

Interview with Vic Tuffen: smart metering

Wiring Matters interviews the author of the IET's Guide to Metering Systems: Specification, Installation and Use on the ins and outs of smart metering.

What is the size of the metering market in the UK and how much is it expected to grow?

It is not an exaggeration to say that the potential metering market in the UK is probably as big as it is ever going to be. That is because the UK has started the replacement of all the electricity and gas primary meters with smart meters. There are about 26 million electricity meters and 23 million gas meters to be changed in homes and small businesses across the UK and the replacement is planned to be completed by the end of 2020. This has had a gradual start but over the next 18 months it will ramp up to meet the targets. At the same time there are several hundreds of thousands of larger commercial and industrial installations of various sizes and configurations that are also being changed for advanced systems. These provide the same facilities as smart meters but in a way that is more business focused.



In addition to that, there is a growing market in the installation of secondary and check meters. Businesses are becoming acutely aware of the need to monitor and control their energy use. Being able to more accurately establish how much energy is being used is essential if a process of targeting and monitoring is adopted to manage energy savings. This can be done by the strategic use of secondary meters.

There is also a growing market for heat and water meters. More and more people are using water meters instead of relying on the rateable value of their house to govern their water costs and the interest in District Heating Schemes has created a growing demand for heat meters.

What is the difference between Smart Meters and the types of meters that used to be installed?

The way in which the amount of electricity used is measured is the same in a smart meter as it is in a normal solid state whole current electricity meter. Where smart meters differ is that they have been designed to provide additional functionality. Of course smart meters will provide near real-time information on how you are using both gas and electricity in your home. In-home displays use a variety of means of showing this information in a graphical way but the upshot is you can see how much you have used and how much it has cost and it will show comparisons with other time periods. In some cases it will give you a warning if you are using comparatively high amounts of energy which should encourage you to review your usage.

Another benefit that we are already beginning to see is the introduction of new tariffs. For example, your cost of energy may differ depending on what time of day you use it or, indeed, what day it is being used.

One of the key requirements for smart meters is the ability to communicate remotely, with information and instructions being passed both to and from the meter. This has enabled the introduction of automatic meter reading which will mean that meters do not have to be manually read any more and should spell the end of estimated meter readings. It will also mean that customers will be able to switch between traditional credit tariffs and a new pay-as-you-go one because the meter can be

switched to pre-payment mode remotely. In addition, the inclusion of a valve in each gas meter does mean that with all the appropriate precautions, it is possible to isolate a meter remotely.

Smart meters are manufactured to meet the Smart Metering Equipment Technical Specifications (SMETS). Meters that are currently being installed meet the SMETS1 requirements. It is hoped that the introduction of smart meters will make supplier switching easier but this is dependent on the equipment meeting the requirements of interoperability. This is a cornerstone of the SMETS2 requirements and will ensure that if a consumer switches, the new supplier will be able to adopt the smart meter equipment seamlessly in their home, irrespective of who has manufactured it.

This is one of the key differences between SMETS1 and SMETS2 meters. As SMETS1 meters have not been designed to communicate with the new smart metering systems, they prescribe communication methods which are particular to the suppliers who are using them which can mean that they are not interoperable.

How will the Smart Metering System work?

The construction of the national infrastructure and organisation for the smart metering system is now nearing completion. The next milestone is in the middle March when full SMETS2 functionality is expected to be available. This will enable the installation of SMETS2 meters. The infrastructure can be split into two discreet areas: the Home Area Network (HAN) and the Smart Meter Wide Area Network (SM WAN).

The Data Communications Company (DCC) was established to enable the development and implementation of the Communication Service Providers (CSP) in three regional bands and the Data Services Provider (DSP). The DCC system users are the energy suppliers, electricity and gas networks and other authorised system users who purchase data services from the DCC. Using this network the system users can get data from the HANs (like meter readings or pre-payment fees) and in turn send data to the HANs like tariff changes or software updates.

The HAN comprises of the Communications Hub which is supplied by the DCC and provides the communications functionality in the home for the SM WAN and acts as a type of wireless router for the HAN. The HAN also includes the smart electricity meter, smart gas meter and in-home display. The HAN uses the Zigbee communications protocol to link the smart equipment elements together. This enables the smart meters to provide usage data to the IHD.

Does an electrician need any special skills/training to install an electric meter?

Where secondary meters are being installed all electrical wiring must comply with the latest edition of BS 7671, so meters must be installed by people who are suitably qualified and experienced. Primary meters can only be installed by trained operatives employed by companies who are approved under the Meter Operators Code of Practice Agreement (MOCOPA). This gives them the authority to remove the Distribution Network's cut-out prior to working on the meter and resealing it on completion, with a unique and traceable seal. There is a specific training course for smart meter installers which results in them gaining an NVQ level 2 qualification.

How can regular meters work with learning thermometers (such as Nest)?

The smart meter HAN uses the Zigbee protocol as its communication platform and essentially creates a new private wireless network within your home. One of the main challenges to the development program has been the sensitivity about security of the data and the system. As a result, the smart metering systems have been designed to be very secure and only approved devices can be connected to the network. Whilst the plan was always to allow customer provided devices to be connected, at the time of writing, this is not yet possible but may be in the future.

The current crop of smart heating controls like NEST or HIVE use different communications platforms so whilst they will easily connect to your mobile phone and heating system they will not connect or directly interact with the smart meter systems.

Is it worth having both installed?

Yes, definitely. Of course they have different functions and work independently but using them together does actually provide what we call closed loop control. It's a bit like driving your car. When you press the accelerator you see the effect on the speedometer and the fuel gauge. With your smart heating controller you can make a change to the settings on your heating system using your mobile phone and soon afterwards you will see the effect on your energy use on your in-home display.

Do you see further developments in the technology of meters in the next five years?

In my opinion the most significant and far reaching changes, in many aspects of the way we live our lives and do business, will be the increasing prevalence and importance of the Internet of Things (IoT). I can't foresee any further technological developments particularly in metering over the next few years but the desire to further expand the levels of technology connectivity shows no signs of abating.

Anybody who has an Amazon Echo will know that more and more applications become available every week and it won't be long before I will be able to ask it how much electricity I have used this morning and how much it cost and perhaps whether I could have got it cheaper from another supplier. Maybe within the next five years Alexa will also switch suppliers for me!

For further information please find the previous Wiring Matters article on [smart meters](#).

For a more in-depth look at metering the IET's [Guide to Metering Systems](#) is available to purchase.



Guide to Metering Systems

