Energy Smart Meters

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Background

Energy smart meters are advanced electricity and gas meters which can offer a range of intelligent functions. The *Energy Act 2008* gave powers to begin a smart meter rollout. Since then, successive Governments and Ofgem (the energy regulator) have been working on a rollout programme (this only applies in Great Britain as Northern Ireland has a separate energy market).

The Government have committed to offer more than 50 million energy smart meters to homes and smaller non-domestic sites in Great Britain by the end of 2020. Energy suppliers have a legal requirement to take all reasonable steps to install smart meters for their customers by this deadline. Due to rollout delays, the Government has proposed introducing a new obligation to 2024 that would apply after the current duty ends.

The Roll Out

The smart meter rollout began in 2011. Until recently the only type of smart meter being rolled out was the SMETS1 specification, which has caused some interoperability problems when consumers switch supplier. Suppliers should now be installing the more advanced SMETS2 meters, though there have been delays to the SMETS1-2 switch, and there are reports that ongoing problems with the infrastructure mean that some SMETS1 are still being installed. The SMETS2 meters are using new infrastructure, provided by the Data Communications Company. Eventually, the Government want SMETS1 meters to also be using this infrastructure.

The latest Government data showed that by the end of June 2019, 14.9 million smart and advanced meters were operating across homes and businesses, leaving the vast majority still to install.

Benefits and concerns

The Government's 2019 cost-benefit analysis estimates that by 2034, the rollout of smart meters will have delivered just under £6 billion of net benefits to consumers, energy suppliers and networks, made up of £19.5 billion of benefits offset by approximately £13.5 billion of costs.

Smart meters are intended to have benefits for consumers, suppliers and networks. For consumers, smart meters could provide more accurate bills, easier switching, clearer energy use through an in-home display, and the potential for reduced bills based on reduced consumption. For suppliers, smart meters could mean avoiding site visits (for example to check meters) and reduced customer service overheads due to more accurate billing. For networks, smart meters could facilitate a smarter grid, and the real-time data supplied by smart meters could make balancing the grid easier.

In addition to criticism for the repeated delays to the rollout, there are also customer concerns regarding energy smart meters including data protection and privacy, connectivity in areas with low or no mobile coverage, installation visits and doorstep selling, health concerns, disconnection of prepayment meters, and the ability to switch supplier and keep the 'smart functionality'.

1. Introduction

1.1 What are energy smart meters?

Energy smart meters are advanced electricity and gas meters which can offer a range of intelligent functions and have intended benefits for energy consumers, suppliers and networks.

The Government plan to roll out more than 50 million new energy smart meters to homes and smaller non-domestic sites in Great Britain. The rollout only applies in Great Britain as Northern Ireland has a separate energy market. The policy is led by the Department for Business, Energy and Industrial Strategy[1] (BEIS) and does not apply to large non-domestic customers.

Ofgem, the energy regulator, explains smart meters in a factsheet:

> A smart meter is a gas or electricity meter that is capable of two-way communication. It measures energy consumption in the same way as a traditional meter, but has a communication capability that allows data to be read remotely and displayed on a device within the home, or transmitted securely externally. The meter can also receive information remotely, e.g. to update tariff information or switch from credit to prepayment mode.[2]

Types of energy smart meters

Although energy suppliers can install a range of types of smart meters and in-home displays, there are broadly three categories of smart meter specification used in the UK smart meter rollout:

- **SMETS1 meters**: are the first generation of energy smart meters and are compliant with the first version of the Government's Smart Meter Equipment Technical Specification ('SMETS'). [3]

- **SMETS2 meters**: are the second generation of energy smart meters and are compliant with the second and latest version of the SMETS.[4] These do not have the interoperability issues of SMETS1 (see Section 1.2).

- **Advanced meters**: are energy meters which have some smart functionalities and are currently being offered to non-domestic sites only. They count towards the 2020 Government target that requires that over 50 million energy smart meters be offered to 30 million domestic and small non-domestic premises. In order to conform to the Government's standards, advanced meters must at least offer the function to store half-hourly electricity and hourly gas data to which both the customer and the supplier can have access.[5]

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[1]   Formerly, the Department for Energy and Climate Change (DECC).
[2]   Ofgem, *Factsheet 101 - Smart metering; what it means for Britain's homes*, 31 March 2011
[3]   DECC, *Smart metering implementation programme: smart metering equipment technical specifications*, 31 March 2014
[4]   DECC, *Smart metering equipment technical specifications: second version*, 28 November 2014
[5]   BEIS, *Smart Meters – Quarterly Report to end June 2017 Great Britain*, 31 August 2017, p.7

1.2 The Smart Meter Rollout

The *Energy Act 2008* gave the Secretary of State powers to begin a smart meter rollout. The rollout began in March 2011 and is composed of two stages:

- the Foundation Stage: which took place from March 2011 to October 2016, was designed as a transitory phase during which the Government set the regulatory and commercial frameworks and for suppliers to start rolling-out the early version of energy smart meters.

- the Main Rollout Stage: (also referred to as the Installation Stage) which began in November 2016 and was due to end in December 2020

The national 'main rollout' was initially intended to begin in 2014 and to complete in 2019. However, Ed Davey MP, the then Secretary of State for Energy and Climate Change, announced in a Written [Ministerial Statement](#) on 10 May 2013 that these dates had been put back to autumn 2015 for the full-scale rollout and the end of 2020 for completion. This was because the "consistent message [from industry] was that more time was needed if the mass rollout was to get off to the best possible start and ensure a quality experience for consumers."[6] The completion date has since been pushed back (see below).

SMETS1 to SMETS2 switch

SMETS1 were meant to be rolled out as part of the Foundation Stage (2011-2016) only. However, delays in the required infrastructure for SMETS2 (see DCC section below) meant that SMETS1 continued to be rolled out as part of the Main Rollout Stage. Following delays and a [consultation](#), the Government announced that the switch date (when SMETS1 will no longer count as part of the rollout) would be December 2018, while for pre-payment smart meters it would be 15 March 2019.[7] It has been reported that even though these deadlines have passed, SMETS1 are still being installed due to difficulties with SMETS2 infrastructure.[8]

In some cases, SMETS1 have not been interoperable when a customer switches supplier. This does not mean that the consumer cannot switch suppliers, but their smart meter may not retain its 'smart' functions with the new supplier and instead becomes a traditional (or 'dumb') meter. The National Audit Office have estimated that 70% of SMETS1 "go dumb" due to switching.[9]

SMETS2 were meant to be rolled out as soon as the Main Rollout Stage was launched in November 2016 because they are supposed to bring a solution to some of the interoperability problems. Instead, the first trial SMETS2 meters were installed by British Gas in August 2017.[10] At the

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[6]   *Written Ministerial Statement by Edward Davey: Smart Metering*, 10 May 2013
[7]   Smart Energy Code, *SMETS1 End Date Derogations*, 8 October 2018
[8]   Adam John, *Suppliers continue to install SMETS1 devices after deadline*, *Utility Week* 18 March 2019
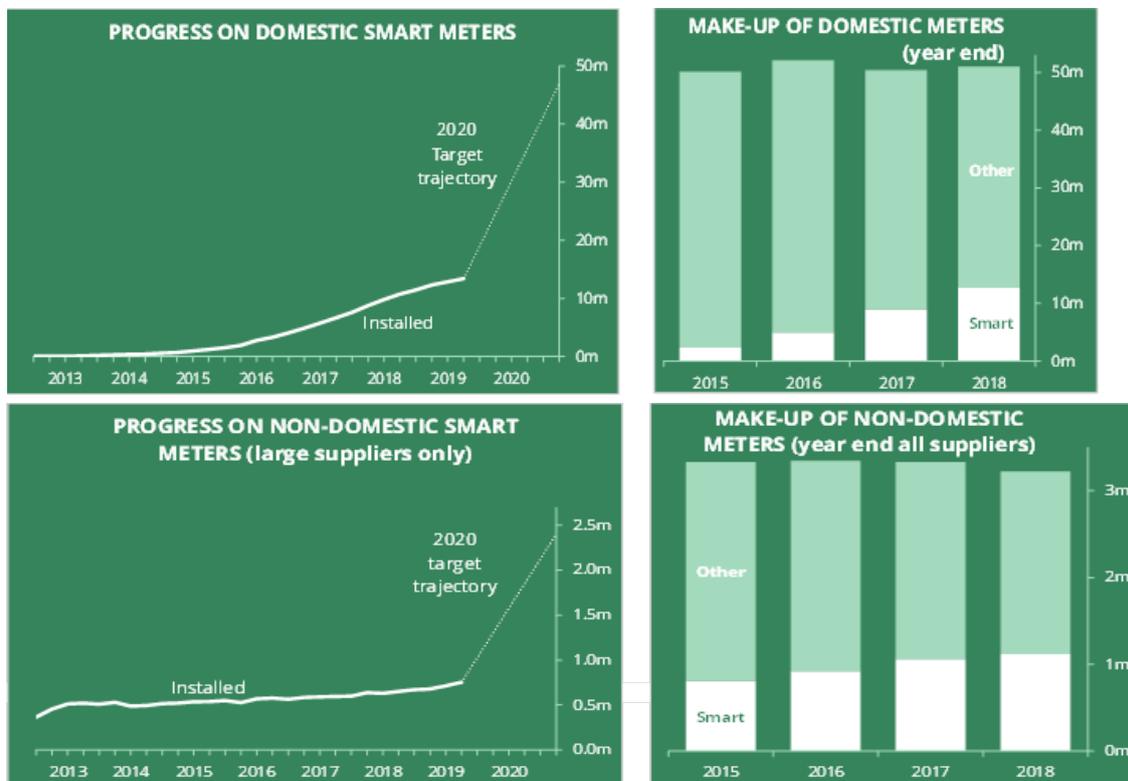[9]   National Audit Office, *Rolling out smart meters*, 23 November 2018
[10]   Landis+Gyr, *Britain leads smart revolution with deployment of most advanced smart meter*, 20 October 2017

time of writing, the DCC webpage said that over 2.2 million SMETS2 meters had been connected to the network.

The roll out completion date

The 2017 Conservative manifesto committed to *offering* as smart meter to all homes and small businesses by the end of 2020[11] and energy suppliers have a legal requirement to "take all reasonable steps" to *install* smart meters by the same date. The latest Government data showed that by the end of June 2019 2018, 14.9 million smart and advanced meters were operating across homes and businesses, leaving the vast majority still to install.

The charts below show installation levels (to June 2018), and the amount required over the next two years if the Government committed to the 2020 deadline.[12]

Consultation on new 2024 completion date

In September 2019, following delays to the rollout and widespread concern that by the end of 2020, in the words of the National Audit Office, "the number of smart meters installed […] will fall materially short of the Department's original ambitions,"[13,14,15] the Government published a consultation on Smart meter policy framework post 2020.

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[11]   The Conservative and Unionist Party Manifesto, 2017
[12]   For more information on this issue, see the Library insight on The smart meter roll-out: will the 2020 deadline be met?
[13]   National Audit Office, *Rolling out smart meters*, 23 November 2018
[14]   See also: Business, Energy and Industrial Strategy Committee, Oral evidence: Rolling out smart meters, HC 1851, 9 January 2019
[15]   See also: CMA, Review of the Energy Market Investigation (Prepayment Charge Restriction) Order 2016, 31 July 2019

The Government stated that they remain on track to offer a smart meter to every home and small business by the end of 2020. However, with reference to installations, it reported that forecasts suggested that by 2020, 30 million smart meters will be installed (i.e 23 million off the 53 million total metering points.)[16]

The Government therefore proposed a post-2020 regulatory framework requiring energy suppliers to install smart meters to a minimum of 85% of their customers (leaving a 15% tolerance level for external factors) by the end of 2024. The new obligation would take effect from 1 January 2021.[17]

The extension received a mixed response. The consumer group Citizens Advice called it "a commons sense move that is good news for customers" and said the new deadline allowed suppliers to fix technical problems and make sure customer service isn't sidelined.[18] However the shadow BEIS Secretary Rebecca Long Bailey said the Government had "botched" delivery of the rollout.[19]

Data Communications Company (DCC)
The rollout and switch to SMETS2 has faced delays due in part to the development of the data communications infrastructure that the smart meters are intended to use.

Initially, energy suppliers installing smart meters each entered into their own private commercial arrangements to access communications networks. Many of these use mobile communications networks (for example, either directly with one provider or through a 'roaming' sim which accesses many networks). As such, there were cases where customers were told they could not have a smart meter as the relevant communications network accessed by that energy supplier was not sufficient. This led to the issue of poor mobile coverage impacting the availability of smart meters (see section 2.8).

In September 2013, the Government granted Smart DCC Ltd[20] (also known as the Data Communications Company or the DCC) a licence to establish and manage a new data and communications network to connect smart meters to energy suppliers and other intermediaries and authorised users. Smart DCC Ltd is a wholly owned subsidiary of Capita. The communications network is illustrated in the diagram below, produced by DCC.[21]

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[16]   The 53 million figure does not exactly equte to the number of homes and small businesses because some customers will have more than one metering point i.e for dual fuels.
[17]   BEIS, Delivering a smart system, Consultation on a Smart Meter Policy Framework post 2020, September 2019
[18]   Citizens Advice, Smart meter rollout extension is "common-sense move", says Citizens Advice, 16 September 2019
[19]   Labour, Delayed smart meter rollout – Long Bailey responds, 17 September 2019
[20]   Data Communications Company, About DCC, [accessed 3 April 2019]
[21]   DCC, *Factsheet – Building a smart metering network for Great Britain*, p.2
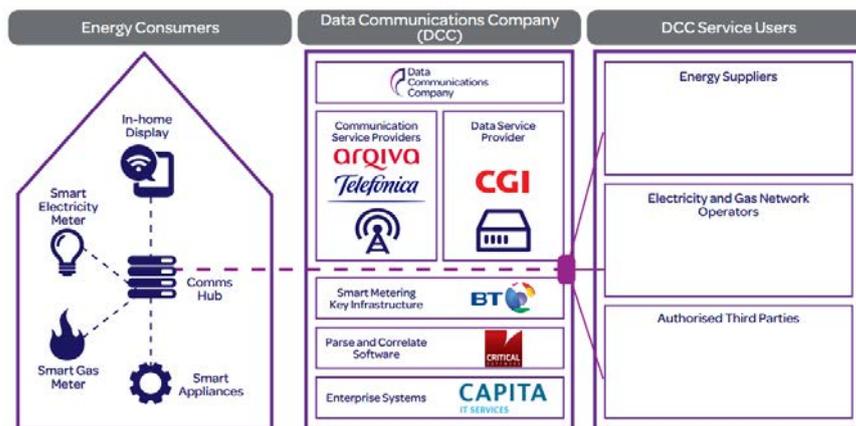
Following delays, the DCC 'went live' in November 2016, enabling the infrastructure to communicate with meters and allowing suppliers to begin to install SMETS2 meters. Eventually, the DCC will mean that energy suppliers will no longer need to procure their own data communications arrangements and coverage will not be linked or reliant to a consumer's mobile phone coverage.

The new communications network is known as wide area coverage or the Smart Meter Wide Area Network (SMWAN). DCC has announced that the SMWAN will be available in 99.50% of the North region and in 99.25% of the Central and South regions by 2020/21.[22] Smart meters will all use the single, centralised SMWAN provided by DCC. For those remaining premises that fall outside of this remit, DCC is also looking at solutions to 'cost-effectively extend coverage' to them.[23]

The Government's long-term intention is to have "all significant populations"[24][25] of SMETS1 meters to be 'enrolled' into the DCC infrastructure. This should allow them to be interoperable when a customer switches supplier. In response to a PQ in October 2018, the Government said that all SMETS1 meters would be migrated to the DCC "by the end of 2020"[26] and the DCC have said that migration will begin in 2019.[27] However the National Audit Office have warned that "it is not certain that [the enrolment] will work as intended" as solutions are technically challenging and still being developed.[28] This should allow them to be interoperable when a customer switches supplier. The Government have consulted on the business case for a possible enrolment.

1.3 Intended benefits of energy smart meters

The Government's 2019 cost-benefit analysis estimates that by 2034, the rollout of smart meters will have delivered just under £6 billion of

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[22]   DCC, *Business Plan 2017/18-2020/21*, p.11
[23]   Ibid.
[24]   PQ 208764, Energy: Meters, 21 January 2019
[25]   The Government have so far consulted on requiring the DCC to enrol all types of SMETS 1 meter except the EDMI set, which comprises less than 1% of the remaining meters to be enrolled.
[26]   PQ 177371, Energy: Meters, 9 October 2018
[27]   DCC, Update on SMETS1 enrolment and adoption, 5 March 2019
[28]   National Audit Office, Rolling out smart meters, 23 November 2018, p.13

net benefits to consumers, energy suppliers and networks, made up of £19.5 billion of benefits offset by approximately £13.5 billion of costs. The majority of the benefits are savings for suppliers (41% such as for avoided site visits and customer issues) and customer energy and time savings (total 39%) and there will also be savings from network benefits (2%), reduced greenhouse gas emission benefits (8%), and an air quality impact (2%).

Benefits for consumers[29]

Energy smart meters with an in-home display give consumers information about their energy consumption. The aim is that with this, customers can take "informed decisions to reduce consumption and thereby bills and CO_2 emissions".[30]

Various research studies have been conducted about the extent to which in-home displays reduce energy consumption.[31] In the UK, the Government's 2011 Energy Demand Research Project[32] (based on large scale pre-roll out trials by energy suppliers), and the 2015 Early Learning Project[33] (based on early stage rollout consumption data and qualitative research) predicted energy savings of around 3%. BEIS has collected and reviewed evidence from energy suppliers, finding that consumption reductions are being achieved and sustained in line with the programme's original expectations, resulting in an assumed demand reduction per household of 3% for electricity and 2.2% for gas (credit, 0.5% for gas prepayment).[34]

Previously, meters had to be manually read, and customers would receive estimated bills. Smart meters can provide half-hourly data, meaning customers should benefit from more accurate billing and avoiding meter reading visits. Similarly, half-hourly data can help the energy system become smarter and more flexible by supporting a more accurate settlement process. Settlement refers to reconciling the difference between the electricity purchased by suppliers from generators based on what they expect their customers to consume, and what their customers actually consume. Electricity is purchased by suppliers in half-hourly periods, but consumption for most customers is not settled half-hourly, instead based on their own meter readings.

Until recently, under Ofgem's smart metering Data Access and Privacy Framework (DAPF) domestic customers had to opt-in to sharing their half-hourly consumption data, and micro-business customers have the

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29   It is important to note that currently, due to the variety of smart meters available (i.e. SMETS1 and SMETS2, and different options from different suppliers), not all smart meters have the capacity to offer all the benefits.

30   DECC, Domestic Sector Impact Assessment, April 2012

31   For example see European Smart Metering Industry Group, The role of data for consumer centric energy markets and solutions, 8 January 2019, and Meijer, Straub, & Mlecnik, Impact of Home Energy Monitoring and Management Systems (HEMS): Triple-A: Stimulating the Adoption of low-carbon technologies by homeowners through increased Awareness and easy Access D2.1.1. Report on impact of HEMS, Delft University of Technology, 2018

32   Ofgem, Energy Demand Research Project Final Analysis, 23 June 2011

33   Gov.uk, Smart Metering Early Learning Project and Small-Scale Behaviour Trials, 2 March 2015

34   BEIS, Smart meter roll-out Cost Benefit Analysis 2019, September 2019

option to opt-out. In June 2019, following a consultation on half-hourly metering for settlement purposes, Ofgem decided that though the rules for existing customers would remain unchanged, when switching suppliers, domestic customers will move from an opt-in for half-hourly metering to an opt-out, and microbusiness customers would no longer be able to opt-out.[35] This change only relates to data access for settlement purposes; for all other purposes the current data access rules will continue to apply.

Half-hourly metering can also lead to new time-of-use rewards. The price of electricity varies throughout the day as demand and supply vary. Energy tariffs can capture the variation in demand and therefore the cost of energy; allowing consumers to be rewarded for using electricity at times when there is less demand.[36] Time of use tariffs have existed in terms on Economy 7 and Economy 10 which reward customers for using energy at night or at prescribed "low peak" periods, but smart time of use tariffs, which respond to the unique daily variations in prices, were first introduced in the UK in January 2017.

This change could be aided by smart appliances that do not need to operate at a particular time and so can choose to operate when energy is cheapest, for example washing machines running overnight (though there are some safety issues to consider.) There is potential for smart meters to catalyse the growth of new products and services such as smart appliances and home batteries which could turn on or off in response to energy tariff price information. This could mean that consumers become active in the network by providing energy or demand side response services to balance the grid.

Smart meters should eventually also make it easier for customers to switch energy supplier, which some argue could lead to a more competitive market with lower tariffs.[37]

Critics argue that the precited savings are inflated and as the cost of the rollout is rising, consumers are seeing reduced net benefits.[38]

Benefits for suppliers

Suppliers benefit from smart meters by avoiding site visits for example to check meters. The more accurate data should also reduce enquiries and customer service overheads, and reduce debt management needs.

Suppliers also benefit from remotely managing customers, for example in terms of switching to pre-payment meters, and disconnecting customers, though existing protections for these customers will remain in place. In a competitive market, a proportion of savings experienced by suppliers may also be expected to pass on to consumers.

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[35] Ofgem, Decision for access to half-hourly electricity data for settlement purposes, 25 June 2019

[36] Written evidence submitted by the Department of Energy and Climate Change (DECC), SME0031, 26 April 2016

[37] Commons Library, The Domestic Gas and Electricity (Tariff Cap) Act, 17 August 2018, Section 6 – Smart Meters

[38] British Infrastructure Group, Not so smart, July 2018

Benefits for networks and smart appliances

As described above, the half-hourly metering that smart meters can provide benefits network operators as well as consumers. National Grid as the network operator must ensure supply meets demand on a second by second basis, including through the daily range of peaks and troughs. The real-time data supplied by smart meters not only makes predicting demand easier, but it also allows consumers to reduce energy demand and pressures on the grid at peak demand times, especially when combined with time-of-use tariffs.[39] This form of 'demand side response' using smart meters can lessen demand peaks and make it easier to balance the grid, and reduce the amount of electricity generation capacity required.

In future, these changes could help contribute to a 'smart grid' that is more efficient.[40] Consumers have the potential to be more active in a smart grid, with domestic renewables, battery storage, electric cars, and smart appliances, working to balance the grid by consuming and providing energy when it is most convenient.

1.4 Consumer engagement and Smart Energy GB

In 2013, following a consultation on engaging consumers,[41] the then Department of Energy and Climate Change established Smart Energy GB to engage customers. Since it was created, it has run information campaigns on the rollout and has a website where consumers can find information on how the policy will affect them. The website also contains information on how to save energy and feedback from smart meter users.

Smart Energy GB's 2019 Smart Energy Outlook combined data from an online survey conducted by Populus and found:

- 98% of people in GB are aware of smart meters

- 39% would like to get a smart meter in the next six months (of those who haven't already upgraded to a smart meter)

- 65% of people with smart meters are more conscious of their energy use

- 79% of people with smart meters have a better idea of their energy costs

- 66% of people with smart meters would recommend them to others[42]

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[39] Written evidence submitted by the Department of Energy and Climate Change (DECC), *SME0031*, 26 April 2016
[40] For more information, see the Library briefing paper on Electricity grids.
[41] DECC, Government Response to the Consultation on the Consumer Engagement Strategy, December 2012
[42] Smart Energy Outlook, Smart Energy GB, March 2018

2. Consumer concerns and questions

2.1 Are energy smart meters mandatory?

Energy smart meters are not mandatory – there is "no legal obligation on individuals to have one."[43]

The 2017 Conservative Manifesto stated that "smart meters will be **offered** to every household and business by the end of 2020".[44]

Supplier licence conditions require them at present to "take all reasonable steps to ensure that a [Smart Meter] is installed" in every premises where they supply electricity.[45]

The reference to "reasonable steps" is open to interpretation. There has been some criticism that certain suppliers are reportedly using unfair methods to install smart meters.[46] It is important to note that old meters may need replacing for general reasons such as safety or inaccuracy of measurement issues. It is also possible that a customer will not be able to access the best value tariffs if they do not have a smart meter.[47]

The Government's Post-2020 Smart Meter Policy Framework Consultation suggests replacing the "all reasonable steps" requirement with a total "market wide" supplier obligation. However, this does not mean that post-2020 roll out of smart meters will be mandatory as the consultation also refers to new consumer engagement activities that will be needed "to encourage and support customers to accept smart meters".[48]

2.2 Can a customer request an energy smart meter?

The obligation to rollout smart meters is supplier-led. This means that energy suppliers are free to plan the rollout in a way that suits their business and the needs of their customers, as long as they meet the overarching obligation.

For consumers who do want an energy smart meter, they can either wait for their energy supplier to contact them and make an offer to them, or they can proactively get in touch with their supplier to get one. However, householders who request an energy smart meter before the energy supplier makes them an offer should be aware that energy suppliers do not have to immediately meet the request.[49]

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43 BEIS, Guidance – Smart meters: a guide, 4 January 2018
44 The Conservative and Unionist Party Manifesto, 2017
45 Ofgem, Standard conditions of electricity supply licence, 19 July 2018
46 Which? Do you feel under pressure to get a smart meter? 26 February 2018
47 Ofgem, Smart meters: Your rights [accessed 3 April 2019]
48 BEIS, Delivering a smart system. Consultation on a Smart Meter Policy Framework post 2020, September 2019
49 Citizens Advice, Getting a smart meter installed [accessed 3 April 2019]

2.3 Recovery of installation costs by suppliers

The costs of the smart meter rollout are not paid by individuals, but are instead passed on to all consumer bills.

Suppliers cannot levy upfront costs for a **standard** smart meter installation. However, if a consumer requests **specific** installation work like a different location for the meter or anything different from the standard installation offer, suppliers may request that the customer incur the cost for the work. This can only be done under restricted circumstances and must be communicated clearly to the consumer before any work starts. [50]

2.4 Installation visit, entry rights and doorstop selling

There have been concerns about unwelcome sales activities at the point of installation and about upfront or one-off charging for smart metering equipment.[51]

Following a consultation, new licence conditions entered into force on 30 November 2012. They enabled suppliers to provide written marketing material or discuss generic approaches to improving energy efficiency. However, suppliers may only carry out face-to-face marketing discussions about specific products or services with the prior consent of the customer, unless that product or service is free. No sales may be completed at the visit.[52]

The licence conditions under which energy suppliers operate also required them to develop the *Smart Meter Installation Code of Practice* which came into force on 1 June 2013 and regulates how suppliers should behave when they install smart meters.

2.5 Data protection and privacy

Under data protection law, data is "personal data" when it can be used to identify a "living individual" or lifestyle. A smart metering Data Access and Privacy Framework (DAPF) was included into supplier license conditions in 2013. The framework covers access to domestic and microbusiness consumers' energy consumption data. Under the existing DAPF, energy suppliers require consent from domestic consumers to access their half hourly electricity consumption data and must give microbusiness customers the opportunity to opt-out.

In 2018, Ofgem consulted on changing this framework to increase access to data to make the electricity system more efficient, whilst also safeguarding consumer privacy. As discussed in Section 1.3 above, Ofgem has decided that for settlement purposes, though the rules for existing customers would remain unchanged, when switching suppliers,

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[50]   *Smart Metering Installation Code of Practice Section A: The Code of Practice*, Version 4.0, footnote 15, p.20

[51]   Ofgem & DECC, Smart metering implementation programme, Supporting document 2 of 5 30, March 2011

[52]   BEIS, Guidance – Smart meters: a guide

domestic customers will move from an opt-in for half hourly metering to an opt-out, and microbusiness customers would no longer be able to opt-out.[53]

The industry body Energy UK, its members and Consumer Futures have produced a *Data Guide for Smart Meters* outlining key information for consumers about their rights and choices.

2.6 Energy smart meters and health

Concerns have been expressed that exposure to electromagnetic fields emitted from smart meters may have health impacts.

Public Health England (PHE), an executive agency to the Department of Health, acts as an independent advisor to Government on the health aspects of radio waves from smart meters. PHE has produced guidance on Smart meters: radio waves and health (last updated June 2017). This states that the evidence to date suggests that exposure to radio waves from smart meters do not pose a risk to health:

> Smart meters use radio waves to allow remote readings to be taken from gas and electricity meters. They are expected to replace the existing meters in people's homes over the next few years.

> The evidence to date suggests exposures to the radio waves produced by smart meters do not pose a risk to health.

> Assessments made in other countries that use smart meters have found exposures that are low in relation to internationally agreed guidelines.

> Public Health England (PHE) has been carrying out an extensive programme of research to assess exposures from the devices as the technology is rolled out. The first set of results, involving laboratory measurements of the Home Area Network radio signals, are now published in the peer reviewed journal of Bioelectromagnetics.

> A selection of smart meter devices available in Great Britain were assessed during normal operation under controlled laboratory conditions.

> The results confirm PHE's existing advice that exposure to radio waves from smart meters is well below the guidelines set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

> The study also concluded that exposure to the radio waves produced by smart meters is likely to be much lower than that from other everyday devices such as mobile phones and Wi-Fi equipment.

> PHE considers exposure to radio waves does not provide a basis to decline having a smart meter.[54]

PHE also reports that it is committed to reviewing new scientific evidence in this area, and publishing updates as necessary.

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[53]   Ofgem, Decision for access to half-hourly electricity data for settlement purposes, 25 June 2019

[54]   PHE, Guidance, Smart meters: radio waves and health, Last updated June 2017

2.7 Vulnerable and prepayment customers

The Public Accounts Committee have previously raised concerns about the ease of disconnecting customers with smart meters and the risk that benefits would accrue more to supply companies than to vulnerable customers and those on prepayment meters.

In September 2011, Ofgem introduced new licence conditions for suppliers as part of its *Smart Metering - Consumer Protections Package* which ensure that:[55]

- Rules around pre-payment and disconnection apply to remote switching and remote disconnection.

- Suppliers are prohibited from disconnecting customers of pensionable age who live alone or with others of pensionable age or under the age of 18 during winter.

- They take all reasonable steps to avoid disconnecting other customers of pensionable age or customers who are disabled, chronically ill or otherwise vulnerable.

- They offer consumers pre-payment meters before they disconnect them, if they are having difficulty paying.

- They consider whether it is safe and reasonably practicable for a customer to be offered pre-payment and when establishing whether the customer or other occupants are vulnerable before disconnection.

To solve some of the other issues faced by prepayment customers, pay-as-you go functionality was built into energy smart meters. Prepayment meter customers may therefore benefit from energy smart meters in terms of:

- New and more flexible ways of topping up remotely

- Ways to set up automatic top-ups to avoid power cuts.[56]

2.8 Switching suppliers and 'dumb' meters

Consumers are always able to switch suppliers. However, there may be cases in which SMETS1 smart meters are not interoperable between energy suppliers. This does not mean that the consumer cannot switch suppliers, but their smart meter may not retain its 'smart' functions with the new supplier. In these cases, the meter will continue to function as a traditional (or 'dumb') meter. This can also happen without switching in areas of poor mobile coverage.[57] The National Audit Office have estimated that 70% of SMETS1 meters "go dumb" due to switching.[58]

"I'm a prepayment customer, can a smart meter make it easier for my supplier to disconnect me?"

Suppliers must follow strict guidance before disconnecting any of their customers regardless of the type of meter used. Customers who think they are being unfairly treated should seek help from their local Citizens Advice Bureau.

Can I switch suppliers with a smart meter?

Yes, but if you have a SMETS1 meter you may not be able to do so whilst retaining all of its smart functions. This problem should be resolved with SMETS2 meters.

[55]   Ofgem, Modification of Standard Conditions of Gas and Electricity Supply Licenses, 23 September 2011
[56]   Gov.uk, Smart meters: a guide [accessed 3 April 2019]
[57]   Victoria Bischoff, Call that smart? New energy meters won't work in 1 in 3 homes: The farce behind scheme designed to cut bills (but actually cost us all £11 billion), This is Money, 5 May 2017
[58]   National Audit Office, Rolling out smart meters, 23 November 2018

In order to help domestic customers understand if the smart meter services they are receiving will be maintained when they switch supplier, Ofgem set new licence conditions requiring that energy suppliers inform consumers that they may lose their smart functionality on change of supplier.[59]

The Government has said its intention is to have "all significant populations"[60] of SMETS1 meters 'enrolled' into the DCC infrastructure and that there is "an obligation on energy suppliers to ensure that all consumers with a smart meter will retain smart services upon switching by the end of 2020".[61] However the National Audit Office have warned that "it is not certain that [the enrolment] will work as intended" as solutions are technically challenging and still being developed.[62]

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[59] Ofgem, Supporting effective switching for domestic customers with smart meters: Modification of supply licence standard conditions, 28 August 2012
[60] PQ 208764, Energy: Meters, 21 January 2019
[61] PQ 208764, Energy: Meters, 21 January 2019
[62] National Audit Office, Rolling out smart meters, 23 November 2018, p.13

3. Legislative basis for smart meters

3.1 EU Directives

The European Union Directive *2006/32/EC* on energy end-use efficiency and energy services requested that Member States provide "individual meters" that show consumption in real-time to European consumers "in so far as it is technically possible, financially reasonable and proportionate in relation to the energy savings".[63]

Three years later, EU Directive (*2009/72/EC*) stated "where the rollout of smart meters is assessed positively, at least 80% of consumers should be equipped with intelligent metering systems by 2020."[64] No deadline was given for gas meters but Directive (*2009/73/EC*) required Members to prepare a timetable for the delivery of intelligent gas meters.[65]

3.2 The 1997-2010 Labour Government

The then Secretary of State for Trade and Industry Alistair Darling's 2007 White Paper *Meeting the Energy Challenge: A White Paper on Energy*[66] said the Labour Government would consult on requiring energy companies to provide energy smart meters to all but the smallest businesses.[67]

Sections 88-91 of the *Energy Act 2008* gave the Secretary of State broad powers to implement and direct the rollout of smart gas and electricity meters. These were due to expire in November 2013 but were extended by the Coalition Government.

3.3 The Coalition and Conservative Governments

The Coalition Programme stated that they would "establish a smart grid and rollout smart meters".[68] The Coalition Government established a national energy smart meter rollout programme that put an obligation on energy suppliers to take all reasonable steps to replace 53 million gas and electricity meters in domestic and small non-domestic premises of Great Britain.[69] The Government aimed for all homes and small businesses to have a smart meter by 31 December 2020, with the bulk of the rollout taking place between 2016 and 2020.

The *Energy Act 2011* (section 73) was amended to extend the 2008 Act's provisions to 2018.

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[63] *Directive 2006/32/EC*, Article 13
[64] *Directive 2012/27/EU*, para. 31
[65] Ibid.
[66] CM 7124 DTI May 2007
[67] *Meeting the energy challenge: a white paper on energy*, pp.10-11
[68] HM Government, *The Coalition: our programme for government*, May 2012, p.16
[69] DCLG, DWP, DECC & Ofgem, *Policy paper: 2010 to 2015 government policy: household energy,* 'Smart meters', 8 May 2015 [accessed 3 April 2019]

Licence conditions have also been amended several times under the
Energy Act 2008 powers to reflect new obligations placed on energy
suppliers for the delivery of the smart meters. Some of the key changes
to licence terms were:

- The obligation to take all reasonable steps to complete the rollout
  by 31 December 2020.

- The obligation to refrain from doing any sales when doing home
  visits to install smart meters.

- The obligation to report on costs and benefits of the rollout to
  Ofgem on a regular basis.

- The obligation to provide customers with an in-home display or an
  alternative display even when they switch suppliers.

- The obligation to give energy efficiency advice during the
  installation visit.

- The obligation to establish and maintain a remote connection to
  smart meters and to take all reasonable steps to bill customers in
  a way that reflects meter readings.

- The obligation to identify vulnerable customers before taking the
  decision to disconnect any domestic consumer

- The obligation to inform customers about the implications that
  switching suppliers will have in terms of smart functionality.

The Smart Energy Code incorporates some of these obligations into a
wider body of rights and obligations placed on suppliers and DCC.

In addition, the Smart Metering Installation Code of Practice (SMICOP)
regulates the behaviour that energy suppliers must adopt when visiting
customers' home to do an energy smart meter installation.

There are already obligations on people to allow energy companies to
replace meters on a regular basis on safety grounds and to ensure they
continue to measure accurately. Suppliers may therefore approach
customers whose meter need replacing with an energy smart meter
offer. However, customers are still allowed to refuse that their obsolete
meter is replaced with an energy smart meter and can ask for a 'dumb'
meter instead.[70]

3.4 The Smart Meter Act 2018

At the Queen's Speech 2017,[71] the Government announced a Smart
Meters Bill. The Bill received Royal Assent on 23 May 2018. The Act
extends again the powers the Secretary of State has to implement and
direct the rollout of smart gas and electricity meters from 2018 to 2023.
The Act also legislates for a 'special administration regime' for the
national smart meter communication and data service provider to
ensure the service continues to be provide even in the unlikely case of

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[70]   Which?, Do I have to accept a smart meter? [accessed 3 April 2019]
[71]   Cabinet Office, *Queen's Speech 2017: background briefing notes*, 21 June 2017,
       p.32

its insolvency. More information on the Act is available from the Library's Smart Meter Act Paper.

3.5 The current Government

In September 2019, following delays to the rollout and widespread concern that by the end of 2020, in the words of the National Audit Office, "the number of smart meters installed […] will fall materially short of the Department's original ambitions,"[72,73,74] the Government published a consultation on Smart meter policy framework post 2020. This proposed a post-2020 regulatory framework requiring energy suppliers to install smart meters to a minimum of 85% of their customers (leaving a 15% tolerance level for external factors) by the end of 2024. The new obligation would take effect from 1 January 2021.[75] More information is available in section 1.2.

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[72]   National Audit Office, *Rolling out smart meters*, 23 November 2018

[73]   Business, Energy and Industrial Strategy Committee, Oral evidence: Rolling out smart meters, HC 1851, 9 January 2019

[74]   CMA, Review of the Energy Market Investigation (Prepayment Charge Restriction) Order 2016, 31 July 2019

[75]   BEIS, Delivering a smart system, Consultation on a Smart Meter Policy Framework post 2020, September 2019

4. Evaluations of the energy smart meter rollout

4.1 Government reports

Impact assessments (2011-2014)

The Government published several impact assessments of the energy smart meter rollout between 2011 and 2014.

The 2014 assessment predicted that the rollout of energy smart meters would cost around £10.9 billion, delivering benefits of £17.1 billion. The figures were higher in terms of costs and lower in terms of gross benefits and net benefits than those published in the previous assessment. The overall domestic and non-domestic net benefit figure was expected to be about £6.2 billion. [76]

Cost-benefit analysis (2016)

BEIS published a cost-benefit analysis in which the total estimated cost of the policy by 2030 remained virtually unchanged **(£11 billion**) but the figures for both total estimated gross benefits and net benefits went **down**. The Government estimated that the policy would deliver benefits of £16.7 billion and net benefits of **£5.7 billion** by 2030 and reduce the average household's combined electricity and gas bill by **£11** in 2020 and **£47** in 2030.[77]

Critics[78] highlighted that these figures were **lower** than the previous estimated long-term savings which were at £24 per annum for the average household in 2020. However, fewer commented on the fact that the Government's new estimate of long-term savings in 2030 is **higher** than the one published in 2014 (£39 at the time).[79]

The Government explanation of the reduction in gross and net benefit figures was that it was due to updates to cost updates and to assumptions around reduced fossil fuel and energy price projections.[80]

Cost-benefit analysis (2019)

During the progress of the Smart Meter Bill (now *Smart Meters Act 2018*) through Parliament, the Government committed to publishing an update to the cost-benefit analysis in 2019.[81]

The new analysis was published in September 2019. The Government said that differences between the 2019 and previous analyses meant that "direct comparisons should not be drawn". The 2019 analysis

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[76] DECC, *Smart meter roll-out for the domestic and small and medium non-domestic sectors (GB)*, 30 January 2014

[77] BEIS, *Smart meter roll-out cost-benefit analysis – Part I*, August 2016

[78] For example, this criticism was voiced in the following articles: The Evening Standard, 'Not so smart meters', 15 November 2016; The Independent, Bad news on smart meters 'buried on day of Trump win', 16 November 2016.

[79] DECC, *Smart meter roll-out for the domestic and small and medium non-domestic sectors (GB)*, 30 January 2014

[80] BEIS, *Smart meter roll-out cost-benefit analysis – Part I*, August 2016, Figure 1-1, p.14-15

[81] HC Deb, Smart Meters Bill, 5 February 2018, Vol 635, c1302

extends the outlook from 2030 to 2034, and estimated that total costs would increase to £13.5 billion largely because they would occur over a longer period than previously estimated. However, estimated total benefits would also increase to £19.5 billion, in part due to the monetisation of some previously non-monetised benefits for consumers. The total net benefits remained similar to the 2016 analysis, at just under £6 billion.

Annual progress reports

In December 2012 the Government published the [First Annual Progress Report on the Rollout of Smart Meters](#), which gave an overview of the programme and its progress.[82]

The Government has now published the second, third and fourth [annual progress reports on the smart meter rollout](#).[83,84,85] For 2016 and 2017, the Government published shorter progress updates.[86]

During the progress of the Smart Meter Bill (now *Smart Meters Act 2018*) through Parliament, the Government committed to providing a further progress report by the end of 2018.[87] The [2018 progress report](#) was published in December 2018 and referred to progress in 2018, such as the SMETS2 switchover, the commitment to enrol SMETS1 in DCC infrastructure, and the passing of the *Smart Meters Act 2018*.

In September 2019, the Government published [a report on the progress on the realisation of smart meter consumer benefits](#). This report provides an overview of the extent to which the anticipated benefits of smart meters for consumers are being realised, and plans in place for future progress.

The Government also published Quarterly statistics on installations.[88]

4.2 National Audit Office and Select Committee reports

The first National Audit Office report (2011)

The National Audit Office (NAO) looked at *[Preparations for the rollout of smart meters](#)* in a June 2011 report[89]. The NAO was concerned about how far energy smart meters would change energy use over sustained periods, considering that evidence on sustained behaviour change by domestic consumers is limited and that the behaviour observed in other countries might not be relevant to consumers in Britain.

The head of the NAO said that the then Department of Energy and Climate Change (DECC) had to address 'major risks' to achieve value for money in delivering the programme since there was 'limited evidence'

[82]   DECC, *Smart Metering Implementation Programme: First Annual Progress Report on the Roll-out of Smart Meters*, December 2013
[83]   DECC, *Second annual report on the roll-out of smart meters*, December 2013, p.6
[84]   DECC, *Third annual report on the roll-out of smart meters*, December 2014, p.7
[85]   DECC, *Fourth annual report on the roll-out of smart meters,* December 2013, p.6
[86]   Gov.uk, *Smart meters: a guide*, last updated 4 January 2018
[87]   HL Deb, Smart Meters Bill, 15 May 2018, vol 791, [c607](#)
[88]   Gov.uk, Smart Meters Statistics, 31 May 2018
[89]   NAO, *Preparations for the roll-out of smart meters* HC 1091, 2010-2012, June 2011

of how much and for how long British consumers' behaviour might change, and costs 'could escalate'.

The first Public Accounts Committee report (2012)

On 17 January 2012 the Public Accounts Committee (PAC) published its report *Preparations for the rollout of smart meters*.[90] The Committee welcomed the introduction of energy smart meters, but like the NAO, it highlighted that this large complex programme had significant uncertainties over the estimated costs and benefits involved. It felt it was "far from certain" that all consumers would benefit, and that many of the benefits would accrue in the first instance to energy suppliers. It said DECC needed to set out how it proposed to engage and inform consumers of the potential benefits to them.

In a response to the PAC's report,[91] the coalition Government agreed that there was a need for transparency around the costs and savings. Under the *Energy Act 2011* DECC would require suppliers to report on their progress on implementation and on their costs and savings. DECC would also report annually on the benefits to consumers to provide transparency and help build confidence.

The second NAO report (2014)

An updated NAO report in 2014 said the economic case for the programme "remains positive" but:

> Significant risks remain including potential consumer resistance to smart meters, the need for industry to resolve outstanding technical issues, the readiness of suppliers, network operators and the supply chain for large-scale installation and the robustness of the data security and privacy arrangements.[92]

The second PAC Report (2014)

On 10 September 2014, PAC published a second report on the preparations for smart metering.

The report set the potential bill savings against the cost to consumers of the energy smart meter rollout:

> The Government estimates that £26 will be saved on average by consumers who pay average bills of £1,300 per annum—a saving of just under 2%. This saving has to be set against the cost of £10.6 billion which will be met by consumers at an average cost that will peak at £11 per annum in 2017.[93]

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[90]   PAC, *Preparations for the roll-out of smart meters,* HC 1617, Sixty Third Report 2010-2011, 17 January 2012

[91]   HM Treasury March 2012 *Treasury Minutes Government Responses on the Sixty Second to the Sixty Seventh Reports from the Committee of Public Accounts: Session 2010-12* Cm 8335

[92]   NAO, *Update on preparations for Smart Metering*, HC 167, 2014-2015, June 2014

[93]   PAC, *Update on preparations for the roll-out of smart meters,* HC 103, Twelfth Report 2014-2015, 10 September 2014

The Committee recommended that in light of these costs and benefits the Department should keep the design of the programme under review in case costs escalated.

The first Energy and Climate Change Committee report (2013)

The then House of Commons Energy and Climate Change Committee (ECCC – now subsumed by the Business, Energy and Industrial Strategy Committee - BEIS) inquired into the Government's energy smart meter programme and published its findings in July 2013.

The Committee considered energy smart meters had the potential to bring great benefits to consumers, suppliers and the UK energy infrastructure more widely. However, they also concluded that a positive experience for customers would only come if the programme made further efforts to ensure that benefits of the technology were spelt out to customers.

The second ECC report (2015)

In 2015, the ECC Committee followed up with a second inquiry on the progress of the energy smart meter rollout. The final report criticised the Government for failing to resolve the following issues:

- Technical communication problems with multiple occupancy and tall buildings which should have been resolved by now

- Compatibility problems between different suppliers and different meters

- A slow start to full engagement with the public on meter installation and long-term use

- A delay by the Government-appointed communications infrastructure company which has further set back confidence in the programme

- A reluctance to improve transparency by publishing the Major Project Authority's assessments on the smart meter programme.[94]

The Committee warned the Government that failure to solve these issues meant that programme ran "the risk of falling short of expectations" and "could prove to be a costly failure."[95] The Committee also expressed scepticism at the likelihood of the rollout being completed by the end of 2020.

The Government and Ofgem responded to the Committee with reassurances on the "good progress" that was "being made on developing technical solutions.[96] The Government disagreed with the

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[94]   ECC Committee, *Smart meters: progress or delay?*, Ninth Report 2014-2015, HC 665, 7 March 2015, p.3
[95]   ECC Committee, *Smart meters: progress or delay?*, Ninth Report 2014-2015, HC 665, 7 March 2015, p.3
[96]   ECC Committee, *Smart meters: progress or delay?: Government and Ofgem Response to the Committee's Ninth Report of Session 2014–15*, para. 1

Committee's recommendations regarding interoperability and said that SMETS 2 meters would solve this issue.[97]

The Science and Technology Committee report (2016)

The Science and Technology Committee (STC) also ran an inquiry into the energy smart meter programme. This inquiry led the Committee to raise concerns over the Government's approach to the evidence check process. The Committee also commented on the "lack of clarity about the primary purpose of smart metering" [98] and that it was the Government's responsibility to make sure that consumers were engaged with the rollout before, during and after installation.

The Committee was satisfied with the evidence it received that the issue of data protection and security was taken seriously by GCHQ but it found that the issue of interoperability of energy smart meters remained unresolved.[99]

In answer to the report, the Government argued that the issue of customer engagement was being remedied through Smart Energy GB's national consumer engagement campaign.[100]

The NAO is planning to publish another report on smart meters in Autumn 2018.

The third NAO report (2018)

On 23 November 2018, the NAO published a report on 'Rolling out smart meters', their third assessment of the rollout. The key findings included that the number of smart meters installed by 2020 "will fall materially short" of the Department's aims and that the cost of the programme have increased "by at least £0.5 billion" since the Department's last forecast. The report concluded:

> The facts are that the programme is late, the costs are escalating, and in 2017 the cost of installing smart meters was 50% higher than the Department assumed. 7.1 million extra SMETS1 meters have been rolled out because the Department wanted to speed up the programme. The Department knows that a large proportion of SMETS1 meters currently lose smart functionality after a switch in electricity supplier and there is real doubt about whether SMETS1 will ever provide the same functionality as SMETS2. The full functionality of the system is also dependent on the development of technology that is not yet developed.[101]

The NAO said that the issues were "not fatal" to the viability of the programme but needed to be addressed for smart meters to "progress successfully and deliver value for money." The NAO made a series of

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97   ECC Committee, *Smart meters: progress or delay?: Government and Ofgem Response to the Committee's Ninth Report of Session 2014–15*, para. 2

98   STC, *Evidence Check: Smart metering of electricity and gas,* HC 161, Sixth Report 2016-2017, 24 September 2016, p.5

99   STC, *Evidence Check: Smart metering of electricity and gas,* HC 161, Sixth Report 2016-2017, 24 September 2016, p.5

100   STC, *Evidence Check: Smart metering of electricity and gas: Government Response to the Committee's Sixth Report of Session 2016–17*, 7 December 2016, para. 11

101   National Audit Office, *Rolling out smart meters*, 23 November 2018

recommendations, including that BEIS should assess the value for money of the 2020 deadline in its upcoming cost-benefit analysis.

4.3 British Infrastructure Group

The British Infrastructure Group (BIG) of parliamentarians is a cross party group of MPs and peers. In July 2018, BIG published a report titled Not so smart: A comprehensive investigation into the roll-out of smart meters. The report said the group "fully supports the rationale behind the energy smart meter roll-out, and the goals it seeks to achieve" but called on the Government to review the rollout, as the deadline would "almost certain[ly]" be missed, and there were possible impacts on the cost and consumer benefits.[102]

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[102]   British Infrastructure Group, *Not so smart: A comprehensive investigation into the roll-out of energy smart meters*, July 2018