HOUSING PROFESSIONALS GUIDE TO SMART METERS

Version 1.3
Last update: 02/09/15

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INTRODUCTION

This guide and its contents has been created by Adecoe for social housing professionals, to aid understanding and decision making on involvement in the smart meter rollout.

Information has been extracted from the Ofgem Smarter Markets Programme website and Smart Energy GB, our work with meter asset providers and early engagement with housing professionals.

For more information on the smart meter roll out:

Ofgem Smarter Markets Programme

Smart Energy GB

Data Communications Company

For more information on Adecoe's smart metering and related activities, contact:

Nicholas Doyle
Nicholasdoyle@adecoe.co.uk
07792 730360

Ellie Horwitch-Smith
elliehorwitchsmith@adecoe.co.uk
07834 506792

OVERVIEW

Why smart meters?

Smart meters are the next generation of gas and electricity meters and they offer a range of intelligent functions. This includes telling you how much energy is being used through an In Home Display (IHD). They can also communicate directly with an energy supplier which means that no one will need to come and read the meter.

Smart meters offer a range of benefits for consumers. They:

- Give near real time information on energy use
- Allow better energy management (thereby help save money and reduce carbon emissions)
- Will mean consumers get accurate bills and only be billed for the energy actually used.

Roll out timescales

Smart meters will be rolled out as standard across the country by 2020. But there will not be a legal obligation on individuals to have one.

The Smart meter roll out is being managed by the Department for Energy and Climate Change (DECC) and rules are being set to ensure that energy suppliers roll out smart meters in a way that is in the interests of consumers. For example, rules around:

- Data access and privacy
- Security
- Technical standards for smart metering equipment
- Meeting the needs of vulnerable consumers
- Specific timescales for individual projects in social housing are likely to be based upon:
- Stakeholder engagement
- Size of portfolio of meters to be exchanged
- Geographic coverage
- Supply chain commitment and lead times etc.

Supplier commitments

Large energy suppliers (with over 250,000 electricity or gas customers) are required to submit their annual Smart meter roll out plans to DECC by January each year. The roll out plans are binding and enforceable by DECC and financial penalties will apply where an energy supplier fails to deliver their roll out target.

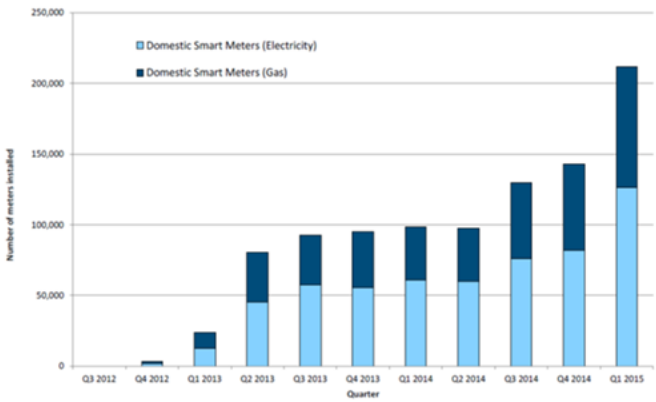
Smaller energy suppliers will be required to submit annual roll out plans from January 2016 but these plans will not be binding or legally enforceable. The 2020 target is however legally binding irrespective of size of energy supplier.

Current scale of installs

Quarterly statistical releases are published on the number of smart meters installed as part of the national roll-out. These can be found at *https://www.gov.uk/government/collections/smart-meters-statistics*.

The following extract from the latest quarterly report shows the number of smart electricity and gas meters installed per quarter up to 31st March 2015 (Q1 2015). Over 1 million smart meters have now been installed in domestic properties across Great Britain up to 31st March 2015 by the large energy suppliers. A little under 1 million of these smart meters are operating in 'smart mode' i.e. remote communication between customer and supplier, representing 2 per cent of the domestic meters in operation.

Figure 1 – Number of smart meters installed by the larger energy suppliers i domestic properties, by fuel type and quarter



We are currently within the foundation stage of the smart metering roll out. Based on volume alone, British Gas are presently the main installer of smart meters; other energy suppliers have carried out project work and delivered at lower volumes, however as yet they have not committed their full portfolio for exchange.

TECHNOLOGY

Functionalities (core)

Broadly speaking both gas and electric smart meters act in the same way as the current "dumb" meters in that they measure the gas and electric in the same way. What makes them "smart" is that they communicate with a display in the home to provide the customer with usage indicators as well as communicating with the energy supplier for billing reads via a third party (the Data Communications Company or DCC).

A smart meter can also be 'switched' between credit and prepayment mode without any meter change. Customers can also more easily change tariff or energy supplier – the smart meter enables more direct dialogue between incumbent energy supplier and customer.

What gets installed? What it looks like.

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Smart meters communicate in the follow ways:

- A supplier/meter provider installs a smart electricity and gas meter, a Communications Hub and an In Home Display (IHD).
- These communicate with each other via a Home Area Network (HAN). The HAN will also allow smart meter connection with other smart devices - 'Consumer Access Devices' or CADs. These CADs may include an online equivalent of an In Home Display.
- Energy suppliers are required to make energy consumption and tariff information available to the consumer via the HAN (i.e. via the IHD).
- The Communications Hub is connected to a Wide Area Network (WAN) which allows for two-way communication supplier/consumer via the DCC.

The size and dimensions of smart meters are no different to the current dumb ones so when the exchange takes place the meters replace the current ones in the same location with very little or no changes to the surrounding areas or meter housing (e.g. meter boxes).

The IHD above can come in various forms however the pictured example above gives usage information on both gas and electricity as well as indicators for excess usage to assist the customer on energy reductions and cost savings.

SMETS1 and SMETS2 – differences, timescales, compatibility

SMETS (Smart Metering Equipment Technical Specifications) is the agreed meter architecture for the Smart meter roll out. SMETS1 is the first stage design and provides consistency through the early stage of the roll out. SMETS2 is the upcoming agreed architecture which is expected to be released in 2016. The main difference between SMETS1 and SMETS2 (as stated by DECC) is the functionality to support smart grids. This includes some data communication differences (particularly relevant in terms of data access, explained below) which could impact energy supplier adoption strategies when a consumer switches supplier.

The SMETS2 Home Area Network will be based on the ZigBee open communication standard – SMETS1 is based on an unspecified communication standard. All SMETS2 equipment must gain certification to the ZigBee communication standard to allow automatic enrolment in the DCC. A certified products list will be maintained by the Smart Energy Code Panel **https://www.smartenergycodecompany.co.uk/home**

The DCC is due to 'go live' in April 2016. At this point SMETS2 will have been launched. The key principle of interoperability on which the smart meter roll out is based is very much focussed on the operations between SMETS2 meters, DCC and energy suppliers.

The Government's policy position is that DCC should assess how it could provide data and communications services for SMETS1 meters.

Section N of the Smart Energy Code sets out a requirement for DCC to prepare an Initial Enrolment Project Feasibility Report. This report will assess the feasibility, cost and risk of options for how DCC could provide data and communication services for SMETS1 smart meters in order to:

- Enable more efficient and effective operation
- Enable easier switching for customers with SMETS1 smart meters
- Reduce the risk of smart meters being replaced before the end of their operating lives.

Energy suppliers have been asked to put forward the SMETS1 meters they wish to be included in the scope of the first Initial Enrolment Project Feasibility Report. Feedback from suppliers is currently being reviewed and the DCC will then publish the timetable for producing the Initial Enrolment Project Feasibility Report.

Communication links for SMETS1 meters

The DCC will be launched in 2016. For smart meter systems installed prior to this date, energy suppliers will access smart meter data via a Smart Meter System Operator (SMSO). A SMSO will offer data and or communications services to energy suppliers on a commercial basis to ensure the consumer benefits of smart meters can be realised during the early stages of the smart meter roll out.

The installation of SMETS1 meters will be phased out when SMETS2 meters become available (phase out/ end date to be confirmed). SMETS1 shall continue to operate via the SMSO communications model with no impact or difference to the service to the end customer. The intention is that all SMETS compliant smart meter systems will migrate to the DCC after its launch (and therefore the services of an SMSO will become redundant) but the processes for migration and timescales are still being agreed and there are likely to be communication standards differences to resolve.

It is anticipated that most SMETS2 meters will be directly connected to the DCC at installation (from late 2016).

Communications Hub and connection to smart devices

The Communications Hub will be provided as part of the SMETS2 roll out. It provides the 'bridge' between devices in the home and the Wide Area Network which is the route for smart meter communications from/to the DCC.

The Communications Hub will be procured and owned by Communication Service Providers (CSPs). These CSPs will provide suppliers with Communication Hubs that comply with the technical specifications for their smart meter roll out – this provision is part of the Smart Energy Code, the multi-party contract which the DCC, suppliers and network operators are required to be party to and comply with.

Initially Communication Hubs will be based on a single band (2.4MHz solution).

The Communications Hub will be able to support up to 16 devices, 4 of which can be electricity meter devices (conventional and micro generation), one a gas meter and one a gas proxy device. There will also be up to 3 connections for Consumer Access Devices (CADs), which includes one In Home Display.

CADs might also include smart energy management solutions like an online In Home Display or other 'new' energy management solutions. They will be able to be 'paired' with the Communications Hub locally i.e. the consumer would enter information onto their meter or remotely e.g. via internet or call centre. For remote pairing, the provider of the CAD will need to be a DCC User e.g. an energy supplier, to enable the DCC to be used to initiate the pairing process.

The Communication Hub will also include connections for 2 prepayment meter interface devices (PPMIDs). PPMIDs allow emergency credit activation, can re-enable connection in the case of electricity disconnection (not gas) and will be able to display a range of prepayment data e.g. meter balance. Energy suppliers will optionally be able to provide consumers with PPMIDs.

For prepayment customers unable to connect to the Wide Area Network for top ups, they will be able to use a Transactional Reference Number.

Limitations on use of wireless HAN and WAN for smart meters

The initial wireless frequency at which the SMETS2 Home Area Network will operate is 2.4MHz which should allow 70% of GB to connect wirelessly to a Wide Area Network (WAN). The ambition is to operate by end of 2020 on a dual band solution of 2.4MHz and 868MHz which would allow 95% of households to connect wirelessly.

A dual band solution will only be provided in areas which are not fully covered by the 2.4MHz option (so there will be no need to 'upgrade' early installations).

Dual band meters are more expensive than single band so there is a clear commercial drive to minimise unnecessary deployment. The cost of running smart meter devices at dual band (particularly if you need to use a high power signal boost) is also higher – and this would be at the cost of the consumer as the power required is drawn through the electricity smart meter.

For the remaining 5% of households, an alternative (wired) solution will be required for the Home Area Network e.g. high rise flats.

There is ongoing consultation on what energy suppliers will do for households within this 5% - DECC currently proposes to develop a collective solution to reduce cost. This might include allowing smart meters to be installed without the full smart functionality but with a target date for the energy supplier to provide an alternative wired solution (possibly post 2020). It is important to note that accuracy of billing is one of the key issues for those in this 5% of households.

Prepay and credit options

Smart meters have the ability to be remotely changed from credit to pre-payment via a signal to close the gas valve within the gas meter or a signal to switch out the power to the electric meter. This removes issues relating to physically swapping out the meters where high levels of no access are recorded and also the legal costs associated with issuing and chasing warrants etc.

There are time saving benefits to both energy supplier and customer, plus flexibility for the current or future occupier of the property to use and pay for energy in a way which best suits their needs and situation.

Those selecting to use the prepayment method will have the ability to top up their meters via various payment methods, including smart phone apps, PayPal and more traditional routes like cash at PayPoint outlets. It is also expected that Smart prepayment customers will be able to access competitive energy deals like those available to direct debit customers.

Customer In-Home Display (IHD)

Customer education is key to the high level success of smart metering. An In-Home Display is a device with a screen that will show how much electricity and gas is being used at any time. It will also give some information about how electricity and gas has been used in the past.

Full technical specification details and functionalities for the IHD are available in the revised Smart Metering Equipment Technical Specifications, version 1.58.

The IHD is provided as part of a smart meter installation. In addition, the customer will receive training from the installer on how to interact with and operate the IHD, and literature will be provided for future reference.

DECC expects the average customer saving as a result of the Smart meter roll out to be £26 by 2020 even with the additional cost associated with the initial roll out, and consumption to fall by around 3% for electricity and 2% for gas as a result of greater access to energy consumption data[1].

[1] DECC Impact Assessment of Smart Meters, 2014

Reliability

At present there have been few issues with regards to mechanical breakdown of smart meters (their design and operating principles are based on the tried and tested current 'dumb' meters). Any faults detected in a correctly installed meter is the primary responsibility of the MAM or MOP. They will arrange via the installer to repair or replace and costs will be recovered via the manufacturer. Where damage is caused to the meter by another, the cost of repair is allocated to the incumbent energy supplier who may seek to recover repair or replacement costs from the customer at source.

Some early issues were experienced with data communication, for example interruption of the internal signal between the gas meter, the electric meter and the IHD. However risk reduction measures are being put in place by using boosters etc. and responsibility for this lies primarily with the DCC.

Data

What data is collected and how frequently?

Smart meters capture data on the amount of electricity and gas (where present) used every 30 minutes. Energy suppliers will be able to collect this data remotely but customers are able to choose how much, and how frequently, their energy data is collected.

SMETS2 includes a requirement for the electricity meter to store up to 24 months of daily consumption data. The Communications Hub will store the equivalent for gas. The DCC will not centralise the storage of any energy consumption data.

If a customer does nothing following a Smart meter installation, the energy supplier will by default collect a daily electricity and gas meter read.

Where a customer wishes to control the amount and frequency of energy data collection, they are able to select the frequency of data collection i.e. monthly, daily or half hourly and also how data is used. The options are:

- Energy supplier use only i.e. for billing purposes
- Energy supplier use for sales and marketing purposes e.g. to promote a new tariff or product
- Provision of data to other organisations e.g. social housing provider, switching sites

Where the energy supplier offers a customer an energy management product online or via their smart phone, it is likely this will come with a minimum data access agreement.

The absolute minimum a customer can opt to provide is monthly energy usage.

For more information, see *www.smartenergygb.org/what-are-smart-meters/what-smart-meters-do/data-safety*

How data is used

Energy consumption data collected by a Smart meter will primarily be used by an energy supplier for billing. Energy bills will be based on actual usage rather than estimate use. However, the collection and availability of actual energy consumption data (depending on what the customer opts to make available) presents other opportunities. For example

- Advice on best tariff (from the incumbent energy supplier)
- Tailored energy efficiency advice
- Energy use comparisons e.g. to similar properties in area
- Demand side response offerings e.g. tariffs tailored to energy use at non-peak times
- New products or tools to manage energy use (online or via smart phone apps)
- Marketing and sales based on energy consumption or patterns.

Data privacy and consumer protection are vital issues in the Smart meter roll out. Smart Energy GB is the national campaign for the Smart meter roll out and offers a source of information and advice for energy customers. *www.smartenergygb.org*.

Smart data opportunities for social housing providers

Smart meters not only present an opportunity to improve the consumer relationship with energy. Engagement in the smart meter roll out affords social housing providers the opportunity to mould smart meter services and immediate opportunities can be developed around the use of energy consumption data. This data could have immediate and longer term operational benefits. For example:

- Energy behaviour and consumption patterns
- Performance of property assets
- Operational support – voids, energy debt etc.
- Development of new or innovative energy services
- Build commercial knowledge of energy consumers
- Enable the development of 'smart homes'

We invite social housing providers to participate in the smart meter roll out and engage in our early development work. Our ambition is to create an approach that complements existing activities.

Who has access to data?

If a customer agrees that other organisations may access their energy consumption data, third parties may be provided access to individual customer data. The access to data may be via a number of routes and depends on whether the smart meter installed is prior to or after the full 'go live' for the DCC i.e. the point at which all smart meters installed are enrolled with the DCC on day of installation.

Prior to the full roll out of smart meters, linked to the date on which the DCC will be fully operational for new smart meter connections, it will be possible to access data via two routes – an energy supplier or the Smart Meter System Operator (SMSO) managing the data communications on behalf of the energy supplier.

There are multiple energy suppliers and SMSOs. When a customer changes energy supplier, there is no obligation on the new supplier to continue to use the incumbent SMSO. This means any data access arrangements made (with the consent of the customer) with the energy supplier who installed the smart meter, or currently operates it (or the SMSO appointed by that energy supplier) is only valid for as long as the customer stays with that energy supplier.

In reality, only a small proportion of social housing customers currently switch energy supplier. This may be because they are unaware of their ability to switch or they are unable to access information on how to switch, or interpret information presented on energy switching sites or by other energy companies. It is therefore probable that smart meters installed, and data arrangements made, with the initial energy company or SMSO for social housing smart meters will be valid up to the point at which the data communications transfer to the DCC, or a new option for data access emerges.

Once the DCC is accepting smart meter enrolment from all new smart meter installations, it will become possible to gain access to smart meter data independently of an energy supplier or their incumbent SMSO, for example directly via an interface with the DCC or via a Consumer Access Device (CAD) connected to the smart meter system.

Data access via the DCC or a CAD is likely to require signatory to the Smart Energy Code; a multi-party agreement which defines the rights and obligations of parties involved in the end to end management of smart metering in Great Britain; and associated security and privacy requirements. Other options that do not require signatory to the Smart Energy Code may also emerge.

Differences in data access for SMETS1 and SMETS2

There may be limitations on data access via the DCC or a CAD for SMETS1 meters as SMETS1 meters are unlikely to be enrolled with the DCC in the near term. There are also technology specification limitations as SMETS1 meters have only one CAD connection point which must be used by the In Home Display. Access to data from SMETS1 meters will therefore continue to be via an energy supplier or their SMSO until SMETS1 meter enrolment decisions are finalised.

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Energy suppliers have been asked to put forward the SMETS1 meters they wish to be included in the scope of the first Initial Enrolment Project Feasibility Report. This may mean not all SMETS1 meters installed in the foundation stage of the rollout will ultimately be enrolled in the DCC. Speculatively, this may be very early versions of SMETS1 meters – those currently being installed are likely to be those suppliers wish to take forward as long term assets.

METER EXCHANGE PROCESS

Smart meter financials

There should be no cost to a customer for exchanging an existing 'dumb' meter to a Smart meter.

Energy suppliers are only allowed to recover the cost of smart meter installations from across their entire customer base as part of their general tariffs. Supplier licence conditions restrict suppliers from creating bespoke tariffs that seek to recover costs from consumers, including the ability to obtain a derogation from licence conditions (a temporary exception).

One exception, which is limited because of the way in which supply licences are currently drafted, is the ability of a supplier to recover costs where a customer is offered a free smart meter installation which does not exceed minimum technical requirements, and turns this down in favour of equipment that exceeds the minimum requirements of the Smart Metering Equipment or In Home Display Technical Specifications.

In terms of the financing of a smart meter installation, energy suppliers do not generally own the meter assets. The contract for metering equipment is between a Meter Asset Manager or Meter Operator and an energy supplier. The Meter Asset Manager (MAM) or Meter Operator (MOP) provides (either directly or via a third party financier) the meter and associate meter assets, installs the meter and then sets up a rental agreement with an energy supplier to recover all costs including ongoing maintenance over a defined period, generally 15 years. The rental agreement switches when the energy supplier is switched by a customer. This is how the current 'dumb' meter infrastructure is provided.

The process for switching a meter

Installing a smart meter system is a pretty easy and quick process. A smart meter installer requires access to the existing meters and in most cases, will simply disconnect power (or gas supply) from the old meter, remove the old meter and replace and reconnect power and gas to the new smart meter.

The In Home Display (IHD) is connected to the electricity smart meter as part of the installation process and basic guidance is provided to the resident on its use and display features. The electricity smart meter (and gas smart meter via the electricity meter) communicates with the In Home Display through a wireless Home Area Network (HAN). The smart meter system communicates with the energy supplier via a Smart Meter System Operator or ultimately the Data Communications Company (once launched) through a wireless Wide Area Network (WAN).

A property does not need to have an existing wireless internet service to benefit from a smart meter – the Home Area Network required for smart meter communications is separate from home internet services and it is the responsibility of the energy supplier to provide a SMETS compliant connection as part of the smart meter installation.

The energy supplier for the property is responsible for all consumer energy supply communications and will most likely be the key point of contact for the smart meter installation appointment and any related questions pre and post installation. The energy supplier may also offer smart meter specific tariffs for gas and electricity and online tools or Apps to support better energy management.

In most cases, smart meters (like dumb meters) will not be owned by energy suppliers, but rented from a Meter Asset Provider (MAP). An energy supplier enters a rental agreement for each smart meter installed and this rental agreement moves as the customer switches energy supplier. It is a requirement in all energy supplier switches that the Meter Asset Provider is identified to the new/ incoming energy supplier so the meter rental agreement can be transferred.

Accreditations and standards for installs

For electric meters the installer must have a valid permit to operate from the relevant district network operator (DNO) as well as showing compliance to the Smart Metering Installation Code of Practice (SMICOP). For gas they must have a valid gas qualification to install domestic size meters such as CCN1, MET1 and comply with the SMICOP.

Lifetime meter responsibility – MAM and MOP role

MAM is the Meter Asset Manager and the primary duty is to manage and maintain the gas meter for its lifetime on behalf of the energy supplier. The energy supplier is billed directly for this service.

MOP is the Meter Operator and duties are the same as the MAM but for electricity meters.

The MAM and MOP have a legal responsibility to the energy supplier to maintain both Smart gas and electricity meters, and where the meters are faulty the MAM/ MOP shall repair or replace the meters. If the meters have been damaged or used in a way out with the manufacturer's recommendations then the energy supplier will be charged for any repairs or replacements

Customer engagement

The following documents should be produced by energy suppliers to support customer understanding and awareness of the smart meter rollout and what it means for them. See individual energy supplier websites for details.

- Difference between traditional and smart meters
- In Home Display – what it looks like and how to use it
- Prepay – how to top up, where to top up, emergency top up etc.
- Smart App (if available, maybe a summary of what different energy suppliers use)
- How to switch supplier
- Managing your energy use
- How data is used and your options

References

DECC Smart Meters
https://www.gov.uk/government/policies/helping-households-to-cut-their-energy-bills/supporting-pages/smart-meters

Ofgem **https://www.ofgem.gov.uk**

The Data Communications Company (DCC)
www.smartdcc.co.uk

Smart Meter Installation Code of Practice
http://www.energy-uk.org.uk/policy/smart-meters/smart-metering-installation-code-of-practice.html

Smart Energy GB **www.smartenergygb.org**