

SmartAMI Meter Definition and Guidance for the Non-Household Market

There is currently a lack of consistency in what constitutes a 'smart' water meter. This paper aims to:

- Provide an enhanced version of the definition of a smart meter originally included in [CPW123 'Improved Codes for Remote Read Type'](#), building on feedback from the Metering Committee and responses to the [CPW142 'Wholesaler Smart Meter Reads'](#) consultation. .
- Provide explanatory guidance to draw a distinction between data captured by Automatic Meter Reading (AMR) meters and 'Smart' Advanced Metering Infrastructure (AMI) ('SmartAMI') meters.
- Provide the configuration of technical solutions and guidance on how the remote read type should be used in CMOS.

This paper also provides a supporting document to the change [CPW142 Wholesaler smart meter reads](#).

The SmartAMI meter definition and supplementary requirements are set out in the box below and additional information and guidance on SmartAMI meter and AMR meter definitions and configurations is provided on the following pages.

This document was developed with and approved by the Metering Committee in December 2023.

SmartAMI definition

A meter installation is SmartAMI (advanced meter infrastructure) where meter read data is captured from a meter using a fixed network radio infrastructure (smart metering). The radio infrastructure can be either a private or public network such as cellular communications. The maximum period between planned data collection events is an hour.

Supplementary requirements

The meter installation and smart metering system is able to provide data in accordance with [the specification for granular consumption data](#).

A water meter should only be classified as SmartAMI in CMOS when it has been commissioned and proven able to provide at least a minimum level of performance as defined by the wholesaler for their smart metering programme.

Wholesalers will provide assurance that the reading on the physical meter register is the same as the reading taken by the smart metering system both at the time of commissioning and during the life of the meter.

Smart meter and AMR definitions and configurations

Introduction

In 2021 Ofwat approved a change of definitions for remote meter read types as set out in [CPW123: Improved codes for 'remote read type'](#).

This document sets out the definitions for traditional, AMR and SmartAMI as follows:

- **Traditional:** a meter that cannot be read remotely.
Automatic Meter Reading (AMR): data is captured from a water meter using 'walk-by' or 'drive-by' methods, with an electronic interface unit near the meter (typically within 10 metres).
- **SmartAMI:** a meter installation is SmartAMI (Advanced Meter Infrastructure) where meter read data is captured from a meter using a fixed network radio infrastructure (smart metering). The radio infrastructure can be either a private or public network such as cellular communications. The maximum period between planned data collection events is an hour.

Data capture for enhanced metering technology

Automatic Meter Reading (AMR)

An AMR water meter requires a mobile device to be brought near the meter to capture data from the meter using a short-range radio interface. This mobile device can be hand-held to facilitate 'walk-by' meter readings or mounted in or on a vehicle for 'drive-by' readings.

Standard data capture

In 'standard' or 'normal' mode an AMR sends a package of data that includes the meter reading, the meter's serial number and any alarms that have been set to identify readings below, or above, a certain level. AMR meter reading works in one of two ways:

- **Continuous messaging** where the meter sends a message at intervals of (typically) 15 seconds. As a mobile device moves past the meter, it will capture one of these messages.
- **Continuous listening** where the meter is listening for a prompt to send a message. As a mobile device moves past the meter it repeatedly sends a broadcast signal for AMR meters to send its data. Any meters in range send messages which are captured by the mobile device.

Enhanced data capture – AMR meters typically also hold a wide range of additional data. This can include: granular consumption data at hourly or 15-minute intervals for up to a month; a daily meter reading at a set time each day; alarms such as leak, tamper alerts, backflow and other similar data.

However, the data capture process is more involved and requires a meter reader to spend two to 10 minutes to use a special data capture process and download the data. There could be circumstances where a meter reading agency designs and implements a manually based AMR reading process to regularly capture granular consumption data over the life of a meter (i.e. typically 15 years). In these situations the meter installation could be considered as SmartAMI.

SmartAMI

Smart/AMI meters are connected permanently to a fixed network radio communication system.

The arrangements for sending data over a fixed network are set up to manage the challenge of providing a complete data set (i.e., a meter reading every hour or 15 minutes), while minimising the draw on the meter's internal battery.

Data capture is managed by the vendor's 'head-end' system, which controls the flow of data over the fixed network and captures the data in a vendor's Data Management System (DMS).

Data is usually transferred to the client once or twice a day in batches. The data includes: the AMI meter's serial number; a date/time stamp; the meter reading (in litres) and any alarms that have been set.

Smart metering configurations

Meter configurations

Unlike smart energy meters, a truly 'smart' meter for the water industry does not exist.

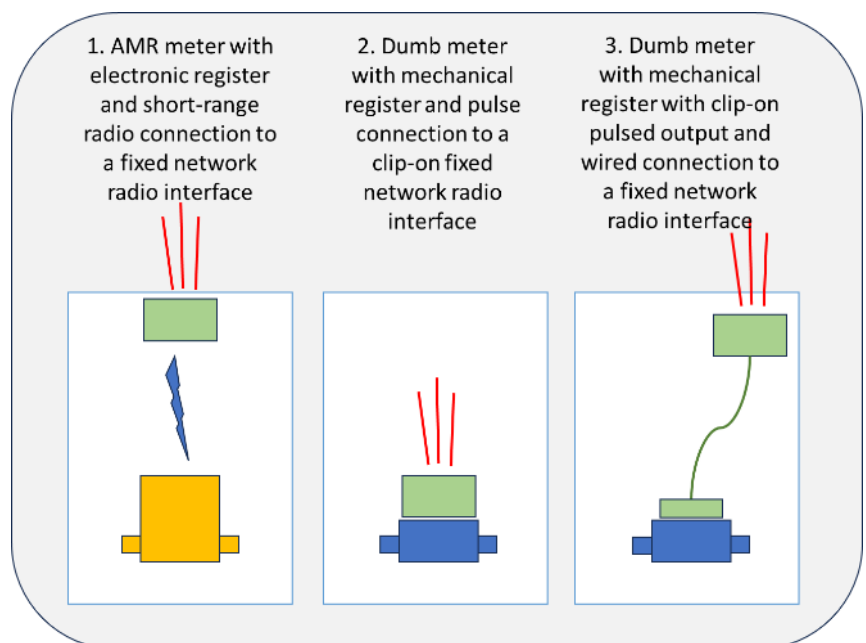
The meter in a smart metering system (be it a SmartAMI meter or a traditional/AMR meter that has been upgraded using add-on technology) is only 'smart' when part of a system that meets certain criteria, e.g. measurement frequency, distance over which data is transmitted, use of data, etc.

All water meter suppliers have developed smart water metering solutions using existing traditional or AMR meters.

In each case, additional devices are fitted to the meter or near to it, to enable communication with a fixed network system.

The typical configurations are as shown in the diagram (right). In all configurations a separate battery powered fixed network radio interface is used to convert a traditional or AMR meter into a smart metering solution. This device has both an interface with the meter to capture consumption data and a separate interface to the fixed network system so that data can be transmitted over the fixed network. The key differences are how this device is installed and how it accesses data from the meter.

Configuration 1 - this solution uses an AMR meter incorporating an electronic register and built-in short-range radio. The fixed network radio interface is installed near the meter and uses the short-range radio to capture a meter reading at regular intervals, i.e. hourly. The meter reading, as shown on the meter register, will always be the same as the reading taken by smart metering system.



Configuration 2 – the fixed network radio interface is clipped on to a traditional meter. It has a magnetic or optical pulse counter to capture consumption from the meter. In addition, the clip-on device could be a camera reader.

Configuration 3 – the meter has a magnetic or optical clip-on pulse counter installed and the fixed network radio interface is connected by wire to the pulse counter.

In configurations 2 and 3 there are two potential opportunities for different readings. Firstly, if the reading on the meter is not entered into the fixed network radio interface correctly at commissioning and, secondly, if there is 'drift' in the readings during the life of the meter.

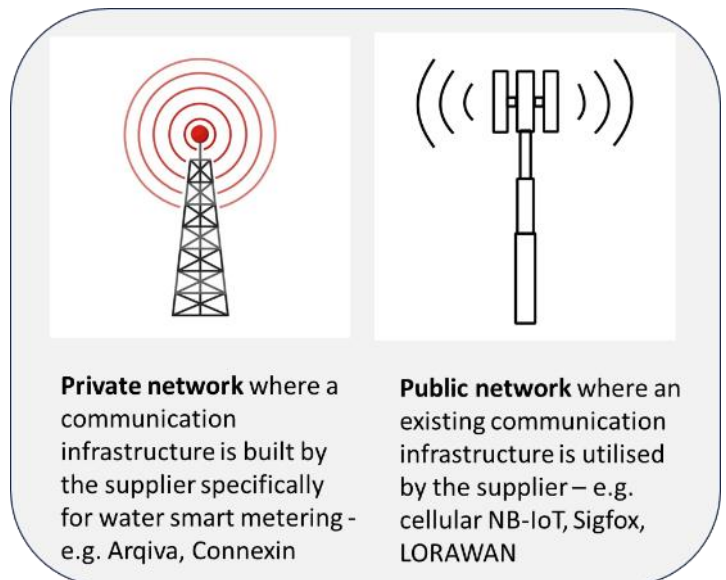
It is recommended that the market should satisfy itself that wholesalers are testing the performance of meters and making the results available where there is evidence of drift between meter register and smart reading.

Fixed network communication configurations

Two fixed network communication configurations are currently being used for water smart metering:

Private networks which are designed, located and operated specifically for water smart metering. These tend to be more expensive but are suited to areas with higher property density, give better data capture performance and can be managed to maximise meter battery life.

Public network which utilises an existing (usually cell based) infrastructure and have a cost advantage in areas of lower property density but are undergoing development to improve data capture performance and meter battery life.



When to classify a meter as SmartAMI in CMOS

As a wholesaler rolls out a smart metering programme a process is required for when the meters is defined as SmartAMI in CMOS.

For a market eligible meter, where a wholesaler installs, owns and maintains a SmartAMI meter installation as part of the change proposal CPW142 'Wholesaler smart meter reads' they will be responsible for providing a meter reading into CMOS on a monthly basis.

A SmartAMI meter would only be designated as such in CMOS once it is connected to the fixed radio network and properly tested and working correctly. Until that time, it will continue to operate and be considered a traditional or AMR meter in CMOS.

A water meter should only be classified as 'smart' (SmartAMI) in CMOS when it has been **commissioned** and proven able to provide at least a minimum level of performance as defined by the wholesaler for their smart metering programme. As an example, one wholesaler is currently using this definition as the

meter can provide at least 22 reads per day for a continuous period of 7 days (based on hourly meter readings).

It is recommended the market revisits this commissioning levels of performance as adoption of smart meters increases and experience improves. Any meter not achieving this level of performance should be designated as traditional or AMR as appropriate.

Wholesalers should also provide assurance that the reading on the physical meter register is the same as the reading taken by the smart metering system both at the time of commissioning and during the life of the meter.

In **operational use** it would be expected that communication performance for some meters could drop below the commissioning level of performance for a period of time. However, it is recommended that once a meter is classified as SmartAMI in CMOS it should remain at that classification. The use of a bilateral should be considered by retailers to report meters that they consider are not providing a suitable level of performance and wholesalers should investigate and remedy as appropriate.

It is recommended this classification should be built into CPW142: Wholesaler smart meter reads to ensure that only when a meter is designated SmartAMI in CMOS would the responsibility for meter reading change from the retailer to the wholesaler.

When not to classify a meter as SmartAMI in CMOS

There are some devices that may be labelled as smart-enabled that shouldn't be classified as SmartAMI in CMOS. These include devices:

- That record consumption such as some loggers and monitors but where the consumption is not tied back to a meter reading.
- Where the accuracy of the smart metering reading cannot be assured against the reading on the meter register.
- That record consumption but cannot provide data in accordance with [the data specification for granular consumption data](#). A key reason could be that that is not provided in discrete hourly or 15-minute intervals starting at 00:00 hours.