SMART METERING CONDITIONS FOR A SUCCESSFUL ROLL-OUT

Working Group report to the
All Party Parliamentary Group on Energy Costs.

July 2014

Contents

Working Group: Purpose, Terms of Reference and Members

The UK government is committed to a mass roll-out of smart meters in Great Britain starting in late 2015 and ending in 2020. The programme is more ambitious than the minimum requirements of European Directives, and this ambition is justified by the perceived benefits of the programme. The present value (PV)[1] cost of this programme is estimated at £10.9bn with expected savings of £17.1bn giving a Net Present Value[2] of £6.2bn. The general provision of smart meters to 80% of households is required by three European Directives, provided that the costs are justified by the benefits.

The roll-out requires changes to industry settlement systems and the codes that govern them, as well as systems used by energy suppliers[3] and the installation of meters at customer premises. Other equipment and changes to consumer goods may also be required to get the full benefit from smart meters. In 2011 the Public Accounts Committee described the challenges associated with roll-out as huge[4]. The purpose of the working group is to produce a report that will assist and guide policy-makers to respond to questions and take any necessary future decisions based on the best available evidence.

The Working Group

The Working Group is a sub-group of the All Party Parliamentary Group on Energy Costs (APPGEC). Full details at: http://www.publications.parliament.uk/pa/cm/cmallparty/register/energy-costs.htm . The secretariat to the APPGEC is provided by Royal Public Affairs: http://www.royalpa.co.uk/

The Working Group has an independent Chair and is made up of volunteers from the APPGEC members with an interest in this subject area. Those that have contributed to the work of the Working Group are listed in Annex 2.

Acknowledgement

This report would not have been possible without the kind support of Calvin Capital Ltd. http://www.calvincapital.com/index.php

[1] Present Value: the application of a discount rate to a stream of past and/or future costs and/or income to calculate a single value that would be equivalent if received or paid today
[2] The net result of the Present Values of costs and benefits
[3] Energy Suppliers: Entities that are licensed to sell gas and/or electricity to final consumers
[4] Public Accounts Committee Conclusions and recommendations (1.8) 63rd Report 14th December 2011

Executive Summary

Conclusion and Recommendations

The Public Accounts Committee noted in 2011 that there was a huge amount of work to be done to complete the mass roll-out by 2020.

Much of the preparatory work has now been completed and good progress has been made in defining the technical specifications for smart meters and the associated communications hubs. The Data Communications Company has been appointed, new licence conditions put in place and much of the Smart Energy Code is ready. The initial version of the Smart Meter Equipment Technical Specification (SMETS 1) was notified to the European Commission[5] in December 2012 and the next version (SMETS 2) is expected to be notified in September 2014. SMETS 2 is not anticipated to be substantially different from SMETS 1, so the technical specification is largely complete, and the smart meters installed to date should be broadly compatible with those installed during the mass roll-out, and capable of adoption by the Data Communications Company.

The number of smart meters installed to date is still relatively small in comparison to the number of traditional meters that still need to be replaced. Energy suppliers have been installing meters consistent with SMETS 1 since December 2012 (the Foundation Phase). Not all energy suppliers have installed significant numbers of smart meters, but some have made good use of the learning opportunity afforded by the Foundation Phase, and by the end of March 2014, nearly 350,000 smart meters had been installed.

The programme is broadly on track for completion by the end of 2020. However, some delay has been experienced to date and any further significant delay could result in missing the timetable.

The National Audit Office has recently confirmed that good progress has been made. However, some risks remain:

- the roll-out requires the provision and installation of a large number of meters in a five year period. Government needs to ensure there is no further delay in clarifying

[5] The technology specification mandated by the UK government must be notified to the European Commission in accordance with Article 8 of Directive 98/34/EC as amended by Directive 98/48/EC before it can become effective.

the technical specifications of smart metering equipment, so manufacturers can design, build and test the equipment and deliver a sufficient quantity of high quality equipment in a short period;

- manufacturers need financial commitment from energy suppliers at an early stage to ensure timely delivery of such a large quantity of meters.
- there can be no further delay if there is to be a realistic timetable for a roll-out that will maximise customer satisfaction with the service delivery;
- a robust and realistic delivery programme needs to be in place for the training, resourcing and logistic planning of the field support;
- the Government has appointed the Consumer Delivery Body to provide information to customers about the benefits of the smart metering programme. The Consumer Delivery Body has yet to openly engage with consumers. Active engagement with consumers needs to happen significantly in advance of the start of the mandated roll-out, so that consumers are fully informed and, hopefully, fully engaged with the smart metering programme and the benefits that it will bring for them;
- a technical solution for multi-occupation and other difficult premises also needs to be urgently resolved; and
- the Foundation Phase is an opportunity to gain much needed experience and perfect systems prior to the roll-out. It would seem that not all of the major energy suppliers have taken full advantage of this opportunity.

For consumers to be able to take full advantage of the possibilities created by smart meters, a degree of automation is likely to be required, within the context of a fully competitive market. For this to happen:

- the technology and systems must provide full communication coverage, data service functionality and interoperable working to enable a competitive market to flourish across Great Britain; and
- metering systems must allow for home automation and other added value services to be easily adopted directly by the domestic customer.

Provided that the risks are addressed in a timely manner and the final design of metering systems is sufficiently flexible to allow the growth of added value services, it is likely that the benefits set out in the DECC Impact Assessment will be achievable. The costs of the programme are well understood and controlled. This should ensure that the policy creates substantial net benefits for the GB consumer.

Policy background

The requirement to roll out smart meters to all households originally derives from European policy implementing single markets in electricity and gas. This was built upon in the Energy Efficiency Directive (Directive 2012/27/EU) which introduced the concept of "smart metering system" as "an electronic system that can measure energy consumption, providing more information than a conventional meter, and can transmit and receive data using a form of electronic communication". Smart meters must provide information about time of use, take account of energy efficiency and consumer benefits, and ensure security and privacy. They must also be capable of registering exports as well as imports of electricity and there is a requirement that metering data should be made available to the customer or nominated third party in a format that is easily understood.

The requirement to roll-out smart meters is dependent on an economic assessment of all the long-term costs and benefits to the market and individual consumer. The type of intelligent metering and the timeframe for the roll-out is a matter for member states. However, the target for implementation is to be no longer than 10 years; and at least 80% of consumers should be equipped with intelligent metering systems by 2020.

Smart grids are seen by the European Commission as vital to achieving the 2020 targets of a 20% reduction in greenhouse gas emissions from 1990 levels, 20% of EU energy consumption coming from renewable resources, and a 20% reduction in primary energy use compared to projected levels.

The rapid growth in the amount of highly dispersed and intermittent renewable generation will lead to a sea change in grid design. The delivery of power needs to be smarter because: (i) a lot of the generation will not be under central control, and possibly not even metered in real time; (ii) flows can be reversed; and (iii) consumer load management offers a potentially low cost means of balancing a system that is becoming increasingly difficult and costly to manage.

The UK Government has mandated a roll-out of smart metering through the Smart Metering Implementation Programme. The programme has a wide range of objectives including promoting low carbon energy and energy saving, promoting competition and improving customer service, and reducing energy supply and distribution costs.

The roll-out is also expected to include more than 2.1 million electricity meters and 1.5 million gas meters at the premises of small and medium sized businesses. It is hoped that there will be a significant take up of time-of-use tariffs that will reduce demand at peak times for these customers.

Vision

The vision behind the roll-out, as described by Ofgem, is one of “smarter markets” in which consumers are more involved. Consumers will have better information and greater choice, allowing them to become more efficient in the way that they use energy and interact with the markets. Engaged consumers will benefit from improved real time data to use less energy, to shift energy use to cheaper times and to sell balancing services back to the electricity suppliers and network operators. This vision, at least in part, applies to gas as well as electricity.

Consumers may not want to actively manage their energy use but they could certainly benefit from technology that would automatically improve the efficiency of their energy use or provides feedback and improved control to energy distributors or energy managers This technology is close to large scale commercial availability, and smart metering may be a key enabling technology leading to intelligent homes.

GB Mandated Systems and Processes

The smart metering system is a combination of physical (meters, communications hardware, etc.) and logical (software in the meter, commands and controls, etc.) technology. Smart meters will have a communications hub providing a home network and be linked to a dedicated wide area network, allowing the transmission of near real time data on energy consumption to the energy supplier and to the consumer (via the in-home display). Smart metering will allow two-way communication, so the energy supplier can also send information to the meter and to the in-home display. The underlying meter (the base unit) of a smart meter is the same as that for a traditional meter. The technical requirements for the metering and communications systems are set out in the Smart Metering Equipment Technical Specifications and the Communication Hub Technical Specification, which will initially be designated by the Secretary of State, but will then be governed by industry codes and subject to regulation by Ofgem.

Suppliers are responsible for arranging the installation and maintenance of the in-premises equipment. However, the communications hub will be provided to the supplier by the Communications Service Provider, which is responsible for operating the wide area network under contract to the Government-licensed Data Communications Company. The DCC will manage the Data Service Provider and Communications Service Provider contracts and re-procure them after the original contract terms have expired.

The Smart Metering Implementation Programme consists of two phases -

(a) Foundation phase (Q1 2012 to Q4 2015): this stage allows government, energy suppliers and other stakeholders to design and test the infrastructure required for smart meters without having any installation targets to meet. Meters installed during this phase should meet the initial technical standards (SMETS 1) and will not need to be replaced during the mass roll-out. Eventually, these meters should be linked to the wide area network.

(b) Mass roll-out - provisionally December 2015 - 31st December 2020: all meters meet the revised technical specification (SMETS 2) and are fully integrated with the communications systems.

Once the mass roll-out is complete the metering will enter the enduring phase: ongoing arrangements for the provision, maintenance and removal/replacement of smart meters.

Customers have the right to refuse the installation of a smart meter, and for this and other potential reasons there may be a small number of existing “dumb” meters still in operation in the enduring phase. This means that from 2021 there will be four types of meters in operation:

- traditional “dumb” meters;
- Advanced Domestic Meters, which do not comply with the technical requirements for smart meters;
- SMETS 1 meters that have the required functionality, but which will not meet the final technical standard, and which may not have a compliant communications hub, but which will be able to be enrolled, adopted and operated by the DCC; and
- SMETS 2 meters, which will meet the full functionality and will be managed by the DCC with a DCC-provided Communications Hub.

Domestic consumers will have control over how their energy consumption data is used, except where this is required for billing or for other regulated purposes, and the more advanced uses of smart meters require explicit consumer consent.

Costs and Benefits

The latest Impact Assessment for the smart meter roll-out, published on 30 January 2014, continues to show a healthy surplus of benefits over costs. The Net Present value is estimated at £6,214 million.

It quantifies the present value (PV) of benefits as follows:

	Present value £ million
Energy savings	5,732
Supplier cost savings	8,262
Network benefits	947
Peak load shifting	893
Carbon and air quality	1,307
Total	17,141

There are many potential benefits for consumers from the introduction of smart metering. The inclusion of a communications hub in the GB specification means that consumer benefits are not dependent on consumers being internet enabled.

Immediate consumer benefits include:

- improved services;
    - there will be no need to wait in for a meter reader and no need for estimated bills;
    - consumers would be able to switch easily from prepayment to direct debit or vice versa, or switch in and out of time-of-use tariffs;
    - there would be no need to agree a meter reading with a landlord or new occupant when moving home;
    - consumers would also potentially have available more tailored tariffs that match their needs; and
- better information and easier switching may lead to greater consumer engagement and improvements in retail market competition.

DECC does not include any of these in its valuation of the benefits because they are difficult to value and other wider benefits such as an intelligent home are similarly excluded because they may require the consumer to incur costs in acquiring smart goods.

Improved information will also allow consumers to identify and modify behaviours and equipment that use energy inefficiently. DECC focuses on energy efficiency when calculating the consumer benefits of the roll-out.
Supplier benefits include cost savings related to:

- meter reading
- customer switching
- the use of prepayment meters
- customer services
- reduced theft of gas and electricity

These savings may, however, be partially offset by increased customer churn and additional maintenance costs for equipment ancillary to the meter. DECC does not consider these potential offsets.
Network operator benefits:

- More accurate loss measurement;
- having additional information will enable them to manage the network more efficiently; and
- there should also be cost savings in generation relating to the metering of micro-generation and shifting demand from peak periods.

However, it remains to be seen whether all of the expected benefits can be attributed to the roll-out of smart metering systems rather than the provision of regular and high quality advice on energy efficiency.

Although some of the DECC assumptions can be criticised as too optimistic there are many potential benefits that DECC has not taken into account.
The Impact assessment quantifies the present value (PV) of costs as follows:

	Present value £ million
Meters & IHDs (capex and opex)	4,611
Installation	1,752
Communication hubs (Capex)	1,042
Data Communications Company (DCC)	1,428
Suppliers' and other participants' system costs	795
Other costs	1,299
Total	10,927

Main Report

POLICY BACKGROUND

The requirement to roll out smart meters to all households is set out in Directives 2009/72/EC and 2009/73/EC, which respectively set out the requirements for single markets in electricity and gas as part of the "Third Package". The requirement is simply to "ensure the implementation of intelligent metering systems that shall assist the active participation of consumers in the electricity supply market." The requirement is further qualified to be dependent upon an economic assessment of all the long-term costs and benefits to the market and individual consumer. The type of intelligent metering and the timeframe for the roll-out is a matter for member states. However, the target for implementation is to be no longer than 10 years and at least 80% of consumers should be equipped with intelligent metering systems by 2020.

Directive 2012/27/EU (the Energy Efficiency Directive) builds on this requirement and introduces the concept of "smart metering system" as "an electronic system that can measure energy consumption, providing more information than a conventional meter, and can transmit and receive data using a form of electronic communication". Article 9 of the directive then sets out five requirements for smart meters. In summary gas and electricity meters need to provide information about time of use, take account of the objectives of energy efficiency and benefits for final consumers, and ensure security and privacy. In addition, electricity meters must be capable of registering exports as well as imports and there is a requirement that metering data should be made available to the customer or nominated third party in a format that is easily understood.

Separately, the Commission has provided the standardisation mandate to European standardisation organisations (M/490 EN) and a set of common functional requirements (October 2011).

Smart grids are seen by the European Commission as vital to achieving of the 2020 targets of a 20% reduction in greenhouse gas emissions from 1990 levels, 20% of EU energy consumption coming from renewable resources, and a 20% reduction in primary energy use compared to projected levels. Smart meters are an integral part of smart grids. Smart grids enable improvements in grid operation, grid automation, distributed energy resource management, industry automation, and building and home automation.

The need for this sea change in grid design is created by the rapid growth in the amount of highly dispersed and intermittent renewable generation, replacing large fossil-fuelled power stations concentrated around the source of fuel. The delivery of power needs to be smarter because: (i) a lot of the generation will not be under central control, and possibly not even metered in real time; (ii) reverse power flows can be created in the networks; and (iii) consumer load management offers a potentially low cost means of balancing a system that is becoming increasingly difficult and costly to manage. Smart grids are expected to be able to flow power from as well as to consumers, and allow consumers to actively manage their demand in a world where generation is from smaller units and is more widely dispersed than had been the norm in the second half of the twentieth century. Smart grids are expected to be significantly more cost-effective than traditional network designs in meeting these challenges.

GREAT BRITAIN: REGULATORY OBJECTIVES

The objectives of Government intervention in the roll-out of smart metering through the Smart Metering Implementation Programme[6] are:

1. to promote cost-effective energy savings, enabling all consumers to better manage their energy consumption and expenditure and deliver carbon savings;
2. to promote cost-effective smoother electricity demand, so as to facilitate anticipated changes in the electricity supply sector and reduce the cost of delivering (generating and distributing) energy;
3. to promote effective competition in all relevant markets (energy supply, metering provision and energy services and home automation);
4. to deliver improved customer service by energy suppliers, including easier switching and price transparency, accurate bills and new tariff and payment options;
5. to deliver customer support for the programme, based on recognition of the consumer benefits and fairness, and confidence in the arrangements for data protection, access and use;
6. to ensure that timely information and suitable functionality is provided through smart meters and the associated communications architecture, where cost effective, to support development of smart grids;
7. to enable simplification of industry processes and resulting cost savings and service improvements;

[6] DECC Impact Assessment 30/01/2014

8. to ensure that the dependencies on smart metering of wider areas of potential public policy benefit are identified and included within the strategic business case for the programme, where they are justified in cost-benefit terms and do not compromise or put at risk other programme objectives;
9. to deliver the necessary design requirements, commercial and registry framework and supporting activities so as to achieve the timely development and cost-effective implementation of smart metering and meeting programme milestones;
10. to ensure that the communications infrastructure, metering and data management arrangements meet national requirements for security and resilience and command the confidence of stakeholders; and
11. to manage the costs and benefits attributable to the programme, in order to deliver the net economic benefits set out in the Strategic Business Case.

DECC and Ofgem in the Smart Metering Implementation Prospectus, published in July 2010, noted: “The roll-out of smart meters will play an important role in Great Britain’s transition to a low carbon economy, and help us meet some long-term challenges we face in ensuring an affordable, secure and sustainable energy supply. The smart meter roll-out is integral to the Green Deal, the Government’s overarching policy to enable households to reduce the amount of energy they use by improving their energy efficiency.”

Ofgem further stated “Smart metering will enable the energy industry to manage the generation and distribution system more effectively and will facilitate increased use of renewable energy. Time-of -use tariffs and other incentives to manage demand will help to reduce peak demand, which will in turn reduce the need for investment in network and generation capacity. Subject to appropriate consumer permissions and protections, smart metering data will enable network operators to make better informed investment decisions and will support network operators to develop “smart grids”, using data to plan and manage the distribution and transmission systems so as to reduce costs, losses and outages.”

The Electricity Networks Strategy Group defined a Smart Grid as “an electricity network that can intelligently integrate the actions of all users connected to it – generators, consumers and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies”. Smart Meters are an integral part of this concept enabling system operators to understand the demand patterns of individual consumers, where previously customer demands had been estimated using standard profiles by customer type.

Generally, when there is a discussion about moving to smart grids, what is meant is the installation of new control mechanisms in the lower voltage distribution systems that deliver power to all of our houses, and most offices and smaller industrial and commercial properties. The benefits and costs of "smart grids" that are described later in this report refer solely to these distribution systems. The high voltage transmission system, which is normally referred to as the "Grid" is already equipped with the sensors and control capability that characterise a smart grid. However, there may still be scope for applying smarter systems. Further, as distribution systems become smarter there may be increased interaction between the distribution and transmission systems and a whole system approach may be appropriate.

The roll-out is also expected to include more than 2.1 million electricity meters and 1.5 million gas meters at the premises of small and medium sized businesses (SME). The expectation is that for these customers there will be a significant take up of time-of-use tariffs that will reduce demand at peak times.

VISION

In the Smart Metering Implementation Programme Prospectus (27 July 2010) DECC and Ofgem set out a vision for the smart meter roll-out that may be summarised as:

1. every home in Great Britain to have smart meters, empowering people to play a more active role in the energy market and manage their energy consumption and reduce their carbon emissions. Smart meters will play an important role in Great Britain's transition to a low carbon economy and help meet some of the long-term challenges in ensuring an affordable, secure and sustainable energy supply. Smart meters are integral to the Green Deal;
2. smart meters will provide consumers with more accurate bills, and visibility and control of their energy tariffs, consumption and spending;
3. subject to consumer permissions and protections, suppliers and others will be able to use consumption data to provide better energy efficiency products and advisory services, including automation of energy services to reduce costs and increase comfort and control;
4. consumers will be able to switch more easily between suppliers and benefit from greater competition and innovative energy tariffs, including time-of-use;

5. consumers' interests and benefits are paramount and consumer protections need to keep pace with technological change. Vulnerable customers will be protected and privacy of consumer data assured;
6. smart metering will enable simplified and improved industry processes, thus reducing costs and enabling increased competition;
7. smart metering will enable the energy industry to manage the generation and distribution system more cost effectively and will facilitate increased use of renewable energy. Time-of-use tariffs and other incentives will help reduce peak demand, which will reduce the need for investment in network and generation capacity;
8. subject to appropriate consumer permissions and protections, smart metering data will enable network operators to make better informed investment decisions and will support network operators to develop smart grids, so as to reduce costs, losses and outages; and
9. the smart metering system will provide infrastructure with the potential to support other initiatives, such as the introduction of smart water metering.

Ofgem has recently evolved a more succinct vision of "smarter markets" in which consumers are more involved. In this concept consumers are empowered by easily available information and greater choice, so that they become more efficient in the way that they use energy and interact with the markets. Consumers are expected to be engaged with and be part of an exciting market with greater competition, more innovation and new offers. The engaged consumer uses the greater availability of real time data to use less energy, to shift energy use to cheaper times and to sell balancing services back to the electricity suppliers and distributors. This vision, at least in part, applies to gas as well as electricity.

However, it is interesting to note that this vision of consumers having greater control over energy use, greater choice and greater involvement with the energy markets, is partially dependent on the wider use of time-of-use tariffs that reflect short term energy costs, and appears to run contrary to consumer groups' and politicians' calls to simplify tariffs. Ofgem's recent regulatory action to simplify and reduce the number of tariffs available is mainly aimed at making customer switching more effective, although simplification is also considered necessary in order to clear the decks before the introduction of time-of-use tariffs. Even with the simplified tariff structure, a survey by Which?, released on 14th March 2014, found that only 35% of consumers could identify correctly the cheapest tariff when faced with tariffs composed of a single unit rate and a standing charge.

THE RIGHT VISION?

The gas and electricity markets have always suffered from a lack of demand side participation, and this has been particularly felt in the electricity market, which must be balanced almost instantaneously and where, as a consequence, the price of the commodity is highly volatile with marginal prices potentially changing rapidly from minute to minute.

That is not to say that there is no demand side participation. Domestic electricity consumers are prepared to shift demand in response to time-of-use tariffs such as Economy 7, and larger consumers are known to manage their demand at peak times in order to avoid paying targeted grid charges (known as “Triad avoidance”). However, these activities are very crudely targeted. We do not know exactly how much Triad avoidance occurs, and consumers do not have accurate information about which high cost periods to avoid. Tariffs like Economy 7 reduce prices at fixed times when it is likely that demand will be low, but have no flexibility to reflect actual market circumstances. Consumers have been willing to be involved, but the technology to enable a more meaningful participation has always been too impractical and too expensive for most customers.

The ability to pass large amounts of data through the internet or mobile telecommunication systems means that it is now technically possible for consumers to interact fully with the energy markets. Most appliances now contain some kind of computer chip that is used to control both displays and functions and in many cases to ensure that the appliance is more energy efficient. However, the infrastructure of software, information and interconnection that is needed to make use of this potential has not yet evolved. Just as important, the regulatory framework does not exist to allow the full benefits to flow from the technology. It remains to be seen whether energy markets will ever be exciting for consumers, or indeed whether consumers really want excitement from, and engagement with, the gas and electricity markets. Unless energy bills become very much larger than they are today it is unlikely that more than a small minority of domestic consumers would find it worth their while to spend significant amounts of time actively managing their energy use. What is more likely is that consumers could benefit from technology that automatically improves the efficiency of their energy use or provides feedback and improved control to energy distributors or energy managers, without consumers needing to be engaged. In this context, smart metering may be a key enabling technology leading to the intelligent homes.

Smart metering should represent a step change in the speed of the evolution of the required infrastructure. Every home and business would be able to exchange data using a common

platform. The availability of real time energy metering information that could be easily accessed by the consumer energy services providers and by other devices should drive an evolutionary change leading to 'intelligent' services and products. For example, it is already possible to fit a switch that turns on electric water heating when the output of your solar panels exceeds the other load in the house, office or factory. In the same way that the availability of large numbers of devices using a common platform led to innovation in computer games or apps for mobile telephones, smart meters have the potential to drive innovation in how energy is used and controlled, to drive demand side response by businesses and domestic energy users, and move towards a new world of reactive energy management systems.

Better information and easier switching should lead to greater consumer engagement with markets and commensurate improvements in competition.

In the shorter term, metering systems that can switch remotely between metering types and tariffs will reduce industry costs and consumer bills, particularly for prepayment customers. Consumers should benefit from improved services. Waiting in for the meter reader to call and receiving estimated bills will be largely unnecessary.

Investment in energy networks should be reduced because of more accurate information about flows, and the smoothing of energy peaks through active demand management. Supply disconnections may be identified automatically rather than waiting for customers to report a problem. This would reduce call centre costs as well as providing a better service. All of this should help to reduce energy bills. Operators will also be able to automatically prioritise and therefore optimise network management outcomes, such as reacting to outages more efficiently, and thus improve service levels.

Suppliers will also benefit. Meter reading will become cheaper, the need for call centres to resolve incorrect bills should be much reduced, debt should be reduced and debt recovery made easier and theft should become easier to detect.

WHAT ARE SMART METERS AND SMART SYSTEMS?

GB MANDATED SYSTEMS AND PROCESSES

Smart meters will be capable of communication, allowing the transmission of near real time data on energy consumption to the energy supplier and to the consumer (via the in-home display). Smart metering will allow for two-way communication meaning the energy supplier

can also send information to the meter (via the communications hub) and to the in-home display. The underlying metrology (the base unit) of a smart meter is the same as that for a traditional meter, i.e. the way in which energy usage is measured will not change. However, in order to allow for communication, smart meters also involve the use of:

(a) a communications hub. This is a device which allows the meter to communicate. Currently this is provided by energy suppliers, but this will change with mass roll-out where it will be provided by a central body; and
(b) an in-home display, which will display energy usage information to the consumer.

Energy suppliers are responsible for arranging the installation of the in-premises equipment, although the communications hub will be provided to the energy supplier by the Communications Service Provider contracted by the Data Communications Company. They may subcontract the work of installation to Meter Asset Managers (MAM) (gas) and Meter Operators (MOP) (electricity). Energy suppliers will own or lease the equipment from Meter Asset Providers (MAPs). Energy suppliers are also responsible for maintenance including taking calls from consumers. Again this may be subcontracted to MAMs and MOPs.

The communication network required for the GB smart metering system will be provided by a regulated entity known as the Data and Communications Company (DCC) established by DECC. The DCC will operate via a Data Services Provider (DSP), which will be responsible for the provision of the data to be transmitted to and from the communications hubs and Communications Service Providers (CSP), which in turn will be responsible for providing the communications network (Wide Area Network) and the communications hubs (Home Area Network). Gas and electricity suppliers will be required to use the DCC to communicate with smart meters at domestic premises and may be permitted to use the DCC for meters at non-domestic premises.

The DCC will be governed by licence and also bound by the Smart Energy Code (SEC). The Smart Energy Code is a contractual framework backed up by regulations that governs how suppliers should undertake the installation and how they should interact with consumers during the roll-out[7]. The SEC will provide arrangements for the introduction and ongoing operation of the end to end smart metering system.

[7] The SEC is a new industry code created under the DCC licence. Energy suppliers and network operators are required by their licences to become parties to the SEC. The code is governed and amended by the parties to it under the regulatory oversight of Ofgem. It is being introduced in stages and is not yet complete. SEC will eventually incorporate governance of the technical specifications including SMETS and CHTS.

The DCC will manage the Data Service Provider and Communications Service Provider contracts and re-procure them after the original contract terms have expired.

In order to ensure interoperability, all meters will be required to meet the Smart Metering Equipment Technical Specifications (SMETS). Communications hubs will need to meet the Communications Hubs Technical Specification (CHTS).

Energy suppliers have the primary responsibility for consumer engagement as the main interface with consumers before, during and after installation. However, consumer engagement will be supported by a programme of centralised activities undertaken by a new Central Delivery Body (CDB), funded by larger suppliers, with small suppliers contributing to the CDB's fixed energy costs.

Domestic consumers will have control over how their energy consumption data is used, except where this is required for billing or for other regulated purposes. In particular:

- suppliers -
    - will only be able to use energy consumption data for marketing purposes where the consumer has given their explicit consent;
    - will have to give consumers the chance to object if the supplier wishes to access energy consumption data relating to a period of less than one month; and
    - will only be able to access the most detailed level of data (up to half-hourly) if the customer has given their explicit consent;
- consumers will be able to share their energy consumption data easily with third parties, such as switching sites and energy services companies.

Arrangements will be put in place through the Smart Energy Code to protect consumers' data and compliance will be audited.

SCOPE

The smart metering system is the combination of physical (meters, communications hardware, etc.) and logical (software in the meter, commands and controls, etc.) technology.

The mandated scope of the smart metering system functional requirements incorporates the premises technology, the communications interfaces and commands and controls used by

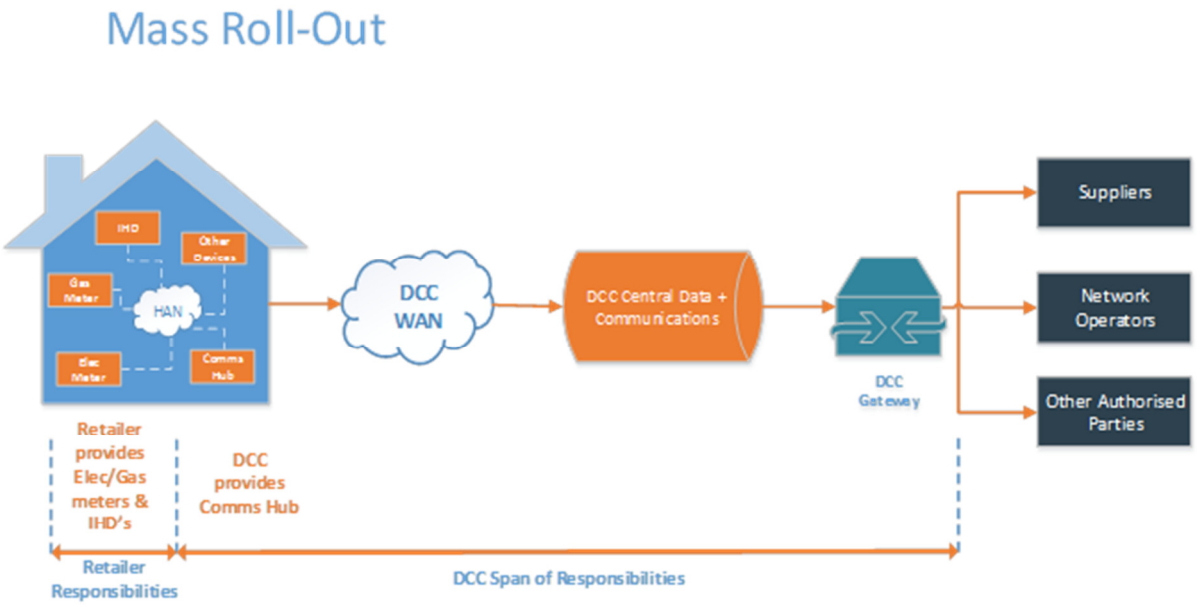
the Data Communications Company (DCC) to access the smart meters. The mandated scope does not include IT systems within the DCC or other parties.

The physical premise technology associated with the minimum functional requirements comprises the electricity and gas meters, communications hubs and some aspects of the in-home display (IHD).

The principal hardware components are:

- metrology - the legally controlled measuring device;
- processing and memory - the computational functionality;
- Wide Area Network (WAN) hardware - the electronic components associated with the wide area communications;
- Home Area Network (HAN) hardware - the electronic components associated with the home area communications (a dedicated local area network);
- contactor/valve - the mechanism for enabling/disabling energy supply into the premises; and
- visual interface - a display (which can be on the meter or other device such as an In-Home Display (IHD).

The diagram below illustrates how this all works together.



PROGRAMME

There has been, and remains much work needed to convert the high level functional requirement into detailed requirements for a system that works in nearly all households, provides the appropriate security and protects privacy, is operable without interfering with other communications equipment in the home, and is sufficiently future-proofed that it can serve its purpose during its full expected service life. As yet there is no agreed detailed specification, but this is due to be completed with the release of SMETS 2.

The Smart Meter Implementation Programme (SMIP) is being managed by DECC, which is responsible for delivery. The individual energy suppliers are responsible for the implementation of the programme in accordance with the timeline set by DECC. The SMIP will involve the introduction of new parties into the energy supply chain, and a corresponding change to the roles and responsibilities of the existing parties.

The Smart Metering Implementation Programme consists of two stages –

1. **Foundation phase** (Q1 2012 to Q4 2015): which allows government, suppliers and other stakeholders to design and test the infrastructure required for smart meters without having any installation targets to meet. During this phase the policy, regulatory and commercial frameworks which will underpin smart meter roll-out are being determined. The key priorities are:
   a) developing the common technical standards for smart metering equipment to ensure it is interoperable (Smart Metering Equipment Technical Specifications (SMETS) for meters and Communications Hubs Technical Specification (CHTS) for communications hubs);
   b) establishing the new entities and service/infrastructure required to enable communication between the smart meters, energy suppliers, network operators and other authorised users e.g. communications service providers;
   c) developing a regulatory framework which incentivises energy suppliers to deliver the roll-out in a consumer friendly way, with appropriate protections, particularly in relation to security;
   d) design of smart meters; and
   e) testing appropriate infrastructure on an individual supplier basis, e.g. IT systems, training and recruitment of staff.

2. **Mass roll-out phase**: provisionally December 2015 - 31st Dec2020.

Once the mass roll-out is complete the SMIP will enter the enduring phase: ongoing arrangements for the provision, maintenance and removal/replacement of smart meters.

There have been many developments to date for the SMIP since the start of the Foundation phase. New licence conditions relating to smart meters and change of supplier (churn) have been introduced (see Ofgem "Effective Switching Licence Condition" which came into force on 1st January 2013). As part of the SMIP, DECC's recent consultation responses confirm the introduction of several new licence conditions in 2014 which should help in relation to the Foundation smart meters on change of supplier. All SMETS compliant meters will count towards the suppliers' roll-out targets. The roll-out of smart meters will be monitored separately by DECC and Ofgem, the guidelines for which are published on the respective websites. The relevant recent developments are summarised below.

(a) Effective Switching Licence Condition

From 1 January 2013, larger suppliers installing advance domestic meters and SMETS 1 meters had to offer those meters to the incoming supplier in smart mode on churn. To allow this to happen, installing suppliers will need to offer Smart Meter Service Operator ("SMSO") services to the incoming supplier to allow the communication of data to and from the smart meter. The SMSO services may be provided in house by the supplier, or using a sub-contractor. There is no obligation on the incoming supplier to accept the meter in smart mode, nor the associated SMSO services.

(b) Operational Licence Condition ("OLC")

This is the overarching operational licence condition which will oblige suppliers to provide domestic customers (amongst others) with key data, and ensure that smart functionality is switched on where a smart meter is installed. It also obliges suppliers to become a party to the Smart Energy Code which (amongst other things) will govern the relationship between industry parties and the DCC and came into force in April 2014. For SMETS compliant meters installed after this date:

i. the installing supplier will need to take "all reasonable steps" to switch on the smart functionality of the meter; and
ii. a supplier inheriting such a meter on churn will need to operate it as a smart meter from the date of enrolment in the DCC or by no later than 2020.

DECC's current intended "go-live" date for the DCC and SMETS 2 is December 2015. Enrolment of existing meters is likely to happen in waves, although the timing of this is still under discussion; DECC has confirmed that SMETS 1 compliant meters will now be capable of enrolment in the DCC. Once a meter is enrolled it must be used in smart mode.

(c) Three New Licence Conditions

Three licence conditions to support smart metering and in particular Foundation meters were introduced in April 2014, these are designed to support the suppliers and Meter Asset Providers funding metering systems in the Foundation phase and beyond.

(d) Enrolment and Adoption of SMETS 1 Meters in DCC

SMETS 1 (approved in late 2012) was produced to ensure that meters installed in the Foundation phase could perform a minimum set of smart functions in a consistent manner. All smart meters installed following SMETS 1 approval were required to be SMETS 1 compliant. Approval of SMETS 1 incentivised energy suppliers to install and operate smart meters during the Foundation phase; because they were assured that there would be no requirement to replace SMETS 1 compliant meters with those meeting the final detailed requirement during the mass roll-out. SMETS 1 meters count towards suppliers' installation targets. Once SMETS 2 is agreed and mandated by DECC and approved by the Commission, all smart meters subsequently installed will need to comply with SMETS 2.

DECC has indicated that infrastructure will now be put in place at the DCC level to allow SMETS 1 meters and associated hubs to be enrolled and the communications contracts to be adopted by the DCC (subject to meeting minimum requirements). This is unlikely to be mandated, although DECC will ask energy suppliers to provide details of portfolios of SMETS 1 meters to assist it with the enrolment process. Enrolment will enable SMETS 1 Foundation meters to be operated via the DCC, albeit ring fenced from SMETS 2.

Customers have the right to refuse the installation of a smart meter, and for this and other potential reasons there may be a small number of existing "dumb" meters still in operation in the enduring phase. This means that from 2020 there will be four types of meters in operation:

- traditional “dumb” meters;
- Advanced Domestic Meters, which do not comply with SMETS1, and do not necessarily have the minimum functionality, and of which there may be many types with limited interoperability, and which cannot be enrolled and operated via the DCC;
- SMETS 1 meters that have the minimum functionality, but which will not meet the final functional standard, and which may not have a compliant communications hub, but which will be able to be enrolled, adopted and operated by the DCC; and
- SMETS 2 meters, which will meet the full functionality and will be managed by the DCC with a DCC, provided Communications Hub.

Additional functionality to meet the needs of future energy management and monitoring services, network management services and consumer needs may be incorporated into later versions of SMETS.

BENEFITS

The latest Impact Assessment for the smart meter roll-out published on 30 January 2014 by DECC[8] quantifies the present value (PV) of benefits as follows:

	Present value £ million
Energy savings	5,732
Supplier cost savings	8,262
Network benefits	947
Peak load shifting	893
Carbon and air quality	1,307
Total	17,141

The costs and benefits are discounted at a rate of 3.5% pa.

The Net Present value is estimated at £6,214 million.

These estimates depend on a number of assumptions. The estimated PV of benefits in the current Impact Assessment are £1,633m; lower than in the analysis performed in January 2013. The main cause of this change is that the roll-out is expected to be slower, so that

[8] Smart meter roll-out for the domestic and small and medium non-domestic sectors GB IA No. DECC0009 30/01/2104

benefits accrue later; which has the effect of reducing the PV. There is a similar effect on the PV of estimated costs, which fell by £1,188m, giving a reduction in the PV of net benefits (NPV) of £445m.

The benefits identified in the Impact Assessment of smart meters fall into four categories:

1. Consumer Benefits

There are many potential benefits for consumers from the introduction of smart metering. The inclusion of a communications hub in the GB specification means that consumer benefits are not dependent on consumers being internet enabled.

Smart metering should lead to heating, lighting and appliances that can respond intelligently to data being received by the meter through a wide area network (WAN) and made available by the meter through a Home Area Network (HAN). For example, we might envisage a system that could dim lights by a small amount, allow the temperature in fridge to rise 1 degree for a specified periods, makes a small change in building thermostat settings and switch off electric vehicle charging - unless charge in the vehicle battery is below a set level - if prices rise above a consumer designated threshold,. When prices are low, the same system might switch on water heating or top up storage radiators. With the permission of the customer, a similar system might be employed by either the energy supplier for wholesale balancing or the local distributor for network management.

Similar benefits should accrue to non-domestic consumers that can use remote sensing to take advantage of energy management systems that react in real time to energy demand signals.

Consumers will benefit from improved services. There will be no need to wait in for a meter reader and no need for estimated bills. Consumers would be able to switch easily from prepayment to direct debit or vice versa, or switch in and out of time-of-use tariffs. There would be no need to agree a meter reading with a landlord or new occupant when moving home. Consumers would also potentially have available more tailored tariffs that match their needs.

Better information and easier switching may lead to greater consumer engagement with commensurate improvements in retail market competition.

DECC does not try to estimate any of the benefits mentioned above. These benefits are difficult to value and may require the consumer to incur costs. For example, replacing an old fridge with an intelligent one could be part of an energy management system. It is also not possible to know the value of the soft costs that the consumer is incurring to achieve the cost savings, such as having slightly dimmer lights at certain times or finding that an electric vehicle is not fully charged when it is needed. Further, some of these benefits depend upon the introduction of new products and services to interface with the meter, and it is possible that new services and appliances would evolve that use a different approach, such as central monitoring of energy costs and access through the home broadband connection.

Through better information, consumers will also be better able to identify and modify behaviours and equipment that use energy inefficiently. It is on this aspect that DECC focuses its attention and attempts to calculate the benefits from the roll-out.

DECC has looked at a number of sources to try to gauge how consumer behaviour may be changed by having a smart metering system, including an In Home Display (IHD). The IHD is an integral part of the smart metering systems roll-out, and research indicates that having immediately available and easily understood information that is constantly viewed by the consumer is an important aspect in changing behaviour.
DECC has assumed the following percentage reductions in energy use when the smart metering system is installed:

Electricity	2.8%
Gas	2.0%

However, for gas customers with a prepayment meter, the energy saving is assumed to be only 0.5%.

The expected benefits that consumers may achieve from installing a smart meter have recently been called into question by complaints in the press that British Gas has made unsupportable claims in its communications with its customers[9]. British Gas had suggested that customers could make savings of “up to £75” per annum, when the results from its own survey indicated that the average saving per customer was only £21 a year. This was also compared unfavourably to a claim made by British Gas a year earlier that the average British household would save over £65 per year.

[9] Times 5th February 2014

For an average dual-fuel customer on a credit meter, the DECC assumptions imply annual savings of around £33. So even DECC's relatively low assumed savings percentages give estimated annual cash savings almost 60% above British Gas's survey information noted above[10].

DECC has used assumptions for energy savings that are significantly lower than is suggested by some research. Trials in Europe have suggested annual savings averaging more than 8%. It is difficult to read across from these and other international studies to GB. For example, air conditioning might be much more important in the USA than for British domestic consumers.

DECC appears to have leaned heavily on research undertaken in the UK by Ofgem in association with a number of energy suppliers[11]. In this research energy suppliers volunteered to run their own trials and the data produced were further analysed by AECOM. Different interventions were applied to trial groups and the resultant changes in energy consumption were compared to control groups. The control groups also demonstrated significant reductions in energy use, possibly through the Hawthorne effect[12]. The results are difficult to interpret as the trials undertaken by different suppliers produced different results. However, it seems clear from the results that having an effective and easily understood real-time display of energy consumption and cost, and the provision of simple to understand energy efficiency advice, were key to achieving significant changes in behaviour.

DECC are conducting an early learning project, due to report later this year which will provide an initial analysis of progress that has been achieved to date in delivering consumer benefits, especially in relation to energy saving, and where further steps are likely to be effective in increasing such benefits.

The type of behavioural changes that were suggested by the energy efficiency advice included:

- better insulation;
- fitting thermostatic controls, servicing boilers;
- turning down thermostats or reducing the time that the heating is on;

[10] DECC state dual fuel reduction of £26 for average bill in 2020 - £33 is calculated by applying the percentage savings to the current average bill as per Ofgem's website. DECC use of 2011 prices may explain the difference. DECC also exclude taxes and the value of carbon from consumer benefits.
[11] Energy Demand Research Project: Final Analysis June 2011
[12] Hawthorne effect: people may change their behaviour merely because they know they are being observed or tested, regardless of any specific attempts to change their behaviour. This Hawthorne effect tends to be short-term but can be reinstated by regularly changing the intervention.

- fitting cylinder jackets and use of immersion heaters;
- taking showers rather than baths;
- putting lids on pans when cooking, or using a microwave or grill rather than an oven;
- filling the kettle less;
- energy saving bulbs;
- using fewer lights in the room or switching off lights when leaving the room; and
- more efficient appliances.

The savings made from these changes tended to continue throughout the two years of the trial.

It is notable that the savings made by consumers in the control groups were significant and in some cases almost as large as the savings made by the trial groups supplied with smart metering systems and energy efficiency advice.
It should be noted that consumers would have incurred costs to achieve the reported savings, but these costs appear not taken into account in DECC's impact assessment.

It is not clear how much of the savings identified in the trials would be available during the mass roll-out of smart metering systems. Since the trials, European action has removed higher wattage incandescent bulbs from sale and by 2015 the use of energy saving bulbs may be ubiquitous. By the time of the roll-out some of the easy wins may have been achieved through mandated action or through other schemes. Further, the level of energy savings made depended on having good quality and frequent energy efficiency advice and also a high quality real-time display. For the benefits to accrue, the roll-out will need to be more than just fitting a meter and the associated equipment. Provision of energy efficiency advice probably needs to be a long term commitment.

2. Supplier Benefits

Suppliers are expected to make savings related to the following:

- avoided site visits, particularly meter reading. Although this is offset to some degree by the continued need to make safety inspections that would otherwise be carried out by the meter readers;
- savings at call centres with fewer inbound calls. Inbound calls are expected to fall by 30% due mainly to fewer disputes about metered values or reporting of customer

meter reads. Further there is no need to reissue bills where customers supply their own readings to replace an estimated reading;

- lower debt and debt recovery costs. Consumers with instantaneous feedback are better able to manage their consumption and costs and are, therefore, less likely to incur debt. Suppliers will be able to identify customers at risk of building up debt sooner and will be able to take appropriate measures such as adjusting direct debit levels. Remote reading will avoid large arrears created where customers receive a succession of estimated bills. Suppliers will also have the ability to switch customers remotely on to prepayment arrangements. Without a smart meter this would require a visit to install a prepayment meter and would probably occur later. In the very unlikely event that a build-up of debt leads to the need for a disconnection, the ability to remotely disconnect through a smart meter will significantly reduce costs;
- avoided costs for prepayment meters. There should no longer be any need to visit customers to replace credit meters with prepayment meters and vice versa. Ofgem reported a total of around 450,000 prepayment meter installations in 2011. These meter installations were not required because of an increase in the number of prepayment customers, but because of customers moving to new premises. Further, smart meters in prepayment mode are likely to require less maintenance than current key meters, which have more mechanical interaction and require keys that can be lost. Suppliers that have installed smart meters for prepayment customers have also managed to make savings in the cost of loading credit onto meters. The current additional cost to serve customers with prepayment meters is estimated by DECC to be £30 for electricity and £40 for gas. These additional costs would be reduced but not eliminated;
- simplify the arrangements for change of supplier. Both the old and the new supplier will receive accurate meter readings on the date of the change of supplier, removing the need to follow up any readings that do not match and reducing instances of miss-billing; and
- reduced theft. It is difficult to know the true level of energy theft. The Impact Assessment is based upon industry estimates that suggest the combine costs of gas and electricity theft could be as much as £800 million per annum[13], although more recent estimates by BGT suggest a lower value of £500m. DECC assume that theft will be reduced by 10% for the roll-out of smart meters.

[13] Smart meter roll-out for the domestic and small and medium non-domestic sectors GB IA No. DECC0009 30/01/2104 p54: Gas £220 -400m and Electricity £400m. Based on Ofgem's strategy consultation for electricity price control September 2012

These savings may however be partially offset by increased customer churn and additional maintenance costs for equipment ancillary to the meter. DECC does not consider these potential offsets. DECC has validated its assumptions in discussions and workshops with energy suppliers.

3. Network Benefits

Network benefits are expected to include:

- reduced losses by:
  - more accurate losses measurement;
  - reducing peak loads (losses are higher at peak times[14]); and
  - enabling improvements in network design that reflect actual flows;
- reduced or avoided investment due to reductions in peak demand following the introduction of time-of-use tariffs and active demand management;
- a reduction in customer minutes lost and improved outage reporting because of better monitoring of loss of supply and an enhanced ability to identify the location, duration, and scope of an incident.;
- operational savings from fault fixing. With earlier notification and better knowledge of loss of supply, technical teams can be deployed more efficiently and in a more targeted manner. It will also be possible to determine remotely whether a fault is with the customer's equipment rather than the network. DECC have assumed 10% reduction in operational costs;
- better informed investment decisions due to more accurate information about power flows. Having more detailed historical information will allow bottlenecks in the network to be identified more easily. Improved planning data will result in more focused investment in network reinforcement. DECC have assumed a 5% reduction in costs;
- avoided investigation of voltage complaints. It will be possible to monitor voltage remotely and notifications will be sent automatically when levels are outside limits. There will no longer be any need to visit premises for separate voltage testing;
- reduced outage notification calls. Earlier and automatic identification of loss of supply and network fault locations means that it should not be necessary to rely upon customers reporting supply failures. This should result in reductions in calls to fault and emergency lines. DECC have assumed a 15% reduction; and

[14] Resistive losses are proportional to the square of current, measured in amps. For any given voltage and power factor, amps are proportionate to demand measured in watts.

- automatically prioritise and optimise network management outcomes and thus improve service levels.

4. Generation Benefits

Generation benefits will include:

- savings in metering for micro-generation. It should no longer be necessary to have a separate export meter for any micro-generation on customer premises;
- short run cost savings from reduced peak demand following the introduction of time-of-use tariffs. Smart meters make time varying tariffs possible by recording the time when electricity is used and allowing two-way communications. Such tariffs can incentivise demand-side response or load shifting. The response can either be consumer initiated or controlled by the supplier. Reducing peak demand should be expected to reduce the marginal cost of generation at peak times; and
- avoided investment in peaking generation following introduction of time of use tariffs.
- The DECC model excludes carbon costs and taxes from energy prices. Consequently, there is no double counting between consumer benefits and generation benefits.

CONCLUSION ABOUT BENEFITS

The latest Impact Assessment produced by DECC continues to show a healthy surplus of benefits over costs. However, it remains to be seen whether all of the expected benefits can be attributed to the roll-out of smart metering systems rather than the provision of regular and high quality advice on energy efficiency.

Although some of the DECC assumptions can be criticised as too optimistic there are many potential benefits that DECC has not taken into account.

COSTS

The latest Impact Assessment for the smart meter roll-out published on 30 January 2014[15] quantifies the present value (PV) of costs as follows:

	Present value £ million
Meters & IHDs (capex and opex)	4,611
Installation	1,752
Communication hubs (Capex)	1,042
Data Communications Company (DCC)	1,428
Suppliers' and other participants' system costs	795
Other costs	1,299
Total	10,927

The costs of an individual installation are estimated as in the table below.

Unit Costs of equipment installed in the home

Component	Cost (£)
IHD	15
Electricity meter	43.6
Gas meter	57.2
Communications equipment	31
Dual fuel installation	68
Total	£240.8

Note: installation costs would be £10 higher if electricity and gas meters are installed by different suppliers.

DCC related costs over appraisal period

	Cost (PV) £ million
DCC licensee costs	194
Dara Service Provider (DSP)	183
Communications Service Provider (CSP)	1,051
Total	1,428

Note: DSP and CSP costs are contract costs so include capital and operational costs and expected profit.

[15] Smart meter roll-out for the domestic and small and medium non-domestic sectors GB IA No. DECC0009 30/01/2104

Suppliers' and other industry participants' system costs

	Cost (PV) £ million
Capital expenditure Suppliers	369
Capital expenditure other industry participants	69
Operational expenditure Suppliers	275
Operational expenditure other industry participants	81
Total	795

Note: costs based upon information provided by the industry. Costs mainly related to IT expenditure.

Cost of capital

DECC have assumed that, with the exception of DCC related costs, the cost of capital is 10% per annum real. Some stakeholders have suggested that their own rates of return are lower. The Net Present Value (NPV[16]) associated with the roll-out would be increased by £300 million for a 1% reduction in the cost of capital. Applying 5% return on capital would increase the NPV by approximately £1.5 billion

Other costs

	Cost (PV) £ million
Energy costs (2.6 W use by in-premises equipment)	681
Increased reading costs remaining basic meters	210
Accelerated disposal costs basic meters	10
Legal and organisational costs	286
Consumer engagement activities Central Delivery Body (CDB)	87
Uncertainty during the Foundation period[17]	25
Total	1,299

[16] DECC apply a discount rate of 3.5% to the stream of future costs and/ benefits to calculate a single value for each that would be equivalent if received or paid today The NPV is the net result of subtracting the Present
Value of costs from and Present Value of benefits. Note that the discount rate is not the same as the cost of capital used to estimate costs.
[17] These uncertainties include potential communications problems, functionality differences and how these meters must be integrated into the DCC system.

GREAT BRITAIN: PROGRESS TO DATE

As the Public Accounts Committee noted, there is a huge amount of work to be done in order to complete the mass roll-out by 2020.

However, much of the preparatory work has now been done and good progress has been made in defining the technical specifications for smart meters and the associated communications hubs. The Data Communications Company has been appointed, new licence conditions put in place and much of the Smart Energy Code is ready. The initial version of the Smart Meter Equipment Specification (SMETS1) was notified in December 2012 and the next version (SMETS 2) is expected to be notified in September 2014. SMETS 2 is not anticipated to be substantially different from SMETS1, so the technical specification is largely complete and the smart meters installed to date should be broadly compatible with those installed during the mass roll-out and capable of adoption by the Data Communications Company.

The number of smart meters installed to date is still relatively small in comparison to the number of traditional meters that still need to be replaced. Energy suppliers have been installing meters consistent with SMETS1 since December 2012 (the Foundation phase). Not all energy suppliers have installed significant numbers of smart meters, but some have made good use of the learning opportunity afforded by the Foundation phase and by the end of March 2014 nearly 350,000 smart meters had been installed. See the tables below and the column headed “smart meters”.

A significant number of smart type meters were in place by the start of the Foundation phase, and the number of these meters continued to grow slowly until the end of 2013. However, these meters will need to be replaced during the roll-out.

Table: Number of electricity meters operated by the larger energy suppliers by meter type at end of quarter[18]

Quarter	Domestic Properties			Smaller Non-Domestic Properties	
	Smart Meters	Smart-Type Meters	Traditional Meters	Smart and Advanced Meters	Traditional Meters
Q3 2012	132	376,423	25,786,824	354,969	1,771,055*
Q4 2012	1,739	407,975	25,766,990	444,943	1,864,295

[18] Source: Smart Meters Great Britain, Quarterly report to end March 2014 Table 2a. DECC 12 June 2014

Q1 2013	12,049	427,631	25,495,489	500,960	1,832,983
Q2 2013	50,038	443,913	25,307,746	509,436	1,790,147
Q3 2013	104,704	484,975	25,272,273	497,756	1,819,499
Q4 2013	163,427	485,873	25,508,995	518,643	1,824,847
Q1 2014	211,730	485,346	25,182,256	481,647	1,782,186
* Estimated - Q3 2012 non-domestic traditional meters					

Table : Number of gas meters operated by the larger energy suppliers by meter type at end of quarter[19]

Quarter	Domestic Properties			Smaller Non-Domestic Properties	
	Smart Meters	Smart-Type Meters	Traditional Meters	Smart and Advanced Meters	Traditional Meters
Q3 2012	124	246,496	21,140,557	10,038	553,631*
Q4 2012	1,461	276,050	21,274,934	9,290	559,271
Q1 2013	11,991	293,878	21,118,073	10,109	536,022
Q2 2013	39,337	300,537	20,923,634	10,603	507,974
Q3 2013	72,113	319,445	20,955,620	10,778	488,142
Q4 2013	101,728	312,256	21,201,471	10,535	482,251
Q12014	132,972	305,495	20,989,449	10,530	480,223
* Estimated - Q3 2012 non-domestic traditional meters					

DELIVERY STAGES

Although the programme has progressed significantly over the last few years there are still critical milestones that need to be reached to ensure it continues on target and in a manner that benefits the consumers and the industry.

FOUNDATION/TRANSITION PHASE

The programme has been in Foundation phase for some time now and moving towards the Transition phase. That is transition from Foundation phase to mandated roll-out. However, there are various milestones that need to be achieved in this period.

[19] Source: Smart Meters Great Britain, Quarterly report to end March 2014 Table 2b. DECC 12 June 2014

- **Smart Metering Equipment Technical Specification 2 (SMETS 2)**
    - SMETS 1 was developed and ratified by the EU in December 2012 to allow during the Foundation Phase the installation of smart meters that had most of the requisite functionality of SMETS 2 meters, but did not conform to the communication protocol and security provisions. The programme stakeholders are currently working on the SMETS 2 and related GB Companion Specification (GBCS) etc. to complete the version of Smart Meters intended for mandated roll-out. SMETS 2 is expected to be notified to the EU in September 2014.

    - Some suppliers are installing large quantities of SMETS 1(Foundation) meters but others are holding off significant implementation in the hope that they can meet their commitments solely during the mandated roll-out. Some of this delay is due to a perception that SMETS 1 meters may have a shorter lifetime than SMETS 2 meters. More commitment from both DECC and the DCC with respect to both the enrolment and adoption criteria for Foundation meters, and the length of the cutover period (the time allowed between SMETS 2 being adopted and SMETS 1 no longer being acceptable for installation) would alleviate some of these concerns and result in more implementation during the Foundation phase. This is crucial to allow all suppliers to gain the knowledge and adjust processes prior to the mandated roll-out so that they can meet the roll-out target finish date of Dec 2020.

- **Prepayment Services**

  The prepayment functionality has not been widely deployed during the Foundation phase. Changes to the Zigbee and DLMS protocols are being developed to provide full prepayment functionality as part of SMETS 2 and the GBCS. Prepayment functionality is a critical element to deliver the expected benefits to fuel poor and vulnerable consumers. Without widely available prepayment functionality the mass roll-out of smart meters could be seen as “exclusive” and not open to all at the same time.

- **Further Delays to the Programme**
    - The programme has already been delayed because of difficulties in developing specifications and protocols and there is now further delay in notifying SMETS 2 and GBCS, which has had a knock on effect on DCC

development. Consequently, the initial live operations date has been moved to December 2015.

- Further, energy suppliers are currently funding the DCC but no communication services are available. Continued delay will only add to the final implementation cost.

- Any further delays needs to be minimised to prevent the Foundation phase being further extended. In addition, further delays in any aspect of the programme that affects the production of SMETS 2 meters and associated equipment will seriously impact on the programme. Time scales are already very tight and even a slight extra delay could now have a knock on effect on the planned completion date for the roll-out. For example, other regulatory changes could divert or dilute industry attention for smart metering implementation.

- **The Consumer Delivery Body (CDB)**
  - The CDB was formed in 2013 and has been active in presenting at various industry forums but has yet to openly engage with consumers. Active engagement with consumers needs to happen significantly in advance of the start of the mandated roll-out, so that consumers are fully informed and, hopefully, fully engaged with the smart metering programme and the benefits that it will bring for them.
  - The mandated roll-out is a major undertaking on an unprecedented market transformational scale. Inevitably, there will be challenges to overcome and problems to solve but the potential benefits for all are too great to lose. Consumers will want to understand what is in it for them, whether as an individual, a family, a community or as a business. There is a great deal at stake, and consumers will naturally be cautious and perhaps even suspicious about both the cost and the consequences of smarter markets, and the information given to them by energy suppliers. It is critical that the CDB is well ahead of the game on all these concerns and informs and supports consumers at all levels.
  - The ideal outcome would be that consumers are eager to have the smart meters rather than perceiving them as an imposition designed to increase the profits of energy suppliers. The CDB, as well as energy suppliers and the network operators, need to work together to provide consumers with a consistent and trusted message on the benefits of smart meters, so that the

consumers realise that the programme is a benefit for them as well as for the industry.

- Consumers need to be convinced that all data recorded is secure, and that it will be used only for good and proper purposes. Without access to the half-hour data the future effectiveness of Smart Grids is less sure. Consumer belief in the privacy of their data is essential.

ROLL-OUT PHASE

Around 50[20] million meters need to be installed at approximately 30 million properties in five years. Issues need to be resolved quickly and efficiently ensuring that the consumer experience is positive. The lessons learnt during the Foundation phase need to be built upon to ensure that any issues that emerge during the roll-out are minimised.

Clear and concise information must be provided to the consumer on the benefits of this new facility: detailed and accurate billing information; in home display giving real time information; and, most importantly, how they can use the information to save money and achieve greater comfort.

There will undoubtedly be some issues found on some installations:

- existing faulty meters that may have resulted in erroneous meter readings and therefore potentially billing corrections and disputes;
- evidence of tampering on the existing installation that may have resulted in theft;
- unsafe situations that result in temporary disconnection of supply.

All of these situations are unavoidable, but they still need quick, efficient and "joined up" working by all involved; energy suppliers, installers and, when appropriate, the network operators.

Most importantly energy suppliers and their agents (the installers) must attend at the time agreed with the consumer, as many will need to take time off work or make special arrangements for another responsible adult to be present during the installation. Failure to

[20] DECC: Q1 2014 47.0m domestic and 2.7m small non-domestic meters

attend and abortive visits need to be avoided at all cost, as these will only serve to gain the programme unnecessary negative publicity.

There are still areas of the programme that could still hinder the full roll-out to all homes:

- development of the 868 MHz HAN protocol, which will be required in approximately 20% of installations for reliable communication between the meter, the Communications Hub and the In Home Display; and

- development and acceptance of a communication solution for use in multiple dwelling properties (flats etc.) which is also required for approximately 20% of households. This facet of the programme is the most likely to adversely affect the fuel poor and therefore must be seen as a priority.

FINANCING THE PROGRAMME:

The unprecedented scale of investment required for this programme to operate will mostly come from the Meter Asset Providers who are part of or backed by banks or other financial institutions, or from energy suppliers own internal sources. Smart meters are more expensive than the traditional meters that they replace and will have a shorter operational life of approximately 10 - 15 years. Confident and timely decision making by DECC and Ofgem, and recognition that this is a fundamental shift from a regulated environment to commercial provision are key to investor confidence during the Foundation/transition and mass roll-out of smart meters.

LEGAL FRAMEWORK:

There have already been significant changes to industry codes and licenses to enable the smart metering programme to proceed. More are required and these need the backing of all industry stakeholders and the government to ensure that they are processed in a timely fashion.

TRAINING:

The industry is facing a huge training task to produce the required number of meter installers qualified to install both gas and electricity meters. The energy suppliers and the National Skills Academy for Power have designed training programmes to re-train each discipline (gas or electricity installers) to work on the other, thereby producing dual fuel installers, and also to train novices up to the required standards for each fuel. These training programmes

are now accepted by all energy suppliers and network operators, which will enable the roll-out to be more flexible and mobile.

POST ROLL-OUT:

The programme must continue to provide the same consistent messages to consumers and to offer improving services and benefits that help and re-assure consumers that the programme continues to be to their benefit.

CONCLUSION AND RECOMMENDATIONS

As the Public Accounts Committee noted, there was a huge amount of work to be done in order to complete the mass roll-out by 2020.

Much of the preparatory work has now been done. Major progress has been made in defining the technical specifications for smart meters and the associated communications hubs. The Data Communications Company has been appointed, new licence conditions put in place and much of the Smart Energy Code is ready. The initial version of the Smart Meter Equipment Specification (SMETS 1) was notified in December 2012 and the next version (SMETS 2) is expected to be notified in September 2014. SMETS 2 is not anticipated to be substantially different from SMETS 1, so the technical specification is largely complete, and the smart meters installed to date should be broadly compatible with those installed during the mass roll-out and capable of adoption by the Data Communications Company.

The number of smart meters installed to date is still relatively small in comparison to the number of traditional meters that still need to be replaced. Energy suppliers have been installing meters consistent with SMETS 1 since December 2012 (the Foundation Phase). Not all energy suppliers have installed significant numbers of smart meters, but some have made good use of the learning opportunity afforded by the Foundation phase, and by the end of March 2014 nearly 350,000 had been installed.

The programme is broadly on track for completion by the end of 2020. However, some delay has been experienced to date and any further significant delay could result in missing the timetable.

The National Audit Office has recently confirmed that good progress has been made. However, some risks remain:

- the roll-out requires the provision and installation of a large number of meters in a period of five years. Government needs to ensure that there is no further delay in clarifying the technical specifications of smart metering equipment, so that manufacturers can design, build and test the equipment and deliver a sufficient quantity of high quality equipment in a short period;
- manufacturers need financial commitment from energy suppliers at an early stage in order to ensure timely delivery of such a large quantity of meters;
- there can be no further delay if there is to be a realistic timetable for a roll-out that will maximise customer satisfaction with the service delivery;
- a robust and realistic delivery programme needs to be in place for the training, resourcing and logistic planning of the field support;
- the consent, cooperation and support of customers are vital to the success of the programme. A consistent and engaging customer communications programme by the Central Delivery Body is required to prepare the domestic customer for the national roll-out of smart meters and to ensure that customers understand the benefits of the programme; and
- the Foundation phase is an opportunity to gain much needed experience and perfect systems prior to the roll-out. It would seem that not all of the major energy suppliers have taken full advantage of this opportunity.
- For consumers to be able to take full advantage of the possibilities created by smart meters in a convenient way, a degree of automation is likely to be required within the context of a fully competitive market. For this to happen:
- the technology and systems must provide full communication coverage, data service functionality and interoperable working to enable a competitive market to flourish across Great Britain; and
- metering systems must allow for home automation and other added value services to be easily adopted directly by the domestic customer.

Provided that the risks are addressed in a timely manner and the final design of metering systems is sufficiently flexible to allow the growth of added value services, it is likely that the benefits set out in the DECC Impact Assessment will be achievable. The costs of the programme are well understood and controlled. This should ensure that the policy creates substantial net benefits for the GB consumer.

References

EU Commission

Technical standards: Directive 98/34/EC as amended by Directive 98/48/EC
http://ec.europa.eu/enterprise/tris/about/index_en.htm

Energy Efficiency Directive (Directive 2012/27/EC)
http://ec.europa.eu/energy/efficiency/eed/eed_en.htm

Third package:
Directive 2009/72/EC http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0072
Directive 2009/73/EC http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0073

Standardisation Mandate M/490 EN
http://ec.europa.eu/energy/gas_electricity/smartgrids/doc/2011_03_01_mandate_m490_en.pdf
2020 targets http://ec.europa.eu/europe2020/targets/eu-targets/

DECC

Background: https://www.gov.uk/smart-meters-information-for-industry-and-other-stakeholders

https://www.gov.uk/smart-meters-how-they-work

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

DCC licence
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/249046/smartdcclicence.pdf

GB Companion Specification
https://www.gov.uk/government/consultations/smart-metering-implementation-programme-the-process-to-finalise-the-great-britain-companion-specification

Impact Assessment: Smart meter roll-out for the domestic and small and medium non-domestic sectors GB IA No. DECC0009 30/01/2104

https://www.gov.uk/government/publications/smart-meter-roll-out-for-the-domestic-and-small-and-medium-non-domestic-sectors-gb-impact-assessment

Smart Energy Code
https://www.gov.uk/government/consultations/new-smart-energy-code-content-stage-4
https://www.gov.uk/government/consultations/new-smart-energy-code-content-stage-3
https://www.gov.uk/government/consultations/new-smart-energy-code-content-stage-2
https://www.gov.uk/government/consultations/stage-1-of-the-smart-energy-code-conclusions-and-proposal

Smart Meter Equipment Technical Specification
https://www.gov.uk/government/publications/smart-metering-implementation-programme-technical-specifications
https://www.gov.uk/government/consultations/regulatory-arrangements-for-enrolment-and-adoption-of-foundation-meters
https://www.gov.uk/government/consultations/smart-metering-equipment-technical-specifications-second-version

Smart Metering Implementation Programme
Second annual progress report on roll-out December 2013
https://www.gov.uk/government/publications/second-annual-progress-report-on-the-roll-out-of-smart-meters

Smart metering summary plan https://www.gov.uk/government/publications/smart-metering-summary-plan

Smart Meters Great Britain, Quarterly report to end March 2014 Table 2a. DECC 12 June 2014
https://www.gov.uk/government/publications/statistical-release-and-data-smart-meters-great-britain-quarter-4-2013

Ofgem

Energy Demand Research Project: Final Analysis June 2011
https://www.ofgem.gov.uk/ofgem-publications/59105/energy-demand-research-project-final-analysis.pdf
https://www.ofgem.gov.uk/publications-and-updates/energy-demand-research-project-final-analysis

Smart Metering Implementation Prospectus July 2010,

https://www.ofgem.gov.uk/ofgem-publications/63541/smart-metering-prospectus.pdf
https://www.ofgem.gov.uk/publications-and-updates/smart-metering-implementation-programme-prospectus

Supplier Licence Conditions
https://epr.ofgem.gov.uk//Content/Documents/Electricity%20Supply%20Standard%20Licence%20Conditions%20Consolidated%20-%20Current%20Version.pdf
https://epr.ofgem.gov.uk//Content/Documents/Gas_Interconnector_SLCs_Consolidated%20-%20Current%20Version.pdf

National Audit Office
http://www.nao.org.uk/wp-content/uploads/2014/06/Update-on-preparations-for-smart-metering-Executive-Summary.pdf

Public Accounts Committee 63rd Report 14th December 2011
http://www.publications.parliament.uk/pa/cm201012/cmselect/cmpubacc/1617/161702.htm

Which? 14th March 2014,
http://www.which.co.uk/news/2014/03/simplified-energy-tariffs-still-too-confusing-says-which-359011/

List of Acronyms

APPGEC: All Party Parliamentary Group on Energy Costs

CDB: Central Delivery Body

CHTS: Communications Hubs Technical Specification

CSP: Communications Service Provider

DECC: Department of Energy and Climate Change

DCC: Data and Communications Company

DSP: Data Services Provider

GBSC: GB Companion Specification

HAN: Home Area Network

IHD: In Home Display

MAM: Meter Asset Manager (gas)

MAP: Meter Asset Provider

MOP: Meter Operator (electricity)

NPV: Net Present Value

Ofgem: Office of Gas and Electricity Markets

PV: Present Value

SEC: Smart Energy Code

SMETS: Smart Metering Equipment Technical Specification

SMIP: Smart Metering Implementation Programme

SMSO: Smart Meter Operator Services

WAN: Wide Area Network

Annex 1: Smart Meter Required Functionality

In 2011 the EU Commission surveyed member states and, following that survey, produced a list of smart meter functionalities for which there was a high degree of consensus:

For the customer:

- provides readings from the meter to the customer and to equipment that he may have installed;
- updates these readings frequently enough to allow the information to be used to achieve energy savings.

For the meter operator:

- allows remote reading of meter registers by the meter operator;
- provides two-way communication between the meter and external networks for maintenance and control of the meter;
- allows readings to be taken frequently enough to allow the information to be used for network planning.

For commercial aspects of energy supply:

- supports advanced tariff systems;
- allows remote on/off control of the supply and/or flow or power limitation.

For security and privacy:

- provides secure data communications;
- fraud prevention and detection.

To allow distributed generation:

- provides import/export and reactive metering.

GB MANDATED SYSTEMS AND PROCESSES

Smart meters will be capable of communication, allowing the transmission of near real time data on energy consumption to the energy supplier and to the consumer (via the in-home display). Smart metering will allow for two-way communication meaning the energy supplier can also send information to the meter (via the communications hub) and to the in-home display. The underlying metrology (the base unit) of a smart meter is the same as that for a traditional meter i.e. the way in which energy usage is measured will not change. However, in order to allow for communication, smart meters also involve the use of:

- a communications hub. This is a device which allows the meter to communicate. Currently this is provided by energy suppliers, but this will change with mass roll-out where it will be provided by a central body; and
- an in-home display, which will display energy usage information to the consumer.

Suppliers are responsible for arranging the installation of the in-premises equipment, although the communications hub will be provided to the supplier by the Communications Service Provider contracted by the Data Communications Company. They may subcontract the work of installation to Meter Asset Managers (MAM) (gas) and Meter Operators (MOP) (electricity). Suppliers will own or lease the equipment from Meter Asset Providers (MAPs). Suppliers are also responsible for maintenance including taking calls from consumers. Again, this may be subcontracted to MAMs and MOPs. In the majority of cases it is expected that gas and electricity meters and the communications hub would be installed in a single visit. However, where gas and electricity are contracted to different suppliers, each supplier will be responsible for arranging the installation and maintenance for their meter. Where separate installation is required, the first installation would include the communications hub, and the second installation would link to that hub. However, where the gas and electricity meters are a considerable distance apart, it is possible that two communications hubs would be installed in a single dwelling.

The communication network required for the GB smart metering system will be provided by regulated entity known as the Data and Communications Company (DCC) established by DECC. The DCC will operate via a Data Services Provider (DSP), which will be responsible for the provision of the data to be transmitted to and from the communications hubs and Communications Service Providers (CSP), which in turn will be responsible for providing the communications network (Wide Area Network) and the communications hubs (Home Area Network). Gas and electricity suppliers will be required to use the DCC to communicate with

smart meters at domestic premises and may be permitted to use the DCC for meters at non-domestic premises.

The DCC will be governed by licence and also bound by the Smart Energy Code (SEC). The Smart Energy Code is a contractual framework backed up by regulations that governs how suppliers should undertake the installation and how they should interact with consumers during the roll-out[21]. The SEC will provide arrangements for the introduction and ongoing operation of the end-to-end smart metering system.

The DCC will manage the Data Service Provider and Communications Service Provider contracts and re-procure them after the original contract terms have expired. Energy suppliers will continue to be responsible for owning or leasing and maintaining the meters.

In order to ensure interoperability, all meters will be required to meet the Smart Metering Equipment Technical Specifications (SMETS). The second version of SMETS (SMETS 2) is expected to govern the communication standard used by smart meters and other aspects of commercial interoperability between suppliers. Communications hubs will need to meet the Communications Hubs Technical Specification (CHTS).
Energy suppliers have the primary responsibility for consumer engagement as the main interface with consumers before, during and after installation. However, consumer engagement will be supported by a programme of centralised activities undertaken by a new Central Delivery Body (CDB), funded by larger suppliers, with small suppliers contributing to the CDB's fixed energy costs.

OFGEM'S REQUIRED FUNCTIONALITY

In its vision for the smart meter roll-out in 2010 Ofgem refers to "every home in Great Britain having smart energy meters" and "Businesses and public sector users will also have smart or advanced energy metering suited to their needs." This implies that we need to define exactly what constitutes a "smart meter" rather than one that is simply "advanced". This Annex looks first at the mandated minimum requirements for smart meters that have been set by Ofgem. Functionality has been included where there is a clear cost benefit case or where the additional costs are insignificant.

[21] The SEC is a new industry code created under the DCC licence. Energy suppliers and network operators are required by their licences to become parties to the SEC. The code is governed and amended by the parties to it under the regulatory oversight of Ofgem. It is being introduced in stages and is not yet complete. SEC will eventually incorporate governance of the technical specifications including SMETS and CHTS.

Ofgem's Original High-Level List of Functional Requirements for Domestic Smart Meters

	High-level functionality	Electricity	Gas
A	Remote provision of accurate reads/information for defined time periods-delivery of information to customers, suppliers and other designated market organisation	Yes	Yes
B	Two-way communication to the meter system; communications between meter and energy supplier and other designated market organisation; upload and download data through a link to the wide area network; transfer data at defined periods; remote configuration and diagnostics, software and firmware changes	Yes	Yes
C	Home area network based on open standards and protocols; provide "real time" information to an in-home display; enable other devices to link to the meter system	Yes	Yes
D	Support for a range of time of use tariffs; multiple registers within the meter for billing purposes	Yes	Yes
E	Load management capability to deliver demand-side management; ability to remotely control electricity load for more sophisticated control of devices in the home	Yes	No
F	Remote disablement and enablement of supply that will support remote switching between credit and pre-pay	Yes	Yes
G	Exported electricity measurement: measure net export	Yes	No
H	Capacity to communicate with a measurement device within a micro-generator; receive, store, communicate total generation for billing	Yes	No

These functional requirements are specified in detail in the Smart Metering Equipment Technical Specifications (SMETS). The initial SMETS (SMETS 1) functional requirement was sent to the European Commission in April 2012 and approval was received from the Commission in September 2012. It was designated by the Secretary of State in December 2012. A revised version was designated in March 2013[22].

Neither the consensus minimum functionality described by the Commission nor the High Level Functionality described by Ofgem seems to capture the full requirements of the vision

[22] Smart Metering Implementation Programme.- Smart Metering Equipment Technical Specifications Version 1.1 issued 31 March 2014

for smart meters and their place in smart grids. For example, the need to measure voltage and frequency are not mentioned. However, SMETS1 includes the requirements for voltage quality measurement and the full functionality may appear in the final detailed specification for mass roll-out (SMETS 2) due to be sent to the Commission for approval in September 2014. The SMETS is recognised by the industry as a developing specification which may be amended and add more functionality and capability over time.

Annex 2: List of Working Group Members

The following contributed to the work of the Working Group

Gary Cottrell - Energy and Utilities Alliance

Jeff Douglas - Energy Technologies Institute

John Heath - Lowri Beck

Kay Houghton - Calvin Capital Limited

Vanessa Northam - Eon

Howard Porter - BEAMA

Nigel Richardson - Energy Technologies Institute

Daniel Riley – Centrica

Richard Street - ICIS

Tony Thornton – Gemserv Limited

Jeremy Yapp - BEAMA

Secretariat

David Lewis Chair

Phil Royal

Beverley Kotey