SMART metering for the Diocese of London

Contents

Summary

Introduction
   The Diocese of London’s estate
   Occupancy and uses
   Metering
   Profile Classes
   Gas supplies

Existing metering types
   Gas
   Electricity

What is SMART metering?

Types of SMART metering
   AMR Devices
   Mandatory Half Hourly (HH) meters
   Elective Half Hourly (EHH) meters
   SMETS meters

Pros and cons of SMART metering

SMART metering roll-out
   Government roll-out scheme

SMART metering infrastructure
   Mandatory HH metering and P272
   SMETS1 enrolment into the DCC network
SMART metering communication
   In-house displays (IHDs)
   Mobile Apps

Size and appearance
   Technical points on installation

Security of data

Government departments, agencies and companies
   Department for Business, Energy & Industrial Strategy (BEIS)
   OFGEM
   District Network Operator (DNO)
   Energy suppliers
   Data Communications Company (DCC)
   SMSO (SMART Metering Service Operator)
   Meter Operator (MOP) and Data Aggregator/Data Collector (DA/DC)

SMART metering policy and legislation
   Ownership and responsibility

Costs of smart metering
   OFGEM regulation - DCP161
   DCP228

Renewable energy
   Feed-in Tariff, changes from April 2019

‘Internet of Things’

Conclusions

Frequently asked questions
   Will SMART Metering cost me money?
   Can I change supplier with a SMART meter?
   Are SMART meters safe?
   How long will my SMART meter last?

Terms and definitions
   Types of meters
   SMART meters
   Abbreviations and acronyms
Summary
SMART metering is any metering system which measures consumption of gas and/or electricity every half an hour (HH metering), and communicates remotely with suppliers and/or customers, for purposes of billing and/or monitoring, without need for manual meter readings.

This has the benefit of enabling users better to monitor, control and hopefully to reduce their consumption and costs.

SMART metering for larger users (known as Maximum Demand) has already been rolled out, in the form of HH Advanced Meters.

SMART metering is currently being rolled out for smaller users (including most churches) with a view to giving every customer the opportunity to have SMART metering installed and in operation, free of extra charge, by the end of 2020.

In addition, older SMART meters which were unable to continue operating in SMART mode after a change of supplier are either being replaced with the latest generation of SMART meters (known as SMETS2), or else they are remaining while being enrolled in the newer secure infrastructure. This is to enable SMART functioning to be restored, and to remain inter-operable in future.

Introduction
The Diocese of London’s estate
The Diocese’s estate consists of a large number of properties, ranging in size from those with small domestic energy supplies to more energy intensive users (churches, schools etc).

Buildings may have a mixture of electricity, gas or other fuels such as heating oil, whereas some may only have electricity meeting all their energy needs for heating, lighting, cooking and hot water.

The purpose of this report is to provide guidance on the metering solutions in place, how SMART metering is to be delivered and what changes are being made in the industry to support this roll-out.

Occupancy and uses
The estate comprises around 480 churches (serving 500+ Sunday congregations), a further 480 church halls, 400+ residences as well as 150 schools.

This means there is a wide range of occupancy times and uses, as well as a range of responsible parties.

Churches and associated schools and halls have a variety of uses throughout the week, hosting activities and community groups.
**Metering**
An estate as diverse as the Diocese of London will have a variety of metering solutions installed across the portfolio.

Typically a Church may have 1-3 meters installed, each serving a different part of the property (vestry, hall, parish office etc).

Some meters will require manual reading; these may be known as traditional, ‘Non Half Hourly’ (NHH) or ‘dumb’ metering.

Other meters will transmit the meter readings automatically and some will be capable of recording consumption at Half-Hour intervals (HH) (various solutions and collectively known as SMART metering).

Whilst you may not be directly responsible for the metering solution within your premises, you can still be active in using the data from the meter to ensure that energy is used at the correct times and kept to a minimum.

**Profile Classes**
Each supply point, or meter, within the portfolio will fall into one of the categories of either domestic, SME (small or medium-sized enterprise/micro business) or a Larger Consuming supply.

Historically these categories will have been defined using a profile class for electricity, with each meter falling into a class dependent on consumption.

- Profile Classes are detailed as the first 2 digits on your MPAN (The 21 digit number denoted with an S on your bill – see Figure 1 below).
- Profile Classes 01 to 04 are domestic to small businesses and will come under the government SMART metering rollout plan currently underway (more details below).
- Profile Classes 05 to 08 for major consumption of electricity are covered by the P272 legislation, to ensure that a form of SMART metering is in place (again more details below). 05-08 profile meters that were part of the P272 protocol (see below) changed profile class to be 00, as part of the process.
- Existing 00 profiles are the previously existing 100kW Maximum Demand sites, ie very large consuming meters. Remote collection of HH data and reads has been in place for these supplies for many years.

*Figure 1: Example of MPAN Number*
Gas supplies
Gas has also been defined by consumption, but does not use profile classes. These supplies will be based on the annual consumption of a site. For the purposes of the SMART metering roll-out, a site consuming less than 73,200 kWh gas per year is included in the government roll-out scheme. (Further details of the scheme below.)

Existing metering types
The current metering solutions for each supply point will generally vary depending on the consumption requirements of the site.

Gas
Gas supplies will have either a traditional meter installed, for manual reading, or a form of first generation SMART meter known as an AMR (Automated Meter Reading).

A site may have one or more meters for gas and electricity. These guidelines are per meter and do not combine the consumption at a site.

Electricity
Electricity metering is more complex and varied. Over previous years, various metering solutions have been rolled out by suppliers, mandated by the government or initiated by consumers.

Your electricity meter may currently be a traditional meter. Or it may already be one of the following SMART meter types:

- An AMR meter (Automated Meter Reading);
- An HH remote meter (Advanced Meter), if the meter has a consumption demand of more than 100,000 kWh per year;
- A version of a SMETS meter (Smart Metering Equipment Standards), including SMET1 and SMETS2 types.

An Advanced Meter is really a type of AMR. See Terms and definitions: Types of SMART meters, below.
What is SMART metering?

A SMART meter is an electronic device that records consumption of electricity and gas and communicates the information to the energy supplier for monitoring and billing.

Types of SMART metering

This includes the following types:

AMR Devices

Automated meter reading (AMR) devices were the first generation of SMART meters installed.

Versions have been used both for gas and for electricity. They are all due to be replaced with SMETS2 meters (see below).

Mandatory Half Hourly (HH) meters

Also known as Advanced Meters, this type of metering is in place for larger consuming sites where it is mandatory for suppliers to obtain consumption half-hourly.

Suppliers use this data for more accuracy when paying for the electricity they provide to consumers (settlement charges).

This type applies to electricity only.

Elective Half Hourly (EHH) meters

This is where a form of SMART metering is in place for smaller supplies that can provide HH data, and the supplier ‘elects’ to use it for accurate billing and settlement purposes. This also applies to electricity only.

SMETS meters

These include first and second generation SMETS meters (known as SMETS1 and SMETS2).

These are types of metering that are capable of recording half-hourly (HH) data but not mandatory for suppliers to collect and use the data, although they will collect readings from these meters for billing purposes.

This technology can be used in its simplest form to collect meter readings remotely, allowing for accurate billing without the requirement of a manual meter reader or customer meter reading. Additional functionality allows for the recording of consumption every half an hour.

Suppliers will also be able to use the SMART meter infrastructure to remotely control and diagnose issues, such as network problems, meter tampering and power cuts etc.

Consumers can choose to use the HH data for their own purposes. This can be displayed on an In-house Display (IHD) or on the suppliers’ website or mobile phone /app, enabling the consumer to monitor consumption in real time.
This permits the management of consumption and the ability to react to anomalies or unexplained variations. These types of meters can be for either gas or electricity.

It is further intended that it will also be used eventually to provide ‘SMART tariffs’, where the cost of energy is lower for use at off peak times.

**Pros and cons of SMART metering**

There are many positive aspects of installing SMART metering. SMART metering should help with accurate and easy reporting, and with improving efficiency – managing and hopefully reducing consumption.

The key to being able to control costs starts is being able to see what is being consumed at any given time, allowing for a real time reaction to any anomalous consumption. Invoicing based on actual consumption with no annual reconciliation means more control over the financial aspect of your energy supplies, and removes the requirement for manual meter readings to be taken.

As the SMART metering network develops, it is hoped that energy suppliers will be able to harness the technology to offer different tariffs for different times of the day. Imagine receiving a message to inform you that if you use your energy at a certain time of day, you will be subject to a cheaper pricing structure.

Additionally with the inevitable rise of electric vehicles, where non-rapid charging is sufficient, eg while parking vehicles on the owner’s premises overnight, SMART meters will be able to switch on and off the auxiliary loads associated with the charging ports, ensuring that the vehicle is charged at the cheapest time of the day.

Thus, the technologies under development within the energy industry for SMART meter consumers will revolutionise the way that we consume and pay for our energy.

It has been widely reported across the media that SMART meters will stop functioning if you change supplier. It is true that to date, the first generations of SMART meter may lose SMART functionality on a change of supplier. However this is to change between 2019 and the end of 2020, during which time energy suppliers are to carry out remote upgrades to SMETS1 devices to make them inter-operable – meaning you can change supplier without losing functionality.

It is also worth noting that whilst the meters may lose SMART functionality and therefore the ability to communicate remotely, the meter itself will still operate and record consumption in ‘dumb mode’. The customer will be required to submit meter readings or for a meter reader to attend the site.

The installation of these first generation SMART meters ended on 15th March 2019. Any meters installed after this date will be fully inter-operable across suppliers.

For further information on the enrolment of these meters into the DCC (Data Communications Company) Network, see ‘SMETS1 Enrolment into the DCC Network’ below. This will allow for any change of supplier in future.
SMART metering roll-out
It is envisaged that SMART metering that records consumption half-hourly will cover 98% of energy supplies, in one form or another by the end of 2020.

OFGEM (Office for Gas & Electricity Markets) have implemented several programmes over recent years, as follows.

Government roll-out scheme
The government wants energy suppliers to install SMART meters across England, Wales and Scotland, with the goal of every domestic and small business premise being offered a SMETS2 type SMART meter by the end of 2020. This covers both gas and electricity supplies.

The programme is run by the DCC (Data Communications Company).

As of the end of March 2019 there were 600k second generation meters (SMETS2) installed, mainly by the big 6 energy suppliers and circa 13 million first generation meters.

Installations of second generation meters are increasing week on week and it is envisaged that by the middle of 2019 over 300,000 will be fitted per week.

If you already have a first generation SMART meter that is no longer functioning as SMART, please see the section on SMETS1 Enrolment into the DCC network, below.

When you will be offered a SMART meter will be dependent on your supplier’s progress, but you can expect to be contacted within a few months.

For all qualifying supplies (domestic and SME) you will be contacted by your supplier to organise the installation of a SMART meter. You should ensure that when you agree to the installation it is at your convenience and you take into account any activity planned at your site (see Technical Points on Installation, below).

SMART metering infrastructure
The home or other premises contains the HAN – Home Area Network. It is over this micro network that the metering devices communicate with the communications hub in the home/business, as well as displaying data on any IHD (In-house Display).

The HAN communicates to the WAN – Wide Area Network through a central comms hub.

This is where the energy data is transferred to the Communications Service Provider (CSP). The CSP are a company who are responsible for transporting the data over the 4G network, or radio waves in the North of the country, to the Data Service Provider (DSP).

The DSP are a further company adding another level of security and checks on the data. It is at this point in the transfer back and forth of data that checks are done on the values, the validity and permissions of the parties etc. See security section below for more information on this. The DSP then pass the data to the supplier and network operators.
Mandatory HH metering and P272

If you have a site with a meter that is classed as a large consuming site then you most likely already have the benefit of HH metering.

In November 2015 a protocol was passed called P272, which mandates that Profile Class 05 to 08 meters, or Maximum Demand meters, are settled on the half hourly market. The amount of energy purchased from the generators needs to be monitored by the suppliers.

This means that you will see accurate bills. Normally your meter will transmit the data remotely. In some sites this may mean a manual download from a meter reader on a monthly basis (dependent on location of the site and meter).

Not only does P272 enable suppliers to balance the energy, but also it will also help you manage and use your energy smartly. It gives you the opportunity to see at which times of the day you consume the most energy and helps you receive a more accurate reading via the half hourly meter consumption – a more accurate settlement which could lead to better tariff rates.

Introducing the new regulations should be providing consumers with more understanding of electricity use, as well as resulting in networks ensuring they are sufficiently developed and maintained.

The P272 programme has been completed for all meters that can be included. Where a meter cannot be included for reasons of access or signal to the meter, then it will remain in traditional mode.

You will still see your existing profile class on your electricity bill, although these are now becoming obsolete. Your profile class will change to 00.

Meters installed under the P272 programme will not be part of the DCC SMART rollout and will continue to communicate in the same way they currently do via the Data Collector appointed. This can be a party appointed by your supplier on your behalf and paid for through our bills, or a direct contract you may have agreed.
SMETS1 enrolment into the DCC network

As referenced earlier in this report, there are two generations of SMETS meters. SMETS2 meters will be automatically enrolled in the DCC secure network. If a 01-04 Profile meter has an AMR (Automatic Meter Reader) it will be replaced with a SMETS2 meter.

The first generation of SMETS meters, however, known as SMETS1, predominantly employ a 3G network for communication through a SMSO (SMART Metering Service Operator). Each meter communicates directly and securely with the appointed SMSO. The SMSO is an agent appointed by the supplier.

In effect the data is sent via packets of data over the 3G network, via the owner of the SIM card. This has meant that when there is a change of supplier, the majority of SMETS1 meters can no longer function remotely. This is due to suppliers not having contractual arrangements with SMSO who ‘owns’ that particular SIM card.

There are approximately 11 million SMETS1 meters installed across the UK. These fall into two categories:

- If the SMETS1 has been installed by your current supplier and is communicating remotely it is classified as an ACTIVE meter;
- If the SMETS1 device has been installed by a previous supplier and is no longer communicating remotely, it is classified as a DORMANT meter.

You may find that although your meter is a SMART meter, you are not currently seeing the SMART benefits. This is a dormant meter and usually a result of having changed supplier. This is not to be confused with ‘dumb metering’ referred to earlier, which is traditional metering that has never been SMART enabled. ‘Dormant’ refers only to a SMART meter that is no longer communicating.

With such a high volume of SMETS1 devices installed, the industry have had to find a way to incorporate the SMETS1 meters into the DCC secure network. This plan is being finalised in early 2019, and the enrolment and adoption process is to begin in May 2019. The DCC will stage the enrolment of individual devices into three cohorts, and the process should be complete in line with the SMETS2 roll out, in December 2020.

This will happen ‘behind the scenes’ as far as consumers are concerned. There will be no physical changes or effect on supply. In effect Dormant meters will become Active and the benefits of SMART Metering will be in place.

The enrolment is only for SMETS1 eligible devices that are in the Profile Classes 01 to 04, and domestic/SME gas supplies. Electricity Profile Classes 05 to 08 are currently covered by the P272 legislation (see above) and for the most part have been upgraded to have some form of HH metering; these will now be Profile Class 00. Historic meters in Profile Class 00 are the over 100kW sites that have had the benefit of HH metering for many years.

There are also a small number of SMETS1 meters that will not be eligible to be enrolled into the DCC. This is because each device and combination of devices needs to be approved by BEIS. Those that are not eligible will require an exchange to a SMETS2 meter before the end of 2020.
**SMART metering communication**

The SMART metering system in a property consists of a Communications Hub (CH), Gas Proxy Function (GPF), Electricity device (ESME), a Gas device (GSME) where applicable and an In-House Display (IHD), again where applicable.

A SMART meter system can support up to 4 ESME and 1 GSME on one comms hub. The CH is the secure communication hub between the DCC to the devices and back again. This secure communication takes place across the HAN (Home Area Network) and the WAN (Wide Area Network).

The CH uses Zigbee (a form of low level digital communication similar to Bluetooth) to communicate over the HAN with the other devices in its SMART metering inventory. This includes the IHD which will give the consumer real time information on consumption and costs. Data is also transferred across the WAN, through the DCC secure network to the suppliers. Each step of the process is encrypted to a high security standard and is endorsed by the National Cyber Security Centre.

*Figure 3 – The HAN and WAN system*
In-house displays (IHDs)
As part of a supplier’s obligation to install SMART Metering, they are also obliged to offer an in-house display. This display will communicate over the HAN with your meters, providing a near real time view of your gas and electricity consumption in one place. This will allow you to manage your energy consumption at the time and take appropriate action.

Understanding when and how you are using energy is the key to reducing and controlling consumption. This only applies to domestic sites; suppliers have no obligation to offer an IHD for micro-business, although you can request one. If your site has not been offered an IHD as it does not qualify, you can request one and connect it yourself very simply (by pressing of buttons to pair the device to your HAN).

For larger consuming sites, HH data should be available from the supplier through the individual supplier's portal. There may be a small charge for this depending on the supplier.

Mobile Apps
Mobile Apps are already available from some suppliers and as the rollout continues these will become more interactive. At the moment they are basic and do not communicate with your actual SMART metering system. They can however display data and energy usage. There is no charge for the mobile apps in their current format.

Size and appearance
Smart meters are roughly the same size as your current meters and will be installed in the same place. Below is a gas meter on the right and electricity on the left. The small device is an IHD.

Figure 4 – SMART meters and IHDs
**Technical points on installation**

When having a SMART meter installed there are a few considerations.

For gas installations on domestic or SME supplies, the existing meter will be replaced. This will mean a short period of disconnection, typically less than 20 minutes. For larger consuming sites the installation will involve a logger being fitted to the existing meter. In these cases there is typically no disconnection period.

For electricity installations the requirement to disconnect will be dependent on the type of meter that you already have. Whole Current meters (WC) mean that the whole current is passed through the meter. This type of meter is typical and will require a short period of disconnection, again typically less than 20 minutes. Alternatively some of the larger SME supplies may have Current Transformer meters (CT). This means that the current is not passed through the meter itself but through a transformer. Therefore there is no shutdown required. This is not common though and your electricity supplier should be able to tell you this information when booking in to have a SMART installation.

If a period of disconnection is required you will need to consider the impact to your premises, such as security systems, broadband and boilers, all of which will be required to be reconnected or restarted. Additionally the time of the appointment will need to be considered around the daily activities at your premises, such as playgroups.

The location of the meters is also a consideration. Whilst the second generation meters may be able to create a Home Area Network (HAN) the HAN may not be able to communicate to the Wide Area Network (WAN) due to a lack of signal. This could be due to the position of a meter and the fabric of the building. Additional equipment such as aerials may be required to get the signal from the Comms hub to the WAN.

In late 2019 there will be a new release of comms hubs called ‘dual band’. These will allow for the signal to be boosted through either longer distances or through thicker walls (eg cellars). If your meter is placed in a crypt for example, you may wish to request the dual band comms hub available later in the programme.

**Security of data**

Government Communications Headquarters (GCHQ) have worked alongside the Department of Energy & Climate Change (DECC), now replaced by BEIS (Department for Business, Energy and Industrial Strategy), in order to ensure that the security of the SMART Metering System across the UK meets extremely high standards.

The commands to meters and the transfer of data across the network require several stages of cryptography. These are supported by the SMART Metering Key Infrastructure (SMKI) and DCC Key Infrastructure (DCCKI). Basically this is digital security that would take the most powerful of computers tens of thousands of years to decrypt. Additional categorization of Critical messages (those that can effect a supply) and anomaly detection within the DCC, further serve to minimize any potential threat to the security of the SMART Metering System by tracking any high levels of critical requests (such as a high number of disconnection requests). The security system is endorsed by the National Cyber Security Centre.
**Government departments, agencies and companies**

The government’s target for rolling out of smart meters nationwide by the end of 2020 is an ambitious one, and involves many parties:

**Department for Business, Energy & Industrial Strategy (BEIS)**

The Government has set the targets and established roles and responsibilities for the national roll-out of SMART meters.

The Department for Business, Energy & Industrial Strategy (BEIS) is leading and monitoring the roll-out. BEIS set out the standards for SMART Metering that suppliers must adhere to.

**OFGEM**

Ofgem will monitor and ensure that consumers are protected and suppliers adhere to the SMART Energy Code set out by the SEC panel (https://SMARTenergycodecompany.co.uk/).

**District Network Operator (DNO)**

This is the regional branch of the National Grid. In London the DNO is UK Power Networks (UKPN). They used to own and install the old-style meters.

The DNO, whilst not directly involved in the SMART roll out, will use and benefit from the data that meters will provide to remotely diagnose network issues.

They are responsible for network repairs and emergencies. If you suffer a power cut, the DNO is supposed to fix it. Whilst they are not involved in the roll-out, they are an interested party and will benefit from the data that will be available.

**Energy suppliers**

The energy suppliers are ultimately responsible for supplying and fitting SMART meters.

Suppliers are required to abide by the rules and regulations set out in the ‘SMART Metering Installation Code of Practice’ (SMICOP), including making sure people know how SMART meters work and how to control their data.

They also have to make sure that the SMART meters they supply meet government standards – the SMART Metering Equipment Technical Standards already referred to (SMETS).

**Data Communications Company (DCC)**

The Data Communications Company (DCC) has built and maintained the secure national infrastructure that underpins the roll-out of SMART meters across Great Britain.

This wireless network connects SMART meters to energy suppliers, network operators and other authorised service users.

The network is maintained to very high security standards (https://www.SMARTdcc.co.uk/about/).
**SMSO (SMART Metering Service Operator)**
Currently for 1st generation SMART meters there will be an SMSO appointed by your energy supplier.

During the enrolment of these meters into the DCC, the role of the SMSO will remain under a slightly different guise, as they will be contracted to the DCC, rather than individual suppliers. This is to ensure interoperability.

**Meter Operator (MOP) and Data Aggregator/Data Collector (DA/DC)**
These companies and contracts are primarily involved in HH metering for Maximum Demand premises (see 'Mandatory HH metering and P272', above). In such cases, a consumer can choose to use the suppliers preferred agent and pay for the services through invoices, or they can appoint their own and pay directly. Typical Meter Operator charges are around £300 per annum with DC/DA charges similar.

Whilst DCC sites will still have appointed Meter Operators (responsible for the meter themselves) and Data Collectors, the requirement for site visits are minimal as data is collected remotely for billing and diagnostics.

For the domestic/SME electricity and gas meters these roles will be decided by your energy supplier and paid for as part of your standing charge.

**SMART metering policy and legislation**

**Ownership and responsibility**
The SMART meters are the responsibility of the supplier. The meters are rented from a Meter Asset Provider (MAP). This agreement can transfer between suppliers.

The IHD remains the property of the supplier and will only work with the SMART meters to which it is associated, such is the security around the SMART metering eco-system.

However, the IHD’s ownership will transfer to each subsequent supplier. Therefore from now on there should be no issue with moving supplier, as is the fundamental function of the programme.

**Costs of smart metering**
For Domestic and SME premises there is no extra cost for SMART Metering as it is covered in your energy bills, the same way that traditional metering is currently. You should see no changes to the rates you pay. It is the supplier’s obligation to rollout and fund the SMART metering. The metering element, along with other costs of distribution and settlement etc are rolled into the standing charge.

A larger consuming site will also pay for metering through its energy supply contract, although you may see the charges for Meter operation (MOP), Data Communication (DC) and Data Aggregation (DA) broken down on the invoice in more detail.
OFGEM regulation - DCP161
As of 1st April 2018, DCP161 became effective. Introduced by Ofgem, this new regulation allows utility companies to charge a penalty rate when their non-domestic/non SME customers draw more power than expected. This only applies to Profile Class 00 (including meters that were previously Profile Class 05 to 08).

The purpose of DCP161 is to compensate DNOs (District Network Operators – UK Power Networks for London, others in other regions), for excess demand from the network. Every half-hourly meter should have an agreed capacity limit and this will be detailed on your invoice. This is the amount of power that is supplied to your local area and assigned to your meter. If you exceed this the DNO has to produce excess energy which incurs costs.

This legislation means that you will be charged for exceeding your available capacity. The easiest way to deal with this is to check your invoice for your assigned allowance and check if you are regularly exceeding this. If the answer is yes, you can apply to the DNO (usually through your supplier) to increase the amount assigned to your supply. In most cases this will be a paperwork exercise, but in very rare cases, where the network has assigned its full capability to other meters, there is none left ‘in the pot’. This would then require a quote from the DNO to upgrade the capability of the local network to satisfy your requirements.

DCP228
From 1st April 2018, the implementation of DCP228 means a change to Distribution Use of System (DUoS) charges which will affect all half-hourly (HH) electricity supplies.

The current scaling methodology is heavily weighted to peak periods (known as the red tier) typically falling between 4-7pm on weekdays. The change means charges will be more evenly distributed throughout the day, providing a more accurate reflection of demand.

DUoS charges are paid by the end user to the supplier, who will then pass them on to the relevant local Distribution Network Operator (DNO).

Renewable energy
SMART meter specifications mean that they are mandated to support export tariffs. In reality that functionality is not yet ready. This however should not prevent you from installing solar panels or other forms of renewable energy.

Feed-in Tariff, changes from April 2019
The government has ended the Feed-in-Tariff (FiT) for new installations of Solar Photovoltaic (PV) generation; as at 1 April 2019, there is some uncertainty of what if anything will replace the FiT. Outline plans presently favour individual agreements between the individual and their energy supplier.

The government has acknowledged that there has to be some benefit from excess generation being supplied to the National Grid System, from privately owned small generation PV systems. At present smaller PV schemes benefit from a 'Deemed Export' i.e. 50% of generation is deemed as going into the National Grid and therefore payments are made on this assumption. How this will be handled in future, and how any generation payments may be administered, are still unknown.
Energy suppliers will want to protect their own interests and those of their shareholders. As such any export payments will have to be metered, which may cause some level of a monopoly with larger suppliers able to fund solutions, which may be out of the reach of smaller suppliers. There is a risk this may result in those suppliers being unable to provide energy at a competitive rate to those requiring export payments.

‘Internet of Things’
The Internet of Things, or IOT, is an extension of the internet into your everyday physical devices. This could mean anything from your smart phone to heating controls.

As technology develops more and more of your home and business can be controlled automatically. Lighting and heating controls and automated doorbells are common place in homes these days. ‘Smart home’ devices such as Amazon Echo can control various devices across the home.

SMART metering data does not currently interact directly with the IOT. However your SMART meter can provide data to a Consumer Access Device (CAD) which can then talk to your device. This enables a communication device to receive data and push it out to other SMART devices in the home. By being a one-way communication this should avoid any compromise to data security.

Conclusions
SMART metering in one form or another is soon going to be offered and available to benefit your site, if it has not already. The DCC have mandated that all domestic and SME consumers are as a minimum offered a SMART meter twice by the end of 2020. Larger supplies are covered by SMART metering legislation already (P272).

Inevitably there will be some sites that cannot install a SMART meter due to specific issues at the site. Access to the current meter or communication issues due to location, may hinder the installation. But ultimately the suppliers will try their best to accommodate your installation.

For small users, how the data produced by SMART metering is used, and the benefits delivered, are up to you. If all you require is accurate billing this is the minimum it will deliver.

However embracing the technology and using it to reduce consumption and therefore costs is the best way to progress. It is estimated that savings based on behavior alone can reach 10% of consumption. But you need to know when and how you are using your energy, in order to make these changes.

Prices have increased year on year for over 20 years. The only way a consumer can reduce the expenditure is to control consumption.

There has been much negative press which is largely unfounded. The system is secure and beneficial to us all. The current network is well over 100 years old. Allowing an upgrade to a SMART network is in the best interests of all.
Frequently asked questions

Will SMART Metering cost me money?
It is a supplier’s responsibility to install SMART in profile class 01-04 metering and they should not charge you any up front fees for this. As part of your current tariff structure you will already pay for a metering element for meter operator charges and manual meter reading. This element will be diverted to pay for the SMART metering.

Can I change supplier with a SMART meter?
If you currently have a first generation SMART meter you will lose functionality if you change supplier. You will still be able to see consumption on the IHD (In-house Display), but this will not reflect any new prices you are paying. However over the next 2 years (from 2019) these meters are to be enrolled to the DCC and be fully ‘inter-operable’, meaning you will be able to change supplier and keep the SMART functionality. All other types of metering, including the second generation of SMART meters allow for a change of supplier with no loss of functionality.

Are SMART meters safe?
SMART Meters use low level radio waves to communicate. Public Health England (PHE) have reviewed the evidence and concluded that exposure to these low level radio waves poses no health risks. SMART meters have gone through rigorous safety testing procedures, and exceed every UK and EU safety standard. PHE say that exposure to radio waves from SMART meters is well within guideline levels, and is many times lower than the exposure from Wi-Fi or mobile phones.

How long will my SMART meter last?
SMART meters are certified for a set period of time, usually ten years. After this time the SMART meter will to be replaced by your supplier. It is worth noting that traditional meters are also certified and need replacing after similar time periods, so this is no different. In the traditional world, after ten years a meter can be re-certified for a further ten years, as long as it is of a required standard. It is hoped that this is the case with SMART meters, however this has not yet been agreed.

Terms and definitions

Types of meters

*Traditional meter:* A standard meter with no remote communications. Requires manual meter readings.

For gas, a traditional meter may be measuring either in 100s of cubic feet (an ‘imperial meter’), or cubic metres (a ‘metric meter’).

For electricity, traditional meters include:
- WC Current Meter (electricity); the most common type of electricity meter;
- CT Current transformer electricity meter; less common, in which the current is passed through a transformer.
SMART meters

Automated Meter Reading: There are three different forms of AMR devices. These are:
- Embedded meters – where the remote reading device is integral to the meter;
- Data loggers – remote reading equipment provided by transporters on larger sites;
- Advanced meters – a remote reading device, connected to the meter; delivers mandatory HH metering under P272.

SMETS1 Meter: SMETS, which stands for ‘SMART Metering Equipment Technical Specifications’, is an industry standard. These meters have the SMART technology to be able to collect remote data as well as remote configuration and diagnostics. They communicate, usually over the 3G network, directly to the supplier. Currently SMETS1 meters do not support changing supplier (interoperability) but this is due to change in 2019. Please see ‘SMETS1 enrolment into the DCC network’, above.

SMETS2 Meter: The second generation of SMETS meters, these are similar to SMETS1 but will communicate through a centralised and secure network (DCC), supporting the change of supplier process.

Abbreviations and acronyms

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MEANING</th>
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<tbody>
<tr>
<td>3G, 4G, 5G</td>
<td>Generations of mobile telecommunications systems (5G yet to come)</td>
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<tr>
<td>Advanced Meters</td>
<td>Mandatory HH meter (under P272)</td>
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<tr>
<td>AMR</td>
<td>Automated meter reading</td>
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<tr>
<td>BEIS</td>
<td>Department for Business, Energy &amp; Industrial Strategy – (superseded DECC in 2017)</td>
</tr>
<tr>
<td>CAD</td>
<td>Consumer Access Device</td>
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<tr>
<td>CH</td>
<td>Communications (Comms) Hub</td>
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<tr>
<td>CSP</td>
<td>Communications Service Provider</td>
</tr>
<tr>
<td>CT</td>
<td>Current Transformer electricity meter</td>
</tr>
<tr>
<td>DC/DA companies</td>
<td>Data Collection/Data Aggregator companies</td>
</tr>
<tr>
<td>DCP161</td>
<td>A protocol to compensate DNOs for excess demand from the network</td>
</tr>
<tr>
<td>DCP228</td>
<td>A protocol for charging of HH metered supplies</td>
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<tr>
<td>DCC</td>
<td>Data Communications Company</td>
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<tr>
<td>DCCKI</td>
<td>DCC Key Infrastructure</td>
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<tr>
<td>DECC</td>
<td>Former Department of Energy &amp; Climate Change</td>
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<tr>
<td>DNO</td>
<td>District Network Operator – in London, UK Power Networks (UKPN)</td>
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<tr>
<td>DR Company</td>
<td>Data Retrieval Company</td>
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<tr>
<td>DSP</td>
<td>Data Service Provider</td>
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<tr>
<td>DUoS</td>
<td>Distribution Use of System charges – part of the structure of charging for HH metered supplies</td>
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<tr>
<td>EHH</td>
<td>Elective Half-Hourly (HH) metering</td>
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<tr>
<td>ESME</td>
<td>Electricity Smart Metering Equipment</td>
</tr>
<tr>
<td>FiT</td>
<td>Feed-in-Tariff for solar PV panels systems</td>
</tr>
<tr>
<td>GBHQ</td>
<td>Government Communications Headquarters</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>GSME</td>
<td>Gas Smart Metering Equipment</td>
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<tr>
<td>GPF</td>
<td>Gas Proxy Function</td>
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<tr>
<td>HH</td>
<td>Half hourly metering</td>
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<tr>
<td>HAN</td>
<td>Home Area Network</td>
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<tr>
<td>IHD</td>
<td>In-House Display</td>
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<tr>
<td>Internet of Things (IOT)</td>
<td>Smart connected devices controlled through the internet</td>
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<tr>
<td>MAP</td>
<td>Meter Asset Provider</td>
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<tr>
<td>MOP</td>
<td>Meter Operator (responsible for the physical meter)</td>
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<tr>
<td>MPAN number</td>
<td>Meter Point Administration Number</td>
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<tr>
<td>MPRN</td>
<td>Meter Point Reference Number</td>
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<tr>
<td>NCSC</td>
<td>National Cyber Security Centre</td>
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<tr>
<td>NHH</td>
<td>Non Half-Hourly metering (traditional ‘dumb’ metering)</td>
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<tr>
<td>Ofgem</td>
<td>Office of Gas and Electricity Markets</td>
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<tr>
<td>P272</td>
<td>A protocol requiring HH metering for larger supplies, moving 05-08 profiles to 00</td>
</tr>
<tr>
<td>Profile Class</td>
<td>The class of electricity supply, depending on consumption.</td>
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<tr>
<td>PV</td>
<td>Photovoltaics (the technology for generating electricity from light via solar PV panels)</td>
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<tr>
<td>SEC</td>
<td>SMART Energy Code Company (<a href="https://SMARTenergycodecompany.co.uk/">https://SMARTenergycodecompany.co.uk/</a>)</td>
</tr>
<tr>
<td>SEDC</td>
<td>SMART Energy Demand Coalition</td>
</tr>
<tr>
<td>SIM</td>
<td>The familiar card in any mobile phone</td>
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<tr>
<td>SMART metering</td>
<td>Any form of meter that records and transmits data remotely</td>
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<tr>
<td>SME</td>
<td>Small or medium-sized enterprise</td>
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<tr>
<td>SMETS1</td>
<td>SMART metering equipment technical specification 1 (gas and electricity)</td>
</tr>
<tr>
<td>SMETS2</td>
<td>SMART metering equipment technical specification 2 (also gas and electricity, but interoperable across suppliers)</td>
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<tr>
<td>SMICOP</td>
<td>The Smart Metering Installation Code of Practice</td>
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<tr>
<td>SMKI</td>
<td>SMART Metering Key Infrastructure</td>
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<tr>
<td>SMSO</td>
<td>SMART Metering Service Operator</td>
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<tr>
<td>UKPN</td>
<td>UK Power Networks (the DNO in London)</td>
</tr>
<tr>
<td>WAN</td>
<td>Wide Area Network</td>
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<tr>
<td>WC</td>
<td>Current Meter (traditional electricity meter)</td>
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<tr>
<td>Zigbee</td>
<td>A specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios.</td>
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