



AMO Guidance Paper

Subject	Advanced Meters for CT metering systems
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I Summary

The Supply Licence Condition (SLC) and the Balancing and Settlement Code (BSC) impose the following requirements on all Current Transformer (CT) metering systems:

- All new and replacement CT metering shall be Advanced Meters (see below in respect of Domestic)
- The requirements apply to all CT Domestic and Non-Domestic customers
- All CT PC5-8 (not PCI-4) Advanced Meters shall be half hourly settled, although PCI-4 can also be settled half hourly *This is a material change from the earlier draft of this document.*
- All CT metering systems shall have an Advanced Meter fitted by the end of December 2020
- Advanced Meters are half hour meters with working communications to obtain half hourly data

This document focuses only on CT metering systems. The document is intended for Meter Operators but may be of interest to other stakeholders.

2 Context

The recent industry focus has been on SLC12.17 which referred to customers with Profile Class (PC) 5-8 supported by the BSC Modification P272¹ deadlines for half hourly settlement of Advanced Meters by 1st April 2017. The PC5-8 SLC apply to CT & whole current metering systems. Although the SLC are much broader than just the PC5-8 requirements, the requirements apply to *all* CT metering systems, with an overarching requirement for full deployment of Advanced Meters at all CT metering systems to be complete by end of December 2020.

Some analysis in 2016 identified that just under 1% of metering systems were CT metering systems.

The following is my understanding of the Licence & BSC obligations around Advance Meters for CT metering systems, which I have sought to confirm with Ofgem, BEIS and ELEXON, through earlier draft, who have not disagreed. At the time of writing Ofgem, BEIS or ELEXON have not issued their own guidance on interpretation of the SLC & BSC, although feedback for members confirmed that this would be beneficial.

¹ www.elexon.co.uk/change/releases/p272-mandatory-half-hourly-settlement-profile-classes-5-8/

3 Licence Conditions

The SLC 12 paragraphs introduced from 2009 added many sections. See Appendix A for a relevant extract. These have existed for many years so should not be a surprise to any stakeholder. Progress was noted in 2013².

SLC12.27 requires **all** CT installations to have an Advanced Meter fitted by the end of 2020, subject to the 'reasonable steps' clause in SLC12.29 & SLC12.22.

SLC12.23 requires all new and replacement meters in Designated Premises to be fitted with an Advanced Meter from April 2014. The definition of Designated Premises is slightly strange as it refers to PCI-4, but despite this Ofgem have confirmed it is seeking to cover all non-domestic customers, as defined in the Licence. There has been ambiguity about mixed domestic and non-domestic use (single supplies to farms & farm houses, pubs with landlord use in a flat, etc.), so this may have been trying to be very clear as to applying to everything non-domestic (as per Licence definition), even if the Profile Class allocated under the BSC is incorrect.

SLC12.25 requires all new and replacement CT meters at Domestic Premises to be fitted as an Advanced Meter from a date determined by the Secretary of State. I have been seeking advice from Ofgem and BEIS what date, if any, has been set. The current view is that it is not thought to have been set, but Ofgem are in discussion with BEIS to enable a formal response/notification. It is worth noting the discussion with BEIS representative made the comment: "why is the industry not proceeding anyway?". The SLC12.27 is clear that they should all be fitted by end of 2020, so the sooner it is commenced the more chance of compliance with the SLC by the end of 2020 completion deadline.

SLC12.28 then requires the half hourly data to be made available to customers (domestic and non-domestic), this is an extension of the facilities already available to customers with existing Advanced Meters³.

The definition of an Advanced Meter in SLC12.19 is that a half hourly meter is fitted with working communications to obtain the half hourly data (not just register reads). So, where there are no working communications, the arrangement does not meet the requirement in the BSC to be required to be settled on a half hourly basis. This has resulted in the BSC regarding sites without working communications as 'out of scope' of the P272 migration consideration. But these sites are being considered by Ofgem as to whether they meet the 'reasonable steps' requirements, if not, then Ofgem has powers for enforcement action on the Supplier. There would be nothing to stop a Supplier settling the site as half hourly with the data collector collecting half hourly data via a site visit, although this is typically more expensive and less reliable than working remote communications.

Ofgem Advanced Meter enforcement action has impacted E.On⁴, npower⁵ and British Gas⁶

² www.ofgem.gov.uk/publications-and-updates/roll-out-advanced-meters-larger-non-domestic-consumers

³ www.ofgem.gov.uk/publications-and-updates/advanced-electricity-meters-decision-letter-timely-access-data-larger-non-domestic-consumers

⁴ www.ofgem.gov.uk/publications-and-updates/investigation-e-s-compliance-its-obligations-under-electricity-supply-licence-standard-licence-condition-12

⁵ www.ofgem.gov.uk/publications-and-updates/investigation-npower-s-compliance-its-obligations-under-electricity-supply-licence-standard-licence-condition-12

⁶ www.ofgem.gov.uk/publications-and-updates/investigation-british-gas-compliance-its-obligations-under-electricity-supply-licence-standard-licence-condition-12

4 BSC

The BSC, section L para 2.2.2 (see Appendix B) describes the obligation with respect to metering equipment. As the P272 implementation date was 1st April 2017 to only effective sub paragraph is (c). So that where there is an obligation in the Supply Licence to install an Advanced Meter then the Advanced Meter shall be Half Hourly Metering Equipment. The changes to the BSC implemented by P272 is limited to only PC5-8 as the BSC definition of Advanced Meters fitted under the SLC is constrained to those fitted only under SLC12.18, i.e. PC5-8. *This is a material change from the earlier draft of this document.*

Where the SLC requires an Advanced Meter to be fitted as the result of the SLC, the BSC now requires PC5-8 to be immediately settled on a half hourly basis. The use of the term in 2.2.2 (c) Half Hourly Metering Equipment is used in the same way as in 2.2.1 to indicate the distinction between NHH & HH settlement.

Therefore, all new CT metering installations should be fitted with an Advanced Meter with working communications and PC5-8 must be settled on a half hourly basis from the energisation date, but PCI-4 there is no mandate but equally nothing to stop them settled on a half hourly basis.

It is also worth noting that 2.1 puts an obligation on the Registrant "...shall ensure that Metering Equipment is ...installed ... maintained and operated subject to the provisions of this Section...". So once an Advance Meter is installed it should be maintained (i.e. working as an Advanced Meter) and operated (i.e. as a half hourly metering system).

As the context of this discussion is CT Metering Systems, the following Measurement Classes are relevant⁷. Measurement class C & E are site specific and relevant for any CT (domestic & non-domestic) customers, above and below 100kW respectively. Measurement class F is aggregated half hourly data which may be used for below 100kW CT domestic customer. The distinction for below 100kW domestic customers was necessary to enable the aggregated DUoS charges for below 100kW customers to be applied on a common basis between CT and whole current domestic customers.

Measurement Class	Description
C	HH metered in 100kW Premises
E	Half Hourly Metering Equipment at below 100kW Premises with current transformer
F	Half Hourly Metering Equipment at below 100kW Premises with current transformer or whole current, and at Domestic Premises

5 Technology

Advance Meters and their associated communications are an established technology. There are over 250,000 Advanced Meters registered and settled on a half hourly basis within the BSC arrangements already, which between them account for about half the energy volume within settlement⁸. There is no technical or systems constraint to progressing with installation of more Advanced Meters.

Where there is CT metering required, in recent years, any new or replacement meter will be a half hourly capable meter fitted even if the intention is to only obtain register reads. The only addition work for compliance with the SLC is the requirement to fit communication equipment. Fitting communication equipment will increase costs and will lead on to ongoing regular costs for use of the communications capability. SLC12.28 then requires the Supplier to facilitate the customer to have access to the data. The BSC then requires PC5-8 (not PCI-4) metering system to be settled on a half hourly basis.

⁷ www.elexon.co.uk/guidance-note/change-measurement-class-change-profile-class/

⁸ www.elexon.co.uk/about/industry-insights/bsc-trading-operations-reports/ Trading Operations Report sections 10.01 & 11.01

Smart metering is designed for the tens of millions of whole current (up to 100 amp/phase) metering systems. The expectation is that no meter manufacturer will develop a cost effective smart meter which meets the SMETS requirement for a CT metering arrangement. The requirement to fit a contactor capable of switching more than 100 amps per phase is a significant cost/risk for a comparatively small market. DCC have also advised that they have no current plans to make their communications infrastructure available for Advanced Meters.

6 The types of customer

From a practical perspective, the types of customers which are increasingly brought into scope of the SLC, include:

Large non-domestic premise – these are no different from the PC5-8 customers cohort who have been notified of the requirements over many years.

Large domestic premise – there are CT installations for large domestic premises, which may have loads over the nominal 70kW, to support air conditioning, swimming pools, saunas, etc. Some of these customers will already be half hourly metered with communications, which is an Advanced Meter. If the maximum demand is over 100kW the BSC has always required these customers to be half hourly settled. Where there are no existing communications, then adding communications is minimal additional effort.

Single, two or split phase with loads over 100amp per phase – these installations may include remote rural premises where conventional multi-phase whole current is not available. The load may be off peak heating or farming uses, such as grain dryers. In these cases, to support the load a large single phase (e.g. 200amp, single phase is c. 40kW), supply may have been provided, which may result in a single-phase CT metering system. Two (or split) phases supplies may have two separate single-phase CT meters, which will not support the netting of microgeneration. These types of installations may be the most difficult to identify within industry systems.

7 Customer reaction

Some customers have not been willing to have an Advanced Meter during the P272 activity. This reluctance is likely to continue with some of these CT customers. However, the only practical meter to be fitted to a CT installation is an Advanced Meter, the broader reluctance may have come from the half hourly settlement. The creation of Measurement Class F provides a simpler settlement approach for below 100kW domestic CT Advanced Meters.

SLC12.29 & SLC12.22 are a conventional ‘all reasonable steps’ clause, although Ofgem have traditionally been reluctant to advise of use of this clause as they view that the Supplier needs to justify any exception. However, as all new and replacement meters must be Advanced Meters and all CT meters must be Advanced Meters by end of 2020 then new CT installations should be settled half hourly from the initial connection.

8 Export

The SLC is really focused on import metering systems. The BSC requires any installed generation equipment with a capacity which exceeds the “Small Scale Third Party Generating Plant Limit”, current set at 30kW, to be settled on a half hourly basis. The CT export metering system (which is the same metering equipment) is not *required* to be settled half hourly unless the generation exceeds the 30kW threshold, although the marginal extra cost for the export to settle on a half hourly basis is minimal, as the metering equipment and communications are already installed and working.

The BSCP514⁹ section 1.2 requires the same Meter Operator to be appointed to the import and the export MPANs associated with the same Metering Equipment. The definition of Metering Equipment includes the CTs, so this means in virtually all cases it will be the same Meter Operator for import & export MPANs.

9 High Voltage sites

Market information shows that there are high voltage sites (all PC5-8) which are not currently settled on a half hourly basis. These sites are all CT metering systems and by their nature can have a very high consumption. There does not seem any reason why these sites do not already have Advanced Meters (with working communications) and should therefore be settled on a half hourly basis.

10 What does this all mean for Meter Operators?

In accordance with the SLC requirements all the CT metering installations should have half hourly metering with communications fitted by the end of 2020 – that is less than three years away.

10.1 Common understanding

Feedback indicates that not all industry stakeholders have a common view of the SLC/BSC requirements for CT metering systems. Therefore, there are requests to fit new meters to CT premises, without communications. Under the SLC fitting a new or replacement meter at a CT installation should include fitting communications and for PC5-8 metering systems they should then be settled on a half hourly basis.

10.2 Resources

Meter Operator companies are under pressure to resource the smart meter roll-out and staff are being deployed to this activity. However, the skills required for CT metering are different, and require specific training and expertise. It is therefore necessary to retain, and develop, a CT metering workforce to deal with the CT metering systems. The Advanced Meter deadlines and the smart meter deadlines are similar causing a potential conflict of resources.

10.3 Migration plans

The feedback from AMO members indicates that a minority of members have an Advanced Meter roll-out plan agreed with Suppliers, others are starting to develop plans. There are tens of thousands of meters which are required to either have Advanced Meters fitted or communications fitted to existing half hourly metering. There are also remaining PC5-8 metering systems that require to be migrated to half hourly settlement.

10.4 Change of Measurement Class

Many PC5-8 customers have questioned the need for installation of Advanced Meters and have sought to avoid the installations. The arguments for CT installations is different as the engineering of the arrangement determines that an Advanced Meter is the only suitable metering arrangement. The direction of travel of the Ofgem market wide half hourly settlement is likely to impact CT Advanced Meters which are larger consuming sites. There are different arguments for PC5-8 whole current meters, that could be fitted with smart meters (and settled on a half hourly basis).

⁹ www.elexon.co.uk/bsc-and-codes/bsc-related-documents/bscps/

10.5 New connections

New CT metering systems should have an Advanced fitted from the initial energisation date and settled on a half hourly basis. The rationale is that Advanced Meters can register maximum demand and so BSCP516¹⁰ section 4.1.2 procedure 5 would require the application of PC5-8. But all PC5-8 should be half hourly settled.

10.6 Identification of CT premises

The industry records of CT metering systems are not robust. There was an exercise some years ago where Meter Operators provided information to Distributors of the CT metered sites. Since then some Distributors have improved their records. At that time at least one Meter Operator found it difficult to identify Domestic customers with CT metering due to different asset databases. It may be appropriate to repeat this exercise. Some analysis in 2016 identified about 255,000 or 0.8% of metering systems were CT metering systems. It is believed that this estimate is too low.

Sending staff to fit a whole current smart meter on a CT installation is a waste of effort and an aborted visit is frustrating for the customer. As the smart meter roll-out progresses, the sites with unrecorded CTs will be identified. Companies need to ensure a robust process is enabled to correctly resolve them correctly, rather than they remain on the 'too hard' list.

10.7 Old meters

Some of the existing non-half hourly CT meters may be very old. Some historic planned replacement meter processes may have identified these meters in the past as due for replacement, then realised they are CT (possibly only when attending the premises due to poor records), then the meter replacement may have been aborted and added to the 'too hard' list. As such, the existing metering may not actually be fit for its current purpose.

10.8 Single phase CT installation

Many historic installations in single phase installations will not be installed to today's technical requirements. The CTs may be simply looped around the tails and wired directly into the CT meter. To comply with the BSC metering CoPs and MOCOPA, there is a need for the Distributor to visit and fit a new CT panel, with Test Terminal Block. In some cases, fitting a new CT panel may be challenging due to space considerations, etc. This will also require completion of the BSC commissioning requirements. In some cases, the installation may be constrained on space and/or need the customer's electrician to make changes to the electrical installation. It is anticipated that these changes may take an extended period to resolve, hence the value of early planning and customer engagement.

10.9 Whether a CT installation is still required

As with the 'large whole current' meters¹¹ it would be wise to confirm if there is still a need for the CT installation prior to perpetuating the CT arrangement. Some of the arrangements may have been fitted as CT installations due to off peak electric heating in non-gas areas where these installations have been replaced by other forms of heating, or large starting current motors which have been replaced/removed. There may also now be three phase supplies available to the premise. In these cases, the existing CT arrangement might be replaced with a conventional single or three phase smart whole current metering arrangement, with the

¹⁰ www.elexon.co.uk/bsc-and-codes/bsc-related-documents/bscps/

¹¹ www.meteroperators.org.uk/member-area/information-for-members see guidance 'large whole current meters' (AMO login required)

cut-fuse downgraded to 100amp/phase. Where there is time switch or similar control of the off-peak load, then alternative arrangements for off-peak control will be required.

11 On-going activity

1. Ofgem to confirm whether the date described in SLC12.25 has been set, if not when it will be determined. [Dec 2017 – Ofgem in discussion with BEIS, which is expected to lead to an ‘open letter’ clarifying expectations]
2. Meter Operators should develop, with their Suppliers, a roll-out plan for the CT sites to meet the December 2020 deadline. It is suggested that this plan should reflect on the difficulties identified in the PC5-8 roll-out and should recognise that it may have separate Ofgem enforcement on Suppliers from the smart meter activity
3. Meter Operators should ensure all new and replacement meters are Advanced Meters. New meters should be settled on a half hourly basis
4. Consider any plans for monitoring of progress by Ofgem or ELEXON, building on the experience of the Advanced Meter & P272 deployment [Dec 2017 – AMO will discuss with ELEXON & Ofgem]
5. Meter Operators will discuss further at their meeting on 1st Feb 2018 whether there is value in a further data cleansing exercise to identify the remaining NHH CT metering systems [Added to HH AMO EMF agenda for 1st Feb 2018]
6. Distributors are preparing numbers of CT metering systems in each region. [Dec 2018 – expected to be available in Jan 2018]
7. The Ofgem SCR half hourly market wide mandate DWG is considering steps towards market wide, which would naturally include the mandate of half hourly settlement of all CT metering.

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Number	Status	Date of issue	Reason for change
1.0	Issue	5 Jan 2018	Issue incorporating material change to reflect the BSC Advanced meter definition
0.2	Draft	7 Dec 2017	Draft revised as result of comments from MRR
0.1	Draft	9 Nov 2017	Draft circulated with MRR for comment

Appendix A - Standard Licence Conditions

Standard Licence Conditions are available from the Ofgem website¹².

Advanced meters for Non-Domestic Premises

12.17 This paragraph has effect on and after 6 April 2009 and applies where the licensee installs or arranges for the installation of an Electricity Meter at Non-Domestic Premises where the metering point falls within profile class 5, 6, 7 or 8 as defined in the Balancing and Settlement Code (for this condition only, “relevant premises”).

12.18 If paragraph 12.17 applies, the Electricity Meter installed at the relevant premises must be an advanced meter.

12.19 For the purposes of this condition, an advanced meter is an Electricity Meter that, either on its own or with an ancillary device, and in compliance with the requirements of any relevant Industry Code:

(a) provides measured electricity consumption data for multiple time periods, and is able to provide such data for at least half-hourly time periods; and

(b) is able to provide the licensee with remote access to such data.

12.20 The licensee must ensure that a Customer supplied with electricity at relevant premises through an advanced meter, or that Customer’s nominated agent, has timely access, on request, to the data provided by that meter.

12.21 As from 6 April 2014, the licensee must not supply electricity to any relevant premises other than through an advanced meter.

12.22 The prohibition imposed by paragraph 12.21 does not apply where the licensee is unable to install or arrange for the installation of any advanced meter at the relevant premises in question despite taking all reasonable steps to do so.

Advanced meters – Designated Premises

12.23 This paragraph has effect on and after 6 April 2014 and applies where the licensee installs or arranges for the installation of a Current Transformer Electricity Meter at any Designated Premises.

12.24 If paragraph 12.23 applies, the Current Transformer Electricity Meter installed or arranged to be installed at the Designated Premises must be an advanced meter.

Advanced meters – Domestic Premises

12.25 This paragraph has effect from the date specified by the Secretary of State in a direction issued to the licensee under this paragraph and applies where the licensee installs or arranges for the installation of a Current Transformer Electricity Meter at any Domestic Premises.

12.26 If paragraph 12.25 applies, the Current Transformer Electricity Meter installed or arranged to be installed at the Domestic Premises must be an advanced meter

¹² www.ofgem.gov.uk/licences-codes-and-standards/licences/licence-conditions

Current Transformer Electricity Meters from 2021

12.27 After 31 December 2020, the licensee must not supply electricity to any Designated Premises or Domestic Premises through a Current Transformer Electricity Meter which is not also an advanced meter.

Customer Access to Data

12.28 The licensee must ensure that a Customer supplied with electricity at Designated Premises or Domestic Premises through an advanced meter, or that Customer's nominated agent, has timely access, on request, to the data provided by that meter.

Exception

12.29 The prohibition imposed by paragraph 12.27 does not apply where the licensee is unable to install or arrange for the installation of an advanced meter at the Designated Premises or the Domestic Premises in question despite taking all reasonable steps to do so.

Applicable definitions

Current Transformer Electricity Meter	Means an Electricity Meter which uses a current transformer as part of the mechanism for measuring the electric current;
Designated Premises	means Non-Domestic Premises at which a metering point falls within profile class 1, 2, 3 or 4 as defined in the Balancing and Settlement Code on 30 November 2012
Domestic Customer	means a Customer supplied or requiring to be supplied with electricity at Domestic Premises but excludes such Customer insofar as he is supplied or requires to be supplied at premises other than Domestic Premises;
Domestic Premises	has the meaning given in and is to be interpreted in accordance with standard condition 6 (Classification of premises);
Electricity Meter	means a meter which conforms to the requirements of paragraph 2 of Schedule 7 to the Act and is of an appropriate type for measuring the quantity of electricity supplied
Non-Domestic Customer	means a Customer who is not a Domestic Customer

Appendix B – BSC

The Balancing and Settlement Code, section L was modified by P272 & P322¹³. Since the P272 implementation Date is now passed, 2.2.2 para (a) & (b) have no real impact, this is the current text¹⁴:

2.1 Registrant responsibilities

2.1.1 The Registrant of each Metering System shall ensure that Metering Equipment is:

- (a) installed and commissioned (if not already installed and commissioned), and
- (b) maintained and operated,

for the purposes described in paragraph 1.1.2 in accordance with and subject to the provisions of this Section L and in accordance with the relevant Code of Practice.

2.2 Type of Metering Equipment

2.2.1 The Metering Equipment to be installed:

- (a) in the case of a CVA Metering System, shall be Half Hourly Metering Equipment;
- (b) in the case of a SVA Metering System which is 100kW Metering System, shall be Half Hourly Metering Equipment;
- (c) in the case of a SVA Metering System associated with any Third Party Generating Plant, except in the case of a Small Scale Third Party Generating Plant, shall be Half Hourly Metering Equipment;
- (d) in the case of a SVA Metering System other than as provided in paragraphs (b),
(c) and 2.2.2 shall be Half Hourly Metering Equipment or Non-Half Hourly Metering Equipment as the Registrant shall choose.

2.2.2 Where a Supplier is under an obligation in its Supply Licence to install an Advanced Meter at a premises and/or supply electricity to a premises through an Advanced Meter then:

- (a) prior to 5 November 2015 the Advanced Meter shall, for the purposes of the Code, be deemed to be either Half Hourly Metering Equipment or Non-Half Hourly Metering Equipment as the Registrant shall choose (subject always to paragraph 2.2.1(b));
- (b) subject always to paragraph 2.2.2(c), as from 5 November 2015:
 - (i) within 45 Business Days of the effective date of either a change of Supplier or a Contract Renewal (subject to the approval of the Performance Assurance Board pursuant to Section Z8.3), the Advanced Meter shall be Half Hourly Metering Equipment;
 - (ii) in all other cases, the Advanced Meter shall, for the purposes of the Code, be deemed to be either Half Hourly Metering Equipment or Non-Half Hourly Metering Equipment as the Registrant shall choose (subject always to paragraph 2.2.1(b) and Section Z8.3);
- (c) as from the P272 Implementation Date the Advanced Meter shall be Half Hourly Metering Equipment.

¹³ www.elexon.co.uk/change/releases/p272-mandatory-half-hourly-settlement-profile-classes-5-8/

¹⁴ www.elexon.co.uk/bsc-and-codes/balancing-settlement-code/bsc-sections/

Applicable definitions

Advanced Meter	means Metering Equipment installed in accordance with the obligation set out in condition 12.18 of the Standard Conditions of each Supply Licence;
Half Hourly Metering Equipment	means Metering Equipment which provides measurements on a half hourly basis for Settlement purposes;
Metering Equipment	means Meters, measurement transformers (voltage, current or combination units), metering protection equipment including alarms, circuitry, associated Communications Equipment and Outstations and wiring;
P272 Implementation Date	means the Relevant Implementation Date for Modification Proposal P272; [set as 1 st April 2017]
Settlement	means the determination and settlement of amounts payable in respect of Trading Charges (including Reconciliation Charges) in accordance with the Code (including where the context admits Volume Allocation);