifying the revised Metering Statement to distinguish it from the previous one.

So if submitted for the second time call it version 2, then increase the number by one for every subsequent submission required.

It would help the re-test process if changes made to the Metering Statement are identified. We would recommend putting updates in a separate column. We would also recommend only submitting separate attachments again where there has been a change and to use version control on updated separate attachments (i.e. update the name of the document (e.g. 'Metering Test Certificates V2.pdf') in the Metering Statement).

Ideally we would prefer all issues to be addressed in the first resubmission but if you submit an update with only some of the issues resolved/clarified you should identify which have been addressed and for any subsequent submission use version control.

We recommend summarising the updates in a change amendment record at the start of the Metering Statement, for example as shown in Table 4:

Table 4: Change Amendment Record Example.

Version	Date	Metering Statement History
1.0	15 November 2017	First submission.
2.0	6 December 2017	Second submission; Metering Test Certificates for Check Meters included and CSV file for date of Proving Test/Meter Commissioning included.

Additional Information Required

To help EMRS understand how the CMU has been configured it helps to provide a summary of the Metering and Data Collection setup. It can delay the Metering Test or result in a failed Metering Test when clarification is needed on how the Metering System is configured.

This information is vital where a complex arrangement is used involving multiple Metering Systems.

For example:

'The Net Output of the CMU is derived by two separate Metering Systems, Metering System 1 is for the gross Generation and Metering System 2 is for the Auxiliary Load for this Generating Unit. The Meters all use pulse outputs to provide data to our internal data collection system.

The data collection system exports data to an IT system and this allocates the data into a half hourly format for each Metering System, subtracts the Auxiliary Load from the gross Generation to determine Net Output and creates the CSV file to be submitted to EMRS. The IT system time is synchronised to UTC by our internal network. Therefore the time in the Meters is not synchronised to UTC. The CSV file is submitted in clock local time.

Schedule 6 (Metering Statement) Requirements

The following sections provide guidance for each one of the Metering Statement sections [(a) to (r)] prescribed in the CM Rules and the Overall Accuracy checks in the Metering Test.

a) Single Line Diagram

The Single Line Diagram (SLD) must include all metered circuits that are making up the CMU or CMU Component. Where non-settlement Boundary Point metering is being used (i.e. Bespoke or Balancing Services Metering Configuration Solutions) the Boundary Point to the Total System (i.e. the Transmission System or Distribution System, as applicable) should be shown.

The Meter Point(s) should be clearly identified and the generating unit/circuit to be reduced should be clearly marked.

Where the CMU is using a generator, including DSR permitted onsite generation, the rating of the generator should be provided. This can be on the SLD but as an alternative can be provided as part of section (a) in the Metering Statement.

An example of a SLD for a CMU using a Bespoke Metering Configuration Solution is shown in Figure 1.

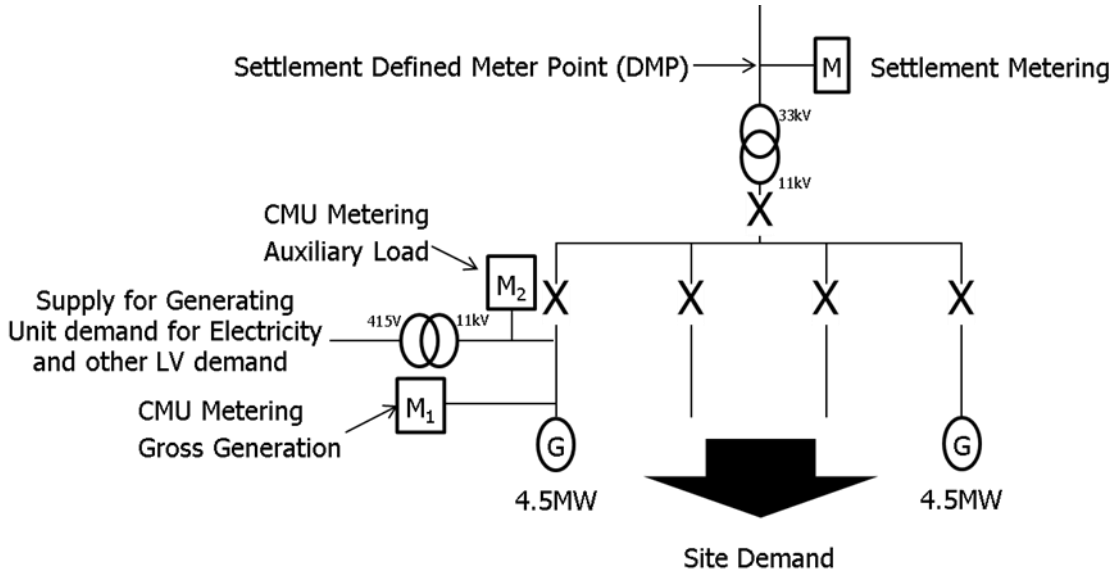

Figure 1: Single Line Diagram for a Bespoke Metered CMU.

A Capacity Provider can choose to submit an electrical schematic diagram (in addition to the SLD) to provide the details for the Measurement Transformer connections and their orientation for power flow. An example of this can be seen in Figure 2.

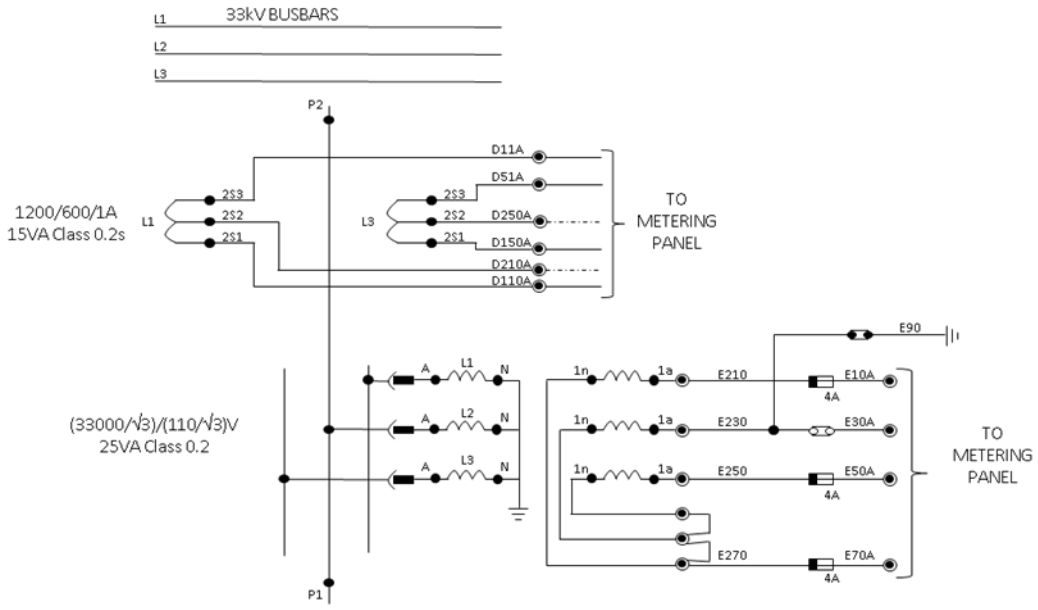

Figure 2: Electrical Schematic Diagram for a Bespoke Metered CMU.

b) CMU Metering Site details

i. The CMU ID is the unique identifier for the CMU that had been allocated by the Delivery Body and can be found in the Capacity Market Register[4] for the relevant Auction.

ii. If any circuit used in the CMU has an identifier (e.g. Generator 4) this should be included here. This can also be the ID to identify the Component where the CMU is made up of multiple Components. Where there is no circuit name or no multiple Components this should be completed as Not Applicable.

iii. This is to identify whether the CMU Component is a Generating CMU or a DSR CMU. In any other case (i.e. Interconnector CMU) this should be completed as Not Applicable.

iv. This is to identify the CMU Type. It will either be a Generating CMU, Interconnector CMU or DSR CMU. In the case of a DSR CMU it should also say whether the DSR is delivered by permitted on-site generation or reduction.

v. The address of the CMU Component. Ideally include a grid reference.

vi. The contact details to arrange a site visit with. This can either be a contact for the actual site or a contact for the Capacity Provider that will arrange the access.

vii. Any specific requirements for the site access should be listed here. For example, a site induction is required.

viii. The type of Metering Configuration Solution used for each Metering System in the CMU should be included. It is possible for a CMU to be made up of Metering Systems that are different Metering Configuration Solutions. This can be one of the following:

[4] https://www.emrdeliverybody.com/CM/Registers.aspx

- BMU Metering;
- Supplier Settlement Metering;
- Bespoke Metering; or
- Balancing Services Metering.

  In the case of Balancing Services Metering the relevant Balancing Service should also be provided, this can be one of the following:

- FFR;
- FCDM; or
- STOR.

  Where a BMU is being split and the Metering Configuration Solution becomes Bespoke, it should be stated that the type of Metering Configuration Solution used is Bespoke but the Metered Volumes are provided by the BMU Metering.

ix. The rated output of any Generating Unit (kW or MW) or the rated capacity of the circuit (kVA or MVA), as applicable should be provided. This is required because the Metering Equipment requirements in some cases (i.e. BSC Codes of Practice and Schedule 7 Bespoke Technical Requirements) vary depending on the rating of the circuit.

c) Metering Technical Details

This section is only for Metering Systems made up of Half-Hourly (HH) Meters or Non-Half-Hourly (NHH) Meters feeding directly into a Balancing and Settlement Code Company (BSCCo) approved Outstation. Where this isn't the case this should be completed as Not Applicable and section (d) would be completed.

These details can be confirmed with the installer. The installer would be the Meter Operator Agent (MOA) where Settlement Metering is used.

i. The Metering Test Certificate has to include all Components making up the CMU and this includes Components that do not require a Metering Test. So where any Settlement metering is used as part of a CMU, every Meter Point Administration Number (MPAN) applicable, and/or every Metering System Identifier (MSID) applicable, and/or every BMU ID applicable should be included.

   The MPAN is the 13 digit number that can be found on the Supplier bill for a site. The MSID is the four digit reference (found in the BSCP20 MTDs form completed by the MOA) for Metering Systems making up a BM Unit, i.e. a Central Volume Allocation (CVA) Metering System. The BMU ID is the ID that the Metered Volumes are aggregated in the BSCP75 process, typically

will start 'T_' or 'E_' (in some cases can be 'M_' or 'I_'). Where non-settlement metering is used (i.e. Balancing Services and Bespoke Metering Configuration Solutions) and there are no Settlement Metering Systems used in the CMU this should be completed as Not Applicable.

ii. This is the serial number of all Meters used in the CMU. This includes Main and Check Meters where both have been installed on a circuit. Where a metered circuit has a name [i.e. from (b) (ii)] it should be linked to the relevant Meter serial numbers for that circuit (e.g. Unit Transformer 1 – Main XY16K12345 / Check XY16K12346).

iii. The outstation ID is dependent on how the Metering System has been configured:

- Where the Meter is the Outstation (i.e. a Half Hourly integral Outstation) it will be, either the Meter serial number or a PIN (address) number configured in the Meter. This is dependent on the Meter manufacturer used and should be confirmed with the installer.
- Where the Half Hourly metered volumes are collated by a device separate to the Meter it should be the ID for this separate Outstation. It will be either the Outstation serial number or a PIN (address) number configured in the Outstation. This is dependent on the Outstation manufacturer used and should be confirmed with the installer.

iv. The number of channels is related to the setup of the Meter/Outstation. Every measurement quantity that is setup in the Meter/Outstation should be included and not just channels used for the Capacity Market. For example, where the Capacity Market uses only Active Import and Active Export channels but the Meter/Outstation is configured with Half Hourly reactive energy channels (e.g. Reactive Import and Reactive Export) the number of channels would be 4 and not 2.

v. The Measurement Quantity ID's are linked to (iv) above. The number of Measurement Quantity ID's should be the same as the number of channels setup. The convention for the most common configurations are:

- Active Energy Import. AI
- Active Energy Export. AE
- Reactive Energy Import. RI
- Reactive Energy Export. RE
- Reactive Import associated with Active Import. Q1
- Reactive Export associated with Active Export. Q2
- Reactive Import associated with Active Export. Q3
- Reactive Export associated with Active Import. Q4

So in the example in (iv) the Measurement Quantity IDs would be AI, AE, RI and RE; this matches the four channels identified in (iv) and reflects the Meter/Outstation setup.

vi. The Meter and pulse multipliers are related to the setup of the Meter:

- Meter Multiplier: Any multiplier applied to the cumulative register on the display of the Meter. For example if the cumulative Meter reading on the display was 123456 x10 kilo Watt hours (kWh) the Meter multiplier would be 10. If the reading on the display was 123456 kWh the Meter multiplier would be 1. This can be either kWh or Mega Watt hours (MWh) depending on the setup of the Meter.
- Pulse multiplier: This is any multiplier applied to the Half Hour pulses recorded (either by the Meter itself or a separate Outstation) in order for it to be converted to energy. So if a Meter recorded pulses in kW and in a Half-Hour recorded 5000 pulses (kW) to convert to energy (2500kWh) the multiplier would be 0.5. Where the Outstation is separate to the Meter the output pulse value of the Meter should be included.

vii. Note that due to a numbering error in the Capacity Market Rules (vii) does not exist.

viii. Current Transformer (CT) and Voltage Transformer (VT) ratios are those programmed into the Meter to convert back to primary energy. Where a Direct Connected or Whole Current Meter is used this should be completed as Not Applicable. There will not always be a VT used, in this case only the CT ratio needs to be stated. These ratios should match the Measurement Transformers connected to the Meters.

In a high voltage (HV) Metering System we would expect to see a VT and CT ratio; e.g. 11kilo Volts (kV)/110V and 200/5Amps (A).

In a low voltage (LV) Metering System we would be expect to see either a CT ratio (e.g. 600/5A) or state Direct Connected or Whole Current metering where no CTs are required due to the low level of the demand.

ix. The communications number is the "dial up" number for the Meter/Outstation. The method is the technique used to remotely contact the Meter/Outstation; for example via a Public Switched Telephone Network (PSTN), Global System for Mobile Communications (GSM) or Internet Protocol (IP).

x. A Metering Dispensation is only applicable to Settlement metering where the Metering System is not compliant with the BSC and a successful application has been made to BSCCo (ELEXON Limited) to be allowed to use that Metering System. The majority of Metering Dispensations are in CVA Metering Systems (i.e. linked to BM Units). Where the Metering System has not required a Metering Dispensation this should be completed as Not Applicable.

You can check the ELEXON website (https://www.elexon.co.uk/reference/technical-operations/metering/metering-dispensations/) for Site Specific Metering Dispensations. Please note that only non-confidential Metering Dispensations are listed.

Where there is a Metering Dispensation associated to a Metering System the dispensation number should be quoted (D/###).

xi. A Complex Site Supplementary form is only applicable to Supplier Volume Allocation (SVA) Supplier Meter Registration Service (SMRS) Metering Systems where an aggregation rule is being applied to determine the metered volumes.

- The D0268 flow is the Meter Technical Details for a SVA Metering System; it is a summary of the details provided in (i) to (ix). A Capacity Provider can either submit D0268s or refer to providing the details in (i) to (ix).
- The BSCP20 form is the Meter Technical Details (MTDs) for a CVA Metering System created by the MOA; it is a summary of the details provided in (i) to (ix). A Capacity Provider can either submit BSCP20 or refer to providing the details in (i) to (ix) or provide the MTDs provided by the Central Data Collection Agent (CDCA).
- The Key Meter Technical Details form is the Meter Technical Details for a non-settlement Metering System (i.e. Bespoke); it is a summary of the details provided in (i) to (ix). A Capacity Provider can either submit a Key Meter Technical Details form or refer to providing the details in (i) to (ix).

xii. The BSCP75 form is the aggregation rule to derive the BMU Metered Volumes; it can be made up of multiple Metering Systems. A Capacity Provider can either submit the BSCP75 form or as an alternative ask the CDCA to provide the aggregation rule they currently hold for the BMU.

For BMUs that have been split to identify the CMU Metered Volumes the aggregation rule for the CMU should be provided by the Capacity Provider.

xiii. Where multiple Metering Systems are used, the Aggregation Rule for the CMU, Generating Unit or DSR CMU Component should be provided unless provided under (c)(xi) or (c)(xii).

Where more than one Metering System is being used as part of a Component in a CMU, EMRS need to know how they should be treated. Typically this is where there is a Meter for the Generating Unit and another for the Auxiliary Load, or where ineligible generation has to be excluded.

The Aggregation Rule should show how the Metered Volumes for the Component will be determined. This should be linked to the Single Line Diagram (SLD) where all Metering Systems should be identified.

So for the example described above with the gross generation Meter and an Auxiliary Load Meter the Metering Statement should include the Aggregation Rule:

$$\text{Net Output CMU} = AE(M_1) - AI(M_2)$$

Where Meters M_1 and M_2 have been clearly identified on the SLD, as shown below in Figure 3:

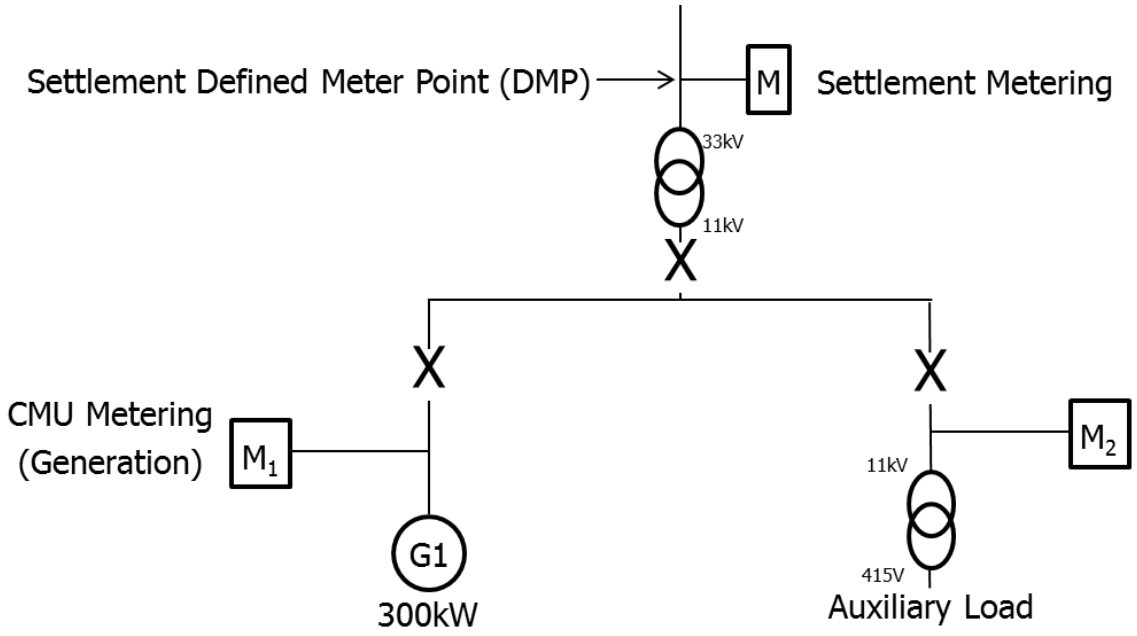

Figure 3: Single Line Diagram for Generation Meter and Auxiliary Load Meter.

Another example of something that should be included in the Aggregation Rule is where an Auxiliary Load circuit is subject to a Metering Test and it is shared between Generating Units. The Metering Statement should confirm the methodology for the apportionment multiplier.

This would include the rated output of each generating unit associated with the Auxiliary Load circuit in kW or MW. All relevant generating units should be identified on the SLD and confirmation should be provided as to what generating units are part of the CMU.

For example, if the Metering Statement included an Aggregation Rule for Net Output that included an apportionment multiplier:

Net Output CMU = AE(M_1) – (0.67 x AI(M_2))

We need to see the justification for the 0.67 multiplier.

The required evidence to be included in the Metering Statement would be:

Generator 1 (CMU) rating = 300kW; and

Generator 2 (Non-CMU) rating = 150kW.

Apportionment Multiplier= (CMU Generator Rating)/(Sum of all Generator Ratings)= 300kW/(300kW+150kW)=0.67

$$Apportionment\ Multiplier = \frac{CMU\ Generator\ Rating}{Sum\ of\ all\ Generator\ Ratings} = \frac{300kW}{300kW + 150kW} = 0.67$$

Where Meters M_1 and M_2 have been clearly identified on the SLD, and all Generating Units associated with the Auxiliary Load circuit, as shown below in Figure 4:

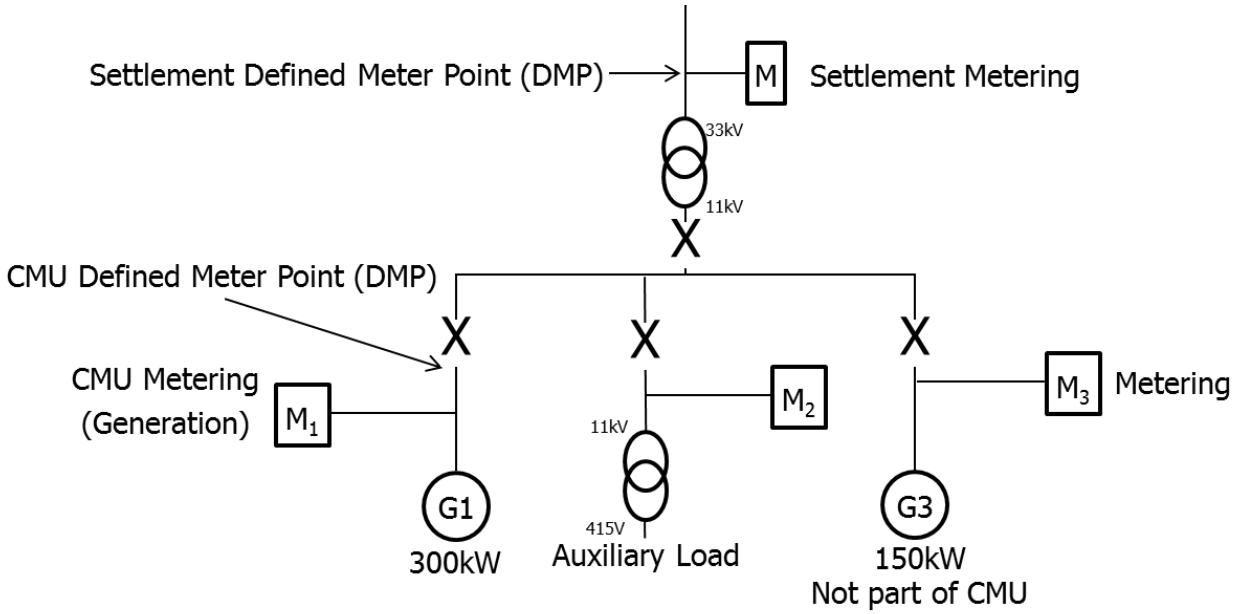

Figure 4: Single Line Diagram for shared Generation Meter and Auxiliary Load Meter.

d) Non Half Hourly Meter Technical Details

This section relates to any CMU not using a Meter (or Non Half Hourly Meter feeding directly into a BSCCo approved Outstation) that measures on a Half Hourly basis. Where this isn't the case this should be completed as Not Applicable and section (c) would be completed instead.

i. A Technical Specification for the metering device must be provided. This should have been produced by the manufacturer of the Meter. It should make reference to the type of instrument, accuracy of it and configuration.

ii. A calibration test certificate for the metering device must be included. This is also required for section (l) Meters. This section can either refer to the section (l) entry or refer to the same attachment. A "Certificate of Conformance" or a manufacturer's specification is acceptable where it includes the accuracy class.

iii. Current Transformer (CT) and Voltage Transformer (VT) ratios are those programmed into the Meter to convert back to primary energy. Where a Direct Connected or Whole Current Meter is used this should be completed as Not Applicable. There will not always be a VT used, in this case only the CT ratio needs to be stated. These ratios should match the Measurement Transformers connected to the Meters.

iv. So in a high voltage (HV) Metering System we would expect to see a VT and CT ratio; e.g. 11kV/110V and 200/5A.

v. So in a low voltage (LV) Metering System we would be expect to see either a CT ratio (e.g. 600/5A) or state Direct Connected or Whole Current metering where no CTs are required due to the low level of the demand.

vi. Details of the device/system used to convert the output of the metering device into Half Hourly settlement periods should be provided. If this is also listed as part of section (e) Data Provision it can either be listed again or that section can be referred to here.

vii. Details of the method used to convert the output of the metering device into Half Hourly settlement periods should be provided. If this is also listed as part of section (e) Data Provision it can either be listed again or that section can be referred to here.

e) Data Provision

For (i) & (ii) Capacity Providers are required to provide EMRS with metered volumes in order for settlement calculations to be carried out after a Stress Event. How the data is submitted to EMRS will depend on the metering pathway. Further information can be found in WP195 – Capacity Market and CFD Metered Data[5].

The method used for any CMU that is using settlement metering and is submitting metered volumes via a BSC process (i.e. a BM Unit or an MPAN) will be a BSC Data Collector. For MPANs this will be the name of the relevant Half Hourly Data Aggregator (HHDA) / Half Hourly Data Collector (HHDC) sending the D0357 flow or for BM Units the CDCA.

In the case of MPANs the Capacity Provider has to establish the D0357 data flow of Metered Volumes through their Supplier. The Supplier will set up the process for the HHDA to send the D0357 flow to EMRS for the relevant MPAN(s).

For data submitted via a non-settlement process a description of how the metered volumes get from the Meter to EMRS is required. This may include a third party data collector, and where it does the name of the relevant Data Collector (DC) is required. The description should include any system that collects data from the Meter and converts to settlement period format in the defined CSV format.

Details of the CSV format and guidance can be found in WP195 – Capacity Market and CFD Metered Data on the EMRS website https://www.emrsettlement.co.uk/publications/working-practices/

Part of the header of the CSV format is the EMR Party ID of the Capacity Provider. This is provided when a Capacity Provider registers with EMRS. The process and registration form for this can be found in the same location as WP195 – Capacity Market and CFD Metered Data; WP22 – Applicant and Capacity Provider; and WP22 – Capacity Market Registration Form[6].

[5] https://www.emrsettlement.co.uk/publications/working-practices/
[6] https://www.emrsettlement.co.uk/publications/working-practices/

An example of the CSV file has to be provided for all Metering Systems using Bespoke or Balancing Services Metering Configuration Solutions. This should be from the day of the Meter commissioning and proving tests (see section (n)) so the Capacity Provider can prove that actual metered volumes can be submitted to EMRS and the commissioning evidence is used to validate the values in the CSV file.

Confirmation that the CSV file is in clock (local) time; i.e. the British Summer Time (BST) format post March clock change and Greenwich Mean Time (GMT) format post October clock change, should be provided.

Where a CSV file is to be submitted the Capacity Provider should confirm the frequency of submission to EMRS.

f) Time Synchronisation

A description is required of how the time of the Metering System is synchronised and by whom.

For any CMU that is using settlement metering and is submitting metered volumes via a BSC process (i.e. a BM Unit or an MPAN) the time synchronisation will be performed by a BSC Data Collector. So for MPANs this will be the name of the relevant HHDC or for BM Units the CDCA.

For any CMU that is submitting metered volumes via a third party data collector, the time synchronisation will be performed by that third party data collector, and where it does the name of the relevant DC is required.

Where the Capacity Provider uses their own systems to collect data a description of how the time is kept synchronised is required and whether it is the Meter or the data collection system converting to Half Hourly settlement period formats that maintains the time.

In some Metering Systems the Meter only provides an instantaneous output (e.g. the Meter sends weighted pulses to a data collection system) and it is the data collection system that must have the time synchronised and not the Meter. If this is the case it should be confirmed in the Metering Statement.

g) Security

A brief description of the security arrangements of the Metering System is required. Some examples of what this can include are:

i. Meters are sealed;

ii. Meters are in a locked cabinet;

iii. Measurement Transformers are in a locked switchboard or locked cabinet;

iv. Metering System is in an authorised access only area; and

v. Metering System is in a locked room.

h) Testing Facilities

A brief description of the testing and isolation facilities at the Meters is required. Where there is no requirement in the relevant governing document to have testing facilities the Capacity Provider should state "None required".

Typically this will include any fuses and test terminal blocks installed at the metering panel or the switchboard housing the Measurement Transformers.

Where the Meter is Direct Connected or Whole Current there is no requirement for test terminal blocks, there will only be the fuses (either main incomer cable head or voltage fuses between the main incomer cable head and the Meter).

i) Installation Date

The installation date of the Meter and measurement transformers is required so the Metering System can be checked against the correct version of the governing documents. It can be a different date for the Meters and Measurement Transformers.

Where an exact date is not known the Capacity Provider should estimate the year of installation and provide the rationale for the estimate.

The commissioning date of the Meter and measurement transformers should also be provided. Again, where an exact date is not known the Capacity Provider should estimate the year of commissioning, which could be different for the Meters and the measurement transformers, and provide the rationale for the estimate.

j) Instrument Transformers (or Measurement Transformers)

This section only relates to Voltage Transformers (VT) and Current Transformers (CT); and where applicable Interposing CTs and Summation CTs.

If the Meter is Direct Connected or Whole Current this section should be completed as Not Applicable.

Evidence is required to confirm the ratio, accuracy class and rated burden of all Measurement Transformers used in the CMU. In addition, evidence of the errors of those Measurement Transformers is needed as part of the determination of Overall Accuracy (see Overall Accuracy section after section (r).

The easiest way to provide this information is through a calibration test certificate for a Measurement Transformer.

There are a number of options to provide evidence of the error where the original calibration test certificate is unavailable:

i. A test certificate for an equivalent type, ratio, accuracy class and rated burden; OR

ii. Evidence from the manufacturer confirming the typical errors (e.g. a technical specification including the limits of error; evidence from the design characteristics of the typical errors); OR

iii. From the National Measurement Transformer Error Statement on the ELEXON website for an equivalent type, ratio accuracy class and rated burden (search the ELEXON website https://www.elexon.co.uk/wp-content/uploads/2013/11/national_measurement_transformer_error_statement.pdf for National Measurement Transformer Error Statement to see the latest version); OR

iv. A photograph of the rating plate of the Measurement Transformer that will show the ratio, accuracy class, rated burden and serial number (see example below); but this will not give any information on the errors.

Where in the example the ratio is 11kV/110V; the rated burden is 50VA; the accuracy class is 0.5/3P[7]; and the serial number is 0133105.

Where no evidence of the error can be provided, other than the rated accuracy class, the rated accuracy class will be used in the Overall Accuracy calculation. If the evidence proves a VT is Class 1.0 but there is no error figure we will use ±1%. This can make it difficult to meet the Overall Accuracy limits, where applicable, specified in the relevant governing documents (e.g. BSC CoPs, Bespoke Technical Requirements - Schedule 7 of the CM Rules).

k) Power Transformers

This is only applicable to BSC Settlement Metering sites that have an approved dispensation (Metering Dispensation), which accounts for transformer losses where the installed metering is not at the Defined Meter Point and there is a power transformer between the two points. Where this is not applicable the Capacity Provider should state this in the Metering Statement.

[7] Where P identifies a protective voltage transformer winding

Where it is applicable the evidence should include:

i. The manufacturer's Power Transformer Test Certificate for the installed Power Transformer; or

ii. The manufacturer's Power Transformer Test Certificate for a Power Transformer of the same type as that installed; or

iii. An average figure approved for use under the dispensation.

l) Meters

Evidence is required to confirm the accuracy class of all Meters used in the CMU or CMU Component. In addition evidence of the errors of those Meters is needed as part of the determination of Overall Accuracy (see Overall Accuracy section after section (r)).

The easiest way to provide this information is through a calibration test certificate for the Meter; the certificate with the actual errors should be provided and not just a certificate of conformity that confirms the errors are within the allowed limits for the accuracy class to help demonstrate the Overall Accuracy of the Metering System is within the allowed limits (if applicable).

There are a number of options to provide evidence of the error where the original calibration test certificate is unavailable:

i. A test certificate for an equivalent type and accuracy class; OR

ii. Technical information from the manufacturer confirming the typical errors from the design characteristics; OR

iii. A photograph of the name plate of the Meter that will show the type, accuracy class and serial number; but this will not give any information on the errors.

Where no evidence of the error can be provided, other than the rated accuracy class, the rated accuracy class will be used in the Overall Accuracy calculation. So if the evidence proves a Meter is Class 1.0 but there is no error figure we will use ±1%. This can make it difficult to meet the Overall Accuracy limits.

It should be noted that a Certificate of Conformity will only confirm the accuracy class of the Meter and will not give the actual calibration test errors. Should a Certificate of Conformity be provided, the rated accuracy class will be used in the Overall Accuracy calculation. So if the evidence proves a Meter is Class 1.0 but there is no error figure we will use ±1%. This can make it difficult to meet the Overall Accuracy limits.

m) Instrument Transformer Burdens

This section only relates to Voltage Transformers (VT) and Current Transformers (CT); and where applicable Interposing CTs and Summation CTs.

If the Meter is direct connected (or whole current) this section should be completed as Not Applicable.

The Capacity Provider must provide the burden (in volt-amperes (VA)) imposed on the secondary side of each Measurement Transformer by equipment connected. The Metering Statement must state whether the burden has been measured or has been estimated.

This is typically called the Working Burden and is **NOT** the Rated Burden. For the transformer to operate accurately the Working Burden must be less than the Rated Burden. Rated Burden is stated on the rating plate and the calibration test certificate from the manufacturer. Rated Burden is not what should be provided in section (m), it is only relevant to section (j).

Where the burden has been estimated, all equipment connected to the Measurement Transformers should be listed with the individual burden for each; this should be available on the manufacturer's technical specification for each piece of equipment. The technical specification can be included as an Appendix to the Metering Statement as evidence.

Where the burden has been estimated, the length (m) of the cable run between the VT & CT and the Meters should be provided as well as the cable resistance (Ω /m). The cable resistance is dependant on the cross sectional area of the cable used (e.g. typically 2.5mm^2 = 0.00741 Ω/m). You should specify whether the length (m) quoted is one way or the loop (i.e. includes the cable to the Meter and the return from the Meter).

A separate burden figure should be listed for all CTs and VTs (e.g. Station transformers and generator circuits).

n) Commissioning

The purpose of the commissioning section is to provide sufficient evidence to prove that the Metering System, in its entirety, is configured correctly and has been tested to prove that the Metering System can correctly measure the primary energy of a circuit that is used to determine the output of a CMU or CMU Component.

The evidence to be provided for commissioning is in two parts:

1. The Measurement Transformers (Current Transformers and Voltage Transformers); where the Meter is connected to a Measurement Transformer; and
2. The Meters.

Where the Meters are Direct Connected or Whole Current, the Meter itself can measure primary values without the need of Measurement Transformers. In these instances only commissioning evidence for the Meters is required.

Measurement Transformers

When the Metering System was initially installed it should have had primary injection testing performed on the Measurement Transformers, sometimes referred to as a ratio and polarity test. Where this test information is not available an alternative option can be used (Options 1 to 5 described below).

The Metering Statement must describe the method used to demonstrate that the Measurement Transformers have been commissioned (i.e. original primary injection test or one of the allowed options as an alternative).

Suitable evidence for the original primary injection test must include:

i. The serial numbers, ratios, accuracy class and rated burden of all Measurement Transformers;

ii. An electrical schematic showing the Measurement Transformers, clearly showing orientation with respect to the direction of incoming power flow and the ferrule numbers of secondary wiring;

iii. The primary value of current injected through the CT and the measured secondary current;

iv. Evidence of the CT polarity test (direction test) that clearly shows the direction the CT is facing (i.e. is P1 of the CT facing the incoming supply and P2 facing the source of the CMU Capacity Obligation (generator or demand reduction));

v. The primary value of voltage injected into the VT and the measured secondary voltage;

vi. Evidence of the VT polarity test (direction test) that clearly shows the direction the VT is facing.

Where the Measurement Transformer is multi-ratio type evidence must be provided to confirm what ratio the metering has been connected to. For example, this could be a ratio and polarity test where the secondary measurements have been taken at the metering panel for the ratios selected or a photograph of the terminal connections clearly showing what ratio the Meter has been connected across (i.e. connected across high ferrule numbers indicates low ratio selected; connected across low ferrule numbers indicates high ratio selected). Referring to Figure 2 (on page 6) the Meter is connected to 2S3 and 2S1 so this is set to the 1200/1A ratio.

Where there is no evidence from when the Metering System was installed the following options are available to determine that primary energy is being recorded correctly:

i. The Demand (derived from independently measured primary values) and the Meter's instantaneous Demand reading for the same period; OR

ii. The Demand (derived from independently measured secondary values where the primary/secondary ratios can be established) and shall be compared to the Demand reading for the same period; OR

iii. Where appropriate and in consultation with the EMRS (acting on behalf of ESC), an alternative measurement device shall be used for comparison with that of the Meter; OR

iv. Where appropriate and in consultation with the CM Settlement Body, an alternative method using:

   a. Photographic evidence of the Instrument Transformer rating plates and Meter programmed ratios;

   b. Photographic evidence of the Instrument Transformer rating plates and a download of the Meter programmed ratios using the Meter manufacturer's software;

   c. For multi-ratio Instrument Transformers photographic evidence of the Instrument Transformer secondary wiring, the Instrument Transformer rating plates and the Meter programmed ratios (or a download of the Meter programmed ratios using the Meter manufacturer's software); or

   d. For multi-ratio Instrument Transformers photographic evidence of the Instrument Transformer secondary wiring, the Instrument Transformer calibration test certificates and the Meter programmed ratios (or a download of the Meter programmed ratios using the Meter manufacturer's software) shall be used to confirm the Instrument Transformers are configured and operating correctly.

Any comparison must be from an independent source and not be using an output from the Meter used in the Capacity Market and not using the same Measurement Transformers (or same winding) as the Metering System used in the Capacity Market. This independent source can be from a protection circuit, SCADA system, transducer, switchgear instrumentation or another Metering System (e.g. the Boundary Point Metering System). This list is not exhaustive.

The current methods agreed to be able to satisfy one of the above options are detailed below. Any other methods the Capacity Provider wishes to use or alternative forms of evidence should be discussed, and agreed, with EMRS in advance.

Option 1: Independently measured primary or secondary values.

Either of the following methods is acceptable and they should include the following:

Option 1A:

- Commissioning Test Certificate of the Meter where it includes both instantaneous Primary values from the Meter and an independent source; and

- A detail of what the source of the independent reading is (e.g. device type, ratio of connected transformers, accuracy class). State if local time or UTC from Meter.

Or Option 1B:

- Photograph of independent Primary/Secondary Energy value (A, V, W, VA);
- Photograph of value from display of Meter at the same time;
- Details of what the source of the independent reading is (e.g. device type, ratio of connected transformers, accuracy class); and
- Date and Time photograph taken. State if local time or UTC from Meter.

Or Option 1C:

- Half Hourly data from an independent Metering System. State if local time or UTC from Meter;
- Details of what the source of the independent reading is (e.g. device type, ratio of connected transformers, accuracy class); and
- Half Hourly data from the Capacity Market Metering System. State if local time or UTC from Meter.

Option 2: Independently measured primary or secondary values where the Meter doesn't have a displayed value (A, V, W, VA) and the Metering System is registered in the BSC.

Should include the following:

- Photograph of independent Primary/Secondary Energy value (A, V, W, VA);
- Details of what the source of the independent reading is (e.g. device type, ratio of connected transformers, accuracy class);
- Date and Time photograph taken. State if local time or UTC from Meter;
- Data from the day photograph taken (CDCA, HHDC or HHDA). State if local time or UTC from Meter; and
- Technical details to identify Half Hourly channel to use.

Option 3: Where the Metering Device is behind the Boundary Point (and there is no independent primary or secondary measurement available) compare with the Boundary Point Settlement Meter

Should include the following:

- Provide photograph of Capacity Market Meter with prevailing load (kW or MW); and
- Date and Time photograph taken. State if local time or UTC from Meter; or alternatively
- Half Hour period from Capacity Market Meter (whole day should be submitted); and

- Date and Time of Half Hour period to be used in comparison. State if local time or UTC from Meter.

For either option the following must be provided:

- Half Hourly data from the Boundary Point Settlement Meter the day photograph taken (CDCA, HHDC or HHDA). State if local time or UTC from Meter;

The CMU Component will have to switched on (if generation) or switched out (if reduction) for a 30 minute period to see step change at the Boundary Point Metering System.

Option 4: Where the primary conductors are accessible in a low voltage installation and a measurement can be taken of primary and secondary current values.

Should include the following:

- Evidence of the primary current measurement. This can be either a photograph of the display of the test instrument at the time of the test showing the current value (A) or a download or screenshot from the test instrument. State if local time or UTC from Meter; and
- Evidence of the secondary current measurement. This can be either a photograph of the display of the test instrument at the time of the test showing the current value (A) or a download or screenshot from the test instrument. State if local time or UTC from Meter.

Option 5: Where Options 1 to 4 cannot be completed verify the ratios programmed into the Metering Device.

Should include the following:

Option 5A:

- Where evidence of the measurement transformer ratio has been provided (e.g. certificate, line diagram, photo) and it is a single ratio measurement transformer; and
- A download of the setup of the Meter that must include the serial number of the Meter and the measurement transformer ratio applied. This must be done using the meter manufacturer's software or a photograph of the display of the Meter clearly showing the Meter serial number and the programmed ratios.

Or Option 5B:

- Where evidence of the measurement transformer ratio has been provided (e.g. certificate, line diagram, photo) and it is a single ratio measurement transformer;
- Evidence of the secondary injected Energy value (A, V, W, VA) or converted to a primary Energy value (A, V, W, VA) from secondary injection unit or a test instrument. State if local time or UTC from Meter;
- Evidence of the energy recorded by the Meter; this can be:

- Photograph of value from display of Meter at the same time. State if local time or UTC from Meter.; or
- Evidence of cumulative register advance for the period. State if local time or UTC from Meter; or
- Evidence of Half Hourly channel value for the period (e.g. downloaded using the Meter manufacturer's software).

Or Option 5C:

- Where evidence of the measurement transformer ratio has been provided (e.g. certificate, line diagram, photo) and it is a multi-ratio measurement transformer; and
- A download of the setup of the Meter that must include the serial number of the Meter and the measurement transformer ratio applied. This must be done using the Meter manufacturer's software or a photograph of the display of the Meter clearly showing the Meter serial number and the programmed ratios; and
- A photograph of the Instrument Transformer secondary wiring that clearly shows the ferrule numbers to identify what ratio the Meter has been connected to.

Meter Commissioning and Proving

Schedule 6 of the Rules requires that any Meter used by the CMU Component that is subject to a Metering Test has to have been commissioned and tested to prove that the data can be received by either the HHDC/CDCA in the BSC or EMRS for non-BSC.

The evidence to be provided for commissioning of the Meters is in two parts:

1. The Meter Commissioning; and
2. The Meter Proving Test.

The purpose of the Meter commissioning test is to provide sufficient evidence to prove that the Meter is configured correctly and has been tested to prove that the Meter can correctly measure the primary energy of a circuit that is used to determine the output of a CMU.

When a Settlement Meter(s) was initially installed it should have had a commissioning and proving test performed on it.

Where the original commissioning/proving test results are unavailable (or in a non-settlement Metering System not completed) suitable commissioning and proving tests have to be re-done.

The Metering Statement must describe the method used to demonstrate that the Meter(s) have been commissioned and the method used to demonstrate the Proving Test.

Meter Commissioning

The Meter commissioning is to prove that the Meter has been configured correctly and is measuring the primary energy flowing through the circuit. It is expected that where a Meter is measuring a generation circuit this will be recorded by the Meter as export (i.e. on an export cumulative register and the export Half Hourly channel) and where a Meter is measuring a demand circuit this will be recorded by the Meter as import (i.e. on an import cumulative register and the import Half Hourly channel).

Where the Meters are Direct Connected or Whole Current, the Meter itself can measure primary values without the need of Measurement Transformers. In these instances only commissioning evidence for the Meters doesn't have to prove Measurement Transformer ratios have been applied correctly.

The Meter commissioning tests should be completed at the same time as the Meter proving tests so the prevailing load can be compared with the Half Hourly data. The commissioning test results should be date and time stamped to enable this.

Typical techniques to demonstrate Meter commissioning in a HVCT or CT Meter are:

- Confirmation that there are no alarms on the Meter.
    - The evidence can be from a photograph of the display of the Meter or a download using the manufacturer's software; OR
    - Recorded on commissioning results.
- Confirmation of the Measurement Transformer ratios have been applied correctly (i.e. measure secondary current/voltage and compare with Meter primary values) and confirmation that the Meter is recording the power flow in the correct direction (i.e. prevailing primary power import flow is recorded as Active Import on the Meter or prevailing primary power export flow is recorded as Active Export on the Meter).
    - Comparison can either be with an instantaneous display on the Meter showing primary voltage and current values or primary kW or kVA. The evidence can be from a photograph of the display of the Meter or a download using the manufacturer's software or recorded on the commissioning results; OR
    - Where the generation/demand is relatively constant during the half-hour period of the test, a comparison with the settlement period data for that day in kWh (we need evidence to show the generation/demand kW value; e.g. from a SCADA system); OR
    - Comparison with an independent Metering System where evidence as to the independence of the non-CMU Metering System used has to be provided (e.g. a photograph of the CMU Meter and the non-CMU Meter).
- An error check of the Meter using a suitably calibrated test instrument as a reference;

Typical techniques to demonstrate Meter commissioning in a Direct Connected or Whole Current Meter are:

- Confirmation that there are no alarms on the Meter.
  - The evidence can be from a photograph of the display of the Meter or a download using the manufacturer's software; OR
  - Recorded on commissioning results.
- Confirmation that the polarity of the Meter is correct.
  - The evidence can be from a photograph of the display of the Meter or a download using the manufacturer's software showing phase rotation, prevailing Volts/Amps/Power.

Meter Proving Test

The Meter proving test is to prove that the Half Hourly data recorded by the Meter can be received and matches the Half Hourly data held by the Data Collector. In the Capacity Market this can be the HHDC or CDCA in BSCCo; or a data collector appointed by the Capacity Provider for a non-settlement Meter; or the Capacity Provider themselves if they collect the data.

Where data is submitted through a non-BSC process, i.e. a CSV file submitted over SFTP, this file has to be provided as part of the proving test evidence. As mentioned previously, this should be completed at the same time as the Meter commissioning tests so the prevailing load can be compared with the Half Hourly data. The CSV file should also be submitted as part of the Metering Statement submission (section (e).

Typical techniques to demonstrate Meter proving are (state if local time or UTC from Meter):

- Confirmation that a Half-Hour period submitted is what the Meter has actually measured.
  - Provide a cumulative energy register reading (active import or export, as applicable) at the start and end of a Half Hour period that the advance can be used to confirm the volumes in the Half Hourly data for the same period (acceptable evidence is a photograph or a test sheet of the register readings or a download using the Meter manufacturer's software; and the Half Hourly data for the day (in a CSV file if applicable); OR
  - Provide a day's Half Hourly data (active import or export, as applicable) downloaded using the Meter manufacturer's software that can be used to confirm the volumes in the Half Hourly data submitted (from data collector or CSV file) to EMRS for the same period (for whole day); OR
  - Provide a day's Half Hourly data (active import or export, as applicable) downloaded from an independent Metering System (evidence to prove the Metering System is independent from the CMU Metering System is required) that can be used to confirm the volumes in the Half Hourly data submitted to EMRS (from data collector or CSV file) for the day for

the same period. (the download of Half Hourly data of the independent Metering System can be provided for other time periods so long as it spans a Half Hour period (e.g. 5 minute periods would need 6 periods to cover the Half Hour period)); OR

- Where the Metering Device has no cumulative register, the secondary current and voltage can be measured to prove prevailing load (we need evidence of the measurement; for example a photograph of the measuring instrument display or recorded on the Meter Commissioning test results) and this will be compared with the Half Hourly data submitted (in the CSV file). This is only possible where the generation/demand is relatively constant.

For a Direct Connected or Whole Current, Meter where the pulse multiplier (i.e. the multiplier applied to the raw metered volumes to get 30 minute kWh data) is 1 (one) it can be agreed with EMRS to only submit a CSV file. This is primarily for situations where the metered circuit is measuring an intermittent ineligible subsidised low carbon generation (e.g. FiT) that needs to be netted off another metered circuit's metered volumes.

o) Transformer Loss Compensations (CT, VT and Power Transformers)

If no transformer loss compensation has been applied to the Meter then the Metering Statement should state Not Applicable.

If the Meter is Direct Connected or Whole Current this section is not relevant and the Metering Statement should state Not Applicable.

Where the Meter has been compensated evidence of compensation figures applied should be provided. This can be a download of the Meter setup using the manufacturer's software that shows the compensation values applied or from the original calculations.

Where the original calculations cannot be provided EMRS will verify the compensation values by re-calculating from the evidence provided on transformer test certificates and burdens connected to Measurement Transformers.

The compensations may only be for CTs, VTs or Power Transformers; or may be a combination of all three.

We would expect to see either an overall compensation percentage value or the individual ratio (%) and phase (minutes) for each phase in CT/VT compensation.

We would expect to see a percentage value for Active (W) Copper (Cu) and Iron (Fe) losses and Reactive (VAr) Copper (Cu) and Iron (Fe) losses in Power Transformer compensation.

p) Cable and Overhead Line Loss Compensations

If no cable and overhead line loss compensation has been applied to the Meter the Metering Statement should state Not Applicable.

If the Meter is Direct Connected or Whole Current this section is not relevant and the Metering Statement should state Not Applicable.

This is only applicable where there is an approved Metering Dispensation and would typically be a multiplier applied to the Metered Volumes in the aggregation rule. Where the Meter has been compensated, evidence of the compensation figures applied should be provided. This can be a download of the Meter setup using the manufacturer's software that shows the compensation values applied to the Meter or a copy of the Aggregation Rule where a fixed multiplier has been applied or from the original calculations.

Where the original calculations cannot be provided EMRS will verify the compensation values by re-calculating from the evidence provided on the cable or overhead lines. We would expect to see the resistance per metre of the cable and the length of the cable.

q) Electrical Losses Factor

If no electrical loss compensation has been applied to the Meter the Metering Statement should state Not Applicable.

Where a Meter on a Private Network has electrical losses applied to the metered volumes to effectively make the metered point the Boundary Point to the Distribution System this section will be applicable. Typically this is where a customer on a Private Network has chosen to have their own Supply contract and the metering has to become settlement compliant.

This is only applicable where there is an approved Metering Dispensation and would typically be a multiplier applied to the Metered Volumes in the aggregation rule.

Where the Meter has been compensated, evidence of compensation figures applied should be provided. This can be a download of the Meter setup using the manufacturer's software that shows the compensation values applied to the Meter or a copy of the Aggregation Rule where a fixed multiplier has been applied or from the original calculations.

Where the original calculations cannot be provided EMRS will verify the compensation values by re-calculating from the evidence provided on any power transformers and cable or overhead lines, as applicable.

We would expect to see a percentage value for Active (W) Copper (Cu) and Iron (Fe) losses and Reactive (VAr) Copper (Cu) and Iron (Fe) losses in Power Transformer compensation.

We would expect to see the resistance per metre of the cable and the length of the cable.

r) Declaration

A declaration from Directors of the Capacity Provider is required. This must be signed. We only require one declaration per CMU and not for each Component making up that CMU. If multiple CMUs are having Metering Statements submitted at the same time the same declaration can be used.

It would be expected that the Director would be equivalent to the person who signed the Director prequalification forms submitted to the Delivery Body.

The declaration must use the terms from the Rules, see below:

The information contained in and enclosed with the Metering Statement, is, at the date of submission and to the best of their knowledge, information and belief, true, complete and accurate in all material respects.

Overall Accuracy

The information submitted in Section (j) and (l) will be used to determine the Overall Accuracy of the Metering System. The Overall Accuracy must be within the allowed limits of the relevant governing documents (i.e. BSC Code of Practice; Capacity Market Rules Schedule 7; the relevant Balancing Services Agreement).

It is important to consider that even though the individual components making up the Metering System (i.e. the Meters and the Measurement Transformers (voltage and current) are compliant it is not guaranteed that the Overall Accuracy will be compliant with the Rules.

The Overall Accuracy may not be maintained if there are no error certificates (or other allowed evidence). So if there were no test certificates provided for a Metering System and it had a VT accuracy class of 1.0, a CT accuracy class of 0.5 and a Meter accuracy class of 1.0 the overall accuracy would use the rated accuracy class. So this would be an aggregate overall accuracy of ±2.5% and in some cases (e.g. a Type 3 Bespoke Meter Type) the allowed limits are ±1.5% and the Metering Test would be failed.

The Overall Accuracy limits are specified in the Rules for Bespoke Meters and the BSC Metering Codes of Practice (or Alpha Cops) for Settlement Meters.

If an actual test certificate for the Meter and Measurement Transformers has been submitted an error figure will be selected (this will be the highest error figure at Unity Power Factor where the rated current applied is between 50% and 120%) from the test certificate.

If a letter from the manufacturer has been provided that error figure will be used.

If a photograph of the rating plate of a Measurement Transformer has been provided the accuracy class of that Measurement Transformer will be used in the calculation (i.e. if the Accuracy Class is 0.5 the figure to be used in the Overall Accuracy calculation will be ±0.5%).

The Overall Accuracy will only include the relevant equipment making up the Metering System (i.e. for high voltage it would be the Meters, Voltage Transformers and Current Transformers; for low voltage it would be the Meter and Current Transformers or just the Meters if direct connected).

Overall Accuracy = Error of Meter + Error of Voltage Transformer + Error of Current Transformer

So if the identified errors were:

Meter: +0.2%

Voltage Transformer: +0.1%

Current Transformer: +0.05%

Overall Accuracy =+0.2% + 0.1% + 0.05% = +0.35%

If there were no certificates or evidence from the manufacturer available the rating plate details would be used, for example:

Meter: +0.2%

Voltage Transformer: ±0.5% (Class 0.5 Voltage Transformer).

Current Transformer: ±0.2% (Class 0.2 Current Transformer).

Overall Accuracy = +0.2% + 0.5% + 0.2% = +0.9%; or

Overall Accuracy = +0.2% - 0.5% - 0.2% = -0.5%;

The worst case scenario figure will be used; in this example it would be the +0.9% value.

If the Meter has been compensated for Measurement Transformer Losses the Overall Accuracy of the Meter becomes:

Overall Accuracy = Error of Meter (%).

So if the identified errors were:

Meter: +0.2%

Voltage Transformer: +0.1%

Current Transformer: +0.05%

If Section (o) Transformer Loss Compensations has been completed and checked both the Current Transformer and Voltage Transformer error figures can be removed from the calculation. This would result in:

Overall Accuracy = +0.2%

If the Transformer Loss Compensation only includes one of the Current Transformer and Voltage Transformer then only the error of the included one should be removed. For example, if the Voltage Transformer loss had been accounted for in the above example the result would be:

Overall Accuracy = Error of Meter + Error of Current Transformer = +0.2% + 0.05% = +0.25%

5. Acronyms and Definitions

A full list of acronyms and definitions included within this document can be found on the EMRS website[8].

6. Need more information?

For more information, please visit our website www.emrsettlement.co.uk or email us at contact@emrsettlement.co.uk or metering@emrsettlement.co.uk.

[8] https://www.emrsettlement.co.uk/documents/2015/08/acronyms-definitions.pdf

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