House of Commons

Energy and Climate Change Committee

# Smart meter roll-out

## Fourth Report of Session 2013–14

### *Volume I*

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## The Energy and Climate Change Committee

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The Report of the Committee, the formal minutes relating to that report, oral evidence taken and some or all written evidence are available in a printed volume. Additional written evidence may be published on the internet only.

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The current staff of the Committee are Sarah Hartwell-Naguib (Clerk), Liz Bolton (Second Clerk), Dr Alfred Gathorne-Hardy (Committee Specialist), Tom Leveridge (Committee Specialist), Luanne Middleton (Inquiry Manager), Shane Pathmanathan (Senior Committee Assistant), Jonathan Olivier Wright (Committee Assistant), Joe Strawson (Committee Support Assistant) and Nick Davies (Media Officer).

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## Report

# Summary

Smart metering has the potential to bring wide benefits to consumers, energy suppliers and our energy infrastructure, and we welcome this investment in the UK's energy system.

Mass roll-out is due to take place between 2015 and 2020, and will see energy companies install approximately 53 million smart meters in homes and small businesses. DECC estimates that roll-out will cost around £12.1 billion and deliver benefits of £18.8 billion. Projected benefits include accurate billing, easier switching, energy and bill savings for consumers, and operational savings for energy suppliers. Smart meters could also facilitate the creation of a smart grid that will help to balance peaks and troughs in electricity supply and demand, but the extent to which they will do this is unclear. Not enough has been done to quantify the benefits of a smart grid, and greater transparency is needed for the true costs and benefits of roll-out to be assessed.

The cost of roll-out will ultimately be paid for by consumers in their bills. There is a clear risk that the £6.7 billion net benefit projected by DECC may not be achieved if costs spiral or if consumers do not realise the expected energy and bill savings. DECC, Ofgem and some energy suppliers have suggested that competition in the market will ensure that costs are kept down and that benefits are passed on to consumers through lower energy prices, but we are not convinced that the energy market is sufficiently competitive to ensure this is the case. Until there is strong evidence that it is, DECC and Ofgem must retain responsibility for ensuring that costs do not spiral and that benefits are passed on. Energy companies should co-ordinate installation activity to ensure costs are contained and the benefits of roll-out are maximised.

Consumer acceptance of and engagement with smart metering is crucial to the success of roll-out. The extent to which consumers will benefit directly through energy and bill savings will depend largely on how they engage with smart meters. The provision of accurate, real-time consumption and billing data via the in-home display (IHD) is central to helping consumers to understand, reduce and alter their energy consumption habits. If households and small businesses are to be given the best chance of achieving savings, they should be offered free IHDs, which must provide accurate, real-time data.

It is important that people have a positive experience when they receive a smart meter and that the information they receive when it is installed will help them to get the most out of it. We welcome the action that DECC and Ofgem have taken to ensure that consumers will receive advice about smart meters and energy efficiency when the meters are installed. However, the benefits of receiving this information may be lost or significantly reduced if gaps in communications coverage mean that some smart meters have to be operated in "dumb" mode for some time after installation. It would be preferable to wait until communications issues are resolved before installing smart meters so that consumers can access the benefits of smart meters as soon as they are installed. Likewise, suppliers should not be pressed to roll-out earlier versions of smart meters now if they prefer to wait for a version that fully meets the technical specifications in order to give their customers a better experience.

We welcome DECC's recent decision to push back the timetable for roll-out to the new 2015-2020 dates, which was a sensible response to delays in the implementation programme. DECC should retain some flexibility in the new timetable, which should be driven by engineering and infrastructure requirements and the need to avoid cost escalation.

The messages that consumers hear about smart metering will be central to their perception of roll-out and whether they choose to accept a smart meter in their home. It is therefore crucial that the aims and potential benefits of roll-out are clear and that public concerns about smart meters are addressed. We welcome the action that DECC is taking to respond to the concerns that have been raised about health, data protection and privacy, and we urge it to outline what further action it will take to address such concerns.

A key lesson from other countries is that good consumer engagement is crucial to building public confidence in and support for smart metering. Current messages emphasise the savings that consumers may make on their energy bills as a result of smart meters, but fail to highlight the wider benefits. The strategic role of smart meters in helping to deliver a secure, affordable and low-carbon energy system for the future by facilitating a smart grid must be clarified, costed and explained to consumers. Government should also be clear about what it regards as a reasonable effort by energy companies to ensure the widest possible take-up of smart meters by consumers, and whether it expects customers who refuse to have a smart meter to be charged for the ongoing cost of manual meter-readings. The new roll-out timetable provides a welcome opportunity to ensure that public engagement strategies are well under way before mass roll-out begins and that a range of messengers, including charities, local authorities and other trusted third parties, will be involved.

# 1 Introduction

1. DECC has outlined its vision "for every home in Great Britain to have smart electricity and gas meters and for smaller business and public sector premises to have smart or advanced metering suited to their needs."[1] It says that "smart meters will play an important role in Britain's transition to a low-carbon economy and help us deliver an affordable, secure and sustainable energy supply."[2] Roll-out will involve visiting approximately 28 million homes and 2 million businesses to install 53 million smart meters, with mass roll-out planned to take place between 2015 and 2020.[3]

2. During roll-out, existing meters will be replaced by smart gas and electricity meters that enable two-way communication. Smart meters will transmit up-to-date readings of the amount of gas or electricity that has been used in each property and will receive information such as current tariff rates from suppliers. Consumers will be able to access information about their energy usage and costs in the home via a device called an in-home display (IHD). Suppliers are responsible for installing smart meters and will pass the costs of roll-out on to consumers through their bills.

3. In this inquiry we have looked specifically at the potential costs and benefits of roll-out and at how preparations for roll-out are progressing in key areas. Given that consumers will be paying for roll-out in their energy bills, and given the strong focus on consumer benefit in DECC's business case for roll-out, we have emphasised consumer aspects of roll-out. We highlight areas of concern regarding progress on preparations for roll-out.

4. We received more than 130 submissions of written evidence and heard oral evidence from a wide range of experts and organisations, as well as from DECC and Ofgem. We also received a valuable insight into the successes and challenges of roll-out in another jurisdiction from the experience of California. A full list of written and oral evidence can be found at the end of the report, and summary notes from our California meetings can be found in Annex 1. We are grateful for all the evidence we received.

1 Ev 93

2 Ev 93

3 *Smart meters: a guide*, DECC website, 19 July 2013, https://www.gov.uk/smart-meters

# 2 The cost-benefit case for roll-out

## Background

5. Some consumers already have a smart meter, but most people will not get one until they are rolled out on a mass scale between 2015 and 2020. More than a million have been installed already, and more than 50 million are expected to be installed in approximately 28 million homes and 2 million businesses during mass roll-out.

*Figure 1: How will smart meters work?*

Smart meters allow energy suppliers to get remote readings of the amount of electricity and gas used by individual households and businesses. This saves suppliers the cost of visiting properties to read meters manually. Smart meters also enable consumers to see how much energy they are using, in pounds and pence, as they are using it. This is expected to help them manage and reduce their energy consumption and costs.

A new communications system is being set up to handle smart meter communications, and contracts for this are currently being procured by DECC. Under this system, data about consumption will be transmitted from the smart meter to energy suppliers and other authorised parties via a central communications hub, which will be provided and managed by a new Data Communications Company (DCC). The DCC is expected to be up and running in time for mass roll-out in autumn 2015.

Communication between the smart meter and the DCC will happen over a wide area network (WAN) and home area network (HAN). The DCC will oversee the delivery of the WAN, which will enable communication from homes and businesses to the central communications hub. Homes and businesses will have their own HAN and individual communication hub, which will enable the smart meter to connect with the WAN.

Within the home, consumers will be able to see how much energy they have used and the cost of that energy on a device called an in-home display (IHD), which will be offered to them when the smart meter is fitted. The smart meter will communicate with the IHD over the HAN. Eventually, as smart appliances come on to the market, the HAN will enable communication between the smart meter and smart appliances in the home.

6. The smart meter roll-out programme will require significant investment, which will ultimately be paid for by consumers in their energy bills. The Public Accounts Committee (PAC) has described it as "a large complex programme...with significant uncertainties over the estimated costs and benefits involved."[4] Witnesses described many benefits that smart metering could bring to consumers, the industry and more widely.[5] However, some have

4 Public Accounts Committee, Sixty-third Report of Session 2010-12, HC 1617, *Preparations for the roll-out of smart meters*, summary, p. 3

5 Ev 65; Ev 71; Ev 27; Ev w47; Ev 74; Ev 80; Ev 85; Ev 87; Ev 89; Ev 93; Ev 99; Ev w118; Ev 106; Ev w122; Ev 110; Ev 121; Ev 126; Ev 146; Ev w127; Ev 150; Ev w134; Q 59 [Audrey Gallacher]; Q 79 [Sean Weir]; Q 114 [Dr Sarah Darby]; Q 162 [Professor Harriet Baldwin]; Q 163 [Dave Openshaw]; Q 193 [Dr Martyn Thomas]

questioned whether the potential benefits will be realised and whether costs can be kept under control.[6]

## DECC's cost-benefit calculations

7. DECC's updated impact assessment of January 2013, estimated a "positive net present benefit of £6.7 billion over the period to 2030, by delivering total benefits of around £18.8 billion and costs of around £12.1 billion."[7] Several witnesses agreed that the projected benefits were achievable, but SSE cautioned that the net benefit of roll-out "should not be exaggerated".[8] Some have questioned how the costs and benefits were calculated.[9] Orsis has stated that there remain "serious concerns with the accuracy of the Impact Assessment and the figures used to calculate the costs and benefits".[10] Alex Henney went further, suggesting that "civil servants cooked the numbers to come up with a net benefit of plus £4.9bn in 2011".[11] When we put this suggestion to DECC, Baroness Verma replied:

> I have looked at the evidence...and I think that cooking the numbers is far, far from the truth. We do in-depth analyses, and I am sure both Daron and Jacqui would verify that. We do go through looking at huge amounts of evidence on a very regular basis to ensure that the numbers stack up.[12]

## Potential benefits

8. DECC's most recent impact assessment lists potential benefits of £18.8 billion, including consumer benefits of £6.3 billion, supplier benefits of £9.07 billion, network benefits of £1.05 billion and carbon-related benefits of £1.46 billion. It also lists non-monetised benefits such as the "potential benefits from the development of a smart grid"; "stronger competition between energy suppliers due to increased ease of consumer switching and improved information on consumption and tariffs"; and improved customer experience from "an end to estimated billing and more convenient switching between credit and pre-payment arrangements".[13] When we asked Baroness Verma what benefits DECC hoped smart meters would deliver, she focused on the projected consumer benefits:

> What we are trying to do is to ensure that, first of all, consumers can have some control over their own usage…With the smart meter, I think the consumers will be better informed. It also gives them an idea of the sort of appliances that they are using and the levels of energy usage. I think it is about looking at behaviour change, trying to make consumers more empowered, and also make energy companies work

6 Ev 93; Ev 58; Ev w75; Ev 80; Ev 87; Ev 99; Ev 126; Ev w127; Alex Henney and Ross Anderson, *Smart Metering – Ed Milliband's Poisoned Chalice*, (2012), http://www.cl.cam.ac.uk

7 Ev 93

8 Stuart Rolland, Darren Braham and Don Leiper, Qq 266-67; Ev 85; Ev 87; Ev 99; Ev 106; Ev w118; Ev w122; Ev 110

9 Ev 58; Ev 87; Ev 92; Ev 99; Alex Henney and Ross Anderson, *Smart Metering – Ed Milliband's Poisoned Chalice*, (2012), http://www.cl.cam.ac.uk

10 Ev 92

11 Ev 58

12 Q 331

13 DECC, *Smart meter roll-out for the domestic and small and medium non-domestic sectors (GB): Final Impact Assessment,* January 2013, p. 3

a little harder, knowing that they have a much more savvy consumer that they are going to have to deal with.[14]

## Direct consumer benefits

9. DECC lists the benefits of smart meters for consumers as follows:

- Smart meters give you near real time information on energy use – expressed in pounds and pence
- You will be able to better manage your energy use, save money and reduce emissions
- Smart meters will bring an end to estimated billing – you will only be billed for the energy you actually use, helping you budget better
- Easier switching – smoother and faster to switch suppliers to get the best deals [15]

10. The provision of accurate bills and up-to-date energy consumption information were widely thought to be the most important benefits of smart meters for consumers.[16] Several witnesses agreed that this information should help consumers to gain a better understanding of their energy use, budget more effectively and reduce their energy consumption and costs.[17] DECC told us that its impact assessment "assumes that domestic consumers will reduce their consumption by 2.8%", but many witnesses have questioned this.[18] Policy Exchange said that DECC's 2.8% estimate was "rightly prudent, as it is not clear whether such savings can be delivered in a UK context".[19] Consumer savings are discussed in more detail in chapter 6.

11. Given the link between accurate, real-time billing information and projected consumer savings, it is concerning that Consumer Focus—now Consumer Futures—has questioned whether consumers with smart meters are currently receiving accurate and up-to-date billing information.[20] It said that the Consumer Direct/Citizens Advice service had received calls indicating that some customers were not getting accurate bills months after their smart meter had been installed, with some being back-billed for usage they thought they had paid for.[21] It suggested that suppliers should be obliged to provide accurate bills once smart meters are installed and should not be allowed to back-bill customers after smart meter installation.[22]

14 Q 329

15 *Smart meters: a guide*, DECC website, 19 July 2013, https://www.gov.uk/smart-meters

16 Ev w27; Ev w104; Ev 89; Ev 93; Ev w118; Ev w122; Ev 121; Ev 126; Ev 146; Ev 150; Q 260 [Don Leiper]; Q 294 [Maxine Frerk]; Q 373 [Jacqui Russell]

17 Q 59 [Audrey Gallacher]; Q 79 [Sean Weir]; Q 114 [Dr Sarah Darby]; Ev w27; Ev 89; Ev 93; Ev w118; Ev 121; Ev 126; Ev 146

18 Q 384 [Jacqui Russell]; Ev w66; Ev w68; Ev w77; Ev w81; Ev w82; Ev w83; Ev w90; Ev w111; Ev 126; Ev w125; Ev 146; Ev w127

19 Ev w127

20 Qq 56 and 61, [Audrey Gallacher]

21 Ev 126

22 Ev 126

12. When we put these concerns to DECC and Ofgem, they both said that there had been "teething problems" with accurate billing initially but that these had since been addressed.[23] Jacqui Russell of DECC said:

> Once a smart meter is there, and you can get to your meter reads without needing to get entry to the property, which is what the challenge is at the moment, then there should be no reason for people to be able to back-bill. There is no excuse. It is for Ofgem to regulate on that specifically".[24]

Clearly, the ability of suppliers to obtain up-to-date meter readings remotely from smart meters is central to their ability to provide consumers with accurate bills and consumption data. We return to this issue in chapters 4 and 5. Ofgem said that the "obligations and associated commercial incentives" on suppliers regarding billing meant that suppliers could "be expected to provide accurate bills to their customers using remote reads." However, it agreed to "keep this under review and consider further action if there is any evidence of problems".[25]

13. ***Ofgem must be prepared to strengthen the requirements on suppliers to provide accurate bills if there is evidence that consumers are not receiving accurate bills and/or that they are being back-billed months after smart meters have been installed.***

## Industry benefits

14. For energy suppliers, generators, and network operators, DECC has predicted £11 billion-worth of efficiency savings such as "avoided site visits for manual meter reads, a more streamlined transfer process when consumers switch suppliers, reduced call centre traffic and improved debt management".[26] Some witnesses raised concerns that suppliers would be the main beneficiaries of roll-out.[27]

## Wider energy infrastructure benefits

15. Several witnesses agreed that smart meters were integral to the provision of a secure, reliable, affordable and low-carbon electricity supply for the future and that all consumers would benefit from this.[28] Similarly, a number of witnesses agreed that smart meters would provide a foundation for a smart grid and a future system in which peaks and troughs in energy provision and consumption would be better balanced and managed.[29] Professor Harriet Bulkeley from Durham University outlined some of these benefits:

> There is also a wide set of benefits...The benefits of having a working electricity grid, and the benefits in terms of broader ideas of energy security and in terms of climate

23 Qq 295-98 [Maxine Frerk]; Qq 373-76 [Baroness Verma and Jacqui Russell];

24 Q 377

25 Ev 79

26 Ev 93

27 Ev w52; Ev w55; Ev w115; Ev w124; Ev 126; Ev w125; Ev 146; Ev 150

28 Ev 93; Ev w118; Q 162 [Professor Baldwin]; Q 163 [Dave Openshaw]; Q 193 [Dr Thomas]

29 Ev w27; Ev w47; Ev 80; Ev 87; Ev 93; Ev w118; Ev w136; Ev 106; Ev w122; Ev 110; Ev 121; Q 193 [Dr Thomas]

> change...If we were to ask people, "Do you want an electricity grid that works or not?" then their answer would probably be yes.[30]

Dave Openshaw from UK Power Networks described the longer-term benefits that consumers could gain from smart metering and the smart grid if they engaged with the technology and the information that smart meters will provide:

> Obviously, it really depends on the extent to which [consumers] engage with the information and make use of the information. I cannot overemphasise the point that Harriet makes about the overall cost of providing electricity, going forward, including generation, transmission and distribution. If we get the sort of engagement we really need, then we will be able to roll-out affordable low-carbon transition, so we will have secure, affordable low-carbon electricity going forward. It really does depend on the extent to which consumers engage. If the behaviour doesn't change, then clearly the benefits are not going to be so high.[31]

See figure 2, below, for more on smart grids.

30 Q 162

31 Q 163

### *Figure 2: What are smart grids for?*

Electricity supply must be balanced with demand in real time. This is currently done by matching supply to meet demand, largely by controlling the output of a relatively small number of large power stations.

Changes in our electricity system as a result of the decarbonisation agenda will mean that the grid will have to be balanced differently in future. As old power stations are retired and we increase the amount of electricity generated from intermittent renewable sources such as wind and wave power, there will need to be greater emphasis on managing demand to meet supply. This challenge will be all the greater because electricity demand is expected to rise significantly as our transport and heating needs are increasingly powered by electricity.

A more sophisticated grid is required to enable the complex interactions between consumers, suppliers and network operators that will be needed to balance electricity demand against supply. Demand-side response (DSR) is expected to play a key role in helping to achieve this balance.

#### *The role of demand-side response (DSR)*

DSR involves using technology and financial incentives to manage and encourage changes in electricity demand to better match the available supply. Time-based tariffs are one such financial incentive that can be used to encourage such changes in consumption.

#### *Time-based tariffs*

Time-based tariffs are used to encourage consumers to use less electricity at peak times, when electricity is the more expensive to produce. Cheaper pricing may also be used to encourage consumption at times when there is greater capacity. For example:

- **Time-of-use** tariffs have fixed prices for different periods of the day with the aim of encouraging people to shift their electricity consumption to off-peak times on a daily basis. Economy 7 is an example of this kind of tariff.
- **Critical peak pricing** sets higher prices during exceptional peaks, when there might otherwise be the risk of blackouts.
- **Real-time** tariffs change the price of electricity on a dynamic basis, perhaps every half hour, to reflect short-term predictions for electricity supply and demand. For example, electricity may be cheaper on a windy day when there is a lot of wind-generated power.

Sources: *What is a Smart Grid?*, Institution of Engineering and Technology briefing, 2013; *Future Electricity Networks,* POSTnote 372, Parliamentary Office of Science and Technology, February 2011.

16. Dave Openshaw outlined the early results from the ongoing Low Carbon London trials on critical peak pricing:

> We have probably not yet fully explored just how flexible people can be if they have the right incentives, and the incentives are in the form of a price. Our tariff is a critical peak price tariff, so the peak price is very, very much higher than the normal or the low price. However, what we have seen is quite significant. Although it is early days, we have seen up to a 20% reduction in peak demand...Of great importance,

> going forward, is the extent to which we can persuade people to move electricity away from peak demand, or, as I said earlier, to use electricity when wind generation is highly available and 20% shifts are very, very significant indeed.[32]

See figure 2, above, for more on demand response and critical peak pricing.

17. During our visit to California, we heard how smart metering had been used in conjunction with time-based tariffs and automated demand response (ADR) to manage consumption at peak times and to help prevent blackouts. See box 1 above for more on time-based tariffs and demand response. For example, one utility, Pacific Gas & Electricity (PG&E), outlined how 80,000 of its domestic customers had opted into a critical peak-pricing tariff and 400,000 of its customers, including commercial customers, were on time-of-use tariffs.[33] Both PG&E and another utility—the Sacramento Municipal Utilities District (SMUD)—described how some customers had signed up to a system giving the utility remote access to their air conditioning units so that they could be cycled on and off during critical peak periods in order to manage demand.[34] SMUD also described an arrangement it had with a commercial plant that could be shut down completely on peak days.[35] Staff at the Lawrence Berkeley National Laboratory told us that demand response techniques had been shown to shave the top off expected peaks in demand by a maximum of 2.9% of system demand in 2006 and that this capability was now as high as 10% in some US states and could be as high as 16% by 2032.[36]

### *Facilitating the introduction of a smart grid*

18. In our 2011 report, *A European Supergrid*, we outlined the challenges of increasing the proportion of the UK's energy mix from renewable sources such as offshore wind and concluded that the Government "must pursue the development of an integrated grid in home waters and begin bilateral negotiations to create new shared infrastructure with our European neighbours".[37]

19. Dr Martyn Thomas of the Institution of Engineering and Technology (IET) described the smart grid as "the real prize" from smart metering and told us:

> The smarter grid will be delivered because it is much too important not to deliver it…The Government cannot meet its climate change targets without it; it cannot meet its international commitments on carbon reduction without it. Ultimately, we won't be able to keep the lights on without a smarter grid, because the cost of achieving those things other ways would be so much higher. So enabling the smarter grid is key and it will happen. I have no doubt about that. The smart metering programme is a key enabling step in doing that.[38]

32 Q 116

33 See PG&E visit summary notes in Annex 1.

34 See SMUD and PG&E visit summary notes in Annex 1.

35 See SMUD visit summary notes in Annex 1.

36 See LBNL visit summary notes in Annex 1.

37 Energy and Climate Change Committee, Seventh Report of Session 2010-12, *A European Supergrid*, summary.

38 Qq 167 and 193

He also said that "we need smart metering to support the smart grid".[39] Siemens agreed that smart metering "is a critical aspect of the Smart Grid system."[40] However, Alex Henney argued that a smart grid could be achieved without smart meters.[41] Consumer Focus said it was "unclear if the current technology and framework will effectively facilitate the introduction of smart grids in practice and how and if cost savings will be passed onto customers."[42]

20. DECC has recognised that "the future system needs to be more integrated and flexible" to meet the challenges of adapting to "significant changes to both electricity generation and demand", and has outlined its commitment to building a smarter grid:

> Smart grids will make a key contribution to UK energy and climate goals. The UK is taking action now and investing in smart grid development and planning for the future.[43]

In its most recent impact assessment for domestic smart metering, DECC said that smart metering "is a key enabler of the future Smart Grid".[44] However, in its written evidence, it was less definite about the role of smart meters in enabling the smart grid, saying only that they were "expected to provide a platform for the development of smart grids and the wider energy services market". [45]

## Costs

21. DECC's impact assessment identifies roll-out costs of £12.1 billion, including metering equipment, installation and operation costs of £6.98 billion, communications equipment costs of £2.65 billion, IT systems costs of £1.24 billion and other industry costs (including consumer engagement) of £1.24 billion.[46] A number of witnesses questioned how realistic these figures were.[47] Various individuals and organisations warned that the size and complexity of the roll-out programme meant there was a risk that costs could spiral in various areas.[48] The Institution of Engineering and Technology (IET) said:

39 Q 167

40 Ev w136

41 Q 193

42 Ev 126

43 *Smart grid: a more energy-efficient electricity supply for the UK*, DECC website, 19 July 2013, https://www.gov.uk/smart-grid-

44 DECC, *Smart meter roll-out for the domestic and small and medium non-domestic sectors (GB): Final Impact Assessment,* January 2013, para. 1.1

45 Ev 93

46 DECC, *Smart meter roll-out for the domestic and small and medium non-domestic sectors (GB): Final Impact Assessment,* January 2013, p. 3

47 Ev 58; Ev w75; Ev 80; Ev 87; Ev 92; Ev 99; Ev 126; Ev w127

48 Q 57 [Audrey Gallacher]; Ev 58; Ev 80; Ev 87; Ev 92; Ev 99; Ev w127; Alex Henney and Ross Anderson, *Smart Metering – Ed Milliband's Poisoned Chalice*, (2012), http://www.cl.cam.ac.uk; Public Accounts Committee, *Preparations for the roll-out of smart meters*, paras. 5 and 7

> Even with a well-planned roll-out this is a complex business and behavioural change project supported by significant IT infrastructure. It will be vulnerable to cost overruns, delays and degradation of functionality unless well managed.[49]

Dr Martyn Thomas of the IET told the Committee that a "typical IT project of this complexity overruns its declared timescales by approximately 100% and its costs by about the same."[50] Others agreed that large IT projects of this nature tended to be at risk of cost overrun.[51] For example, the PAC noted in its 2011 report "Preparations for smart meter roll-out" that the data communications service was a "complex IT project", and said that it did not "share the Department's optimism" that it had "adequately accounted for the risks involved in the complex and ambitious smart metering programme, especially cost escalation."[52]

22. We note that DECC has not published the Major Projects Authority's review of the smart meter project on grounds of commercial sensitivity. Given the concerns that have been raised about the risk of cost escalation, we hope that it will make this information available as soon as possible and that the assessment will offer reassurance rather than cause alarm.

### *Installation and hardware*

23. Paul Spence of EDF noted that installation costs would be one of the largest elements of roll-out, but felt that DECC's cost projections were "about right".[53] However, Orsis disagreed:

> There are many that feel the costs used in the Impact Assessment are out of date, and understated. For example, the costs of the installation of smart electricity and gas meters is set to be £59 for a dual fuel installation – this figure is hugely optimistic based on the costs currently in the market place. There are other cost estimates that, in our opinion, require further investigation in the light of experience.[54]

24. The Energy Services and Technology Association (ESTA) and Orsis pointed out that the design and functionality of the meters had a direct effect on their cost and that this in turn affected the cost of roll-out to consumers.[55] Hans Kristiansen of Orsis said that there had been "an unfair focus on the smart meter itself" rather than on "smart metering and smart solutions" and suggested that the design of the meter that most people would receive during mass roll-out—the SMETS 2—contained elements "that will not add value to the consumer, and yet they will ultimately be footing the bill".[56] British Gas noted that

49 Ev 80

50 Q 167

51 Alex Henney, Q165; Ev w127; Alex Henney and Ross Anderson, *Smart Metering – Ed Milliband's Poisoned Chalice*, (2012), http://www.cl.cam.ac.uk; Public Accounts Committee, *Preparations for the roll-out of smart meters*, paras. 7 and 8

52 Public Accounts Committee, *Preparations for the roll-out of smart meters*, paras. 7 and 8

53 Qq 208 and 221

54 Ev 92

55 Q 78

56 Q 78; Ev 92; SMETS 2 = the second version of the Smart Metering Equipment Technical Specifications. SMETS are discussed in more detail in chapter 5.

although it had "done more than anyone to establish supply chains and use volume to drive down the cost of equipment" there was still a "significant gap" between its costs and those anticipated in the impact assessment, which "assumes that the cost for metering equipment will drop markedly once mass roll-out commences and large orders are placed".[57]

### *Potential for greater co-ordination between suppliers*

25. Consumer Futures has suggested that one way of achieving significant efficiency savings during installation would be to increase co-ordination between suppliers.[58] Audrey Gallacher told the Committee:

> One of the issues around ensuring value for money or mitigating the increased costs is probably around co-ordination…I think in places like blocks of flats and multiple occupancy dwellings, there is a lot that could be done, particularly around the communications…We could do much more, probably much more cheaply, and have a much better consumer experience, because there will not be a requirement for multiple visits to the home.[59]

Suppliers agreed that there were opportunities for greater co-ordination during roll-out, but views differed on the extent to which such efficiencies could be achieved.[60] Most suppliers agreed that it was important to co-operate regarding the fitting of communications systems in multi-tenanted buildings such as blocks of flats, but some saw logistical problems with attempting to organise a street-by-street, house-by-house roll-out.[61] British Gas, E.ON and First Utility in particular emphasised the difficulties of such an approach.[62] Darren Braham of First Utility noted that there were other ways of achieving savings:

> If an engineer can install half a dozen meters in a day, they do not have to be properties next to each other. As long as they are able to have sufficient density in a local area, that should bring down the cost significantly, so I do not think there is necessarily a significant cost disadvantage of not going street by street...[63]

26. ***We recommend that suppliers work together to achieve efficiency savings during roll-out. This would help to ensure efficiency and the widest possible coverage of the WAN (Wide Area Network). DECC should draw up a co-operation protocol and require suppliers to sign up to it.***

57 Ev 110

58 Q 56 [Audrey Gallacher]; Ev 126

59 Q 56

60 Qq 208-09 [Tony House, Paul Spence, Dr Andrew Pennington and Andrew Ward]; Q 263 [Stuart Rolland, Darren Braham and Don Leiper]

61 Qq 208-09 [Tony House, Paul Spence, Dr Andrew Pennington and Andrew Ward]; Q 263 [Stuart Rolland, Darren Braham and Don Leiper]

62 Q 263

63 Q 263

## Value for money and cost-effectiveness of roll-out

27. Dr Thomas suggested that smart meter roll-out would be cost-effective only if smart meters ultimately enabled the smart grid:

> The important role of the meters is to enable the smarter grid…If this programme were only to be providing in house displays and remote access for billing, I very much doubt that it would be a cost effective way of achieving those goals. You can already buy in house displays and clip them on to your supply wires, and the remote billing issues are probably not of sufficient benefit to the consumer to merit the cost of the whole smart metering programme but the smarter grid really matters.[64]

Policy Exchange agreed that "if the energy savings of £4.4 billion are not achieved (and costs overrun, which, for a project of this size, is a likely scenario), this looks an expensive project simply to avoid estimated bills".[65]

28. The IET also raised concerns that because smart grid benefits "are not currently included in the business case…we do not have an accurate picture of smart metering costs and benefits".[66] Professor Bulkeley noted that "it is quite difficult to put a cost" on such benefits and said that they therefore usually are not "taken into account".[67] Indeed, the "potential benefits from the development of a smart grid" are listed as a non-monetised benefit in DECC's most recent impact assessment, and DECC has stated that the "full benefits" of such developments are "yet to be quantified".[68]

## Passing on costs and benefits to consumers

29. Consumer Focus said that it remained to be convinced "that the shape of the current roll-out will deliver smart metering at lowest cost, minimal hassle and maximum benefit to consumers" and has highlighted that there is "no mechanism in place to limit the financial risk to consumers should costs start to rise".[69] Similarly, the Federation of Small Businesses has suggested that Ofgem should "be tasked with ensuring the costs savings that the energy suppliers are likely to experience are being passed on to consumers through lower bills".[70] ScottishPower and RWE npower noted that they were obliged to report their costs and benefits for roll-out to DECC and Ofgem and said that these would therefore be subject to review.[71]

30. We asked DECC, Ofgem and energy suppliers how they would ensure that roll-out costs were kept down and that benefits were passed on to consumers. We were surprised to

64 Q 178 [Dr Thomas]

65 Ev w127

66 Ev 80

67 Q 162

68 DECC, *Smart meter roll-out for the domestic and small and medium non-domestic sectors (GB): Final Impact Assessment,* January 2013, p. 3; Ev 93

69 Ev 126

70 Ev 146

71 Q 210 [Andrew Ward]; Q 224 [Dr Pennington]

hear that competition in the energy market was seen as sufficient to achieve these aims.[72] Baroness Verma told us:

> It is in the interests of suppliers to ensure that they are looking at it as a proper business case. It is a competitive market out there. It would not be in the interests of anybody to escalate costs.[73]

31. Consumer Focus questioned whether competition would be sufficient to keep costs down and ensure that benefits were passed on:

> If we are solely relying on the competitive market to keep costs at a minimum, then I think that is probably fairly naive given the history that we have seen and the lack of competition. Wholesale reduction has not been passed through on to retail bills. So there is probably a lot more that needs to be done to ensure not only value for money but that consumers are adequately protected and that they get the benefits of smart meters as well.[74]

The PAC has also questioned whether competition would be sufficient to ensure that supplier benefits were passed on:

> No transparent mechanism presently exists for ensuring savings to the supplier are passed on to consumers, and the track record of energy companies to date does not inspire confidence that this will happen.[75]

32. Ofgem acknowledged that there had been concerns about competitiveness in the retail market, but suggested that the steps it was taking through the Retail Market Review would help to ensure that savings were passed on to consumers:

> As you know, at the minute we have concerns about how competitive the retail market is. That is why we are doing radical proposals around the Retail Market Review…We are not there yet, but, by the time we get to mass roll-out, I think the market should look very different, and by that point we would expect suppliers to be under real pressure to pass those savings on.[76]

33. We made several recommendations regarding competition in our *Consumer Engagement with Energy Markets* report and recently revisited this issue in our *Energy Prices, Profits and Poverty* inquiry and report. This most recent report found that there is currently insufficient measurement of performance against agreed indicators to determine whether competition in the supply market has increased. In its response to our *Consumer Engagement* report, Ofgem outlined the need for "a robust and comprehensive suite of indicators" to inform the "review of the retail energy market and the impacts of the RMR"

72 Q 287 [Maxine Frerk]; Qq 332-33 [Baroness Verma]; Q 224 [Paul Spence]; Q 268 [Don Leiper]; Ev 93. See also Ev 99; Ev 110; Ev 121

73 Q 332

74 Q 55 [Audrey Gallacher]

75 Public Accounts Committee, *Preparations for the roll-out of smart meters*, summary, p.3

76 Q 287

that it will conduct in 2017.[77] It is therefore difficult to understand how it can confidently assert in 2013 that the market "should look very different", in terms of competition, by the start of mass roll-out in 2015.[78]

34. **Smart metering has the potential to bring wide benefits to our energy infrastructure and to consumers, and we welcome this investment in the UK's energy system. The development of a smart grid will be key to meeting future energy challenges, but the extent to which smart metering will facilitate that is unclear, and not enough has been done to quantify the benefits of a smart grid. Greater transparency is needed for the true costs and benefits of roll-out to be assessed.** ***DECC should clarify the extent to which smart metering will facilitate the development of the smart grid and should publish its analysis of the financial costs and benefits of a smart grid.***

35. **There is a clear risk that the £6.7 billion net benefit projected by DECC may not be achieved if costs spiral or if consumers do not realise the expected energy and bill savings. There is also a risk that the benefits that accrue to suppliers as a result of roll-out will not be passed on fully to consumers. We are not convinced by the argument that competition in the market will ensure that costs are kept down and benefits are passed on to consumers. Until Ofgem can provide concrete evidence that competition has increased—for example by publishing its analysis of market performance against agreed indicators of competitiveness or by publishing a review of the impact of its RMR reforms—serious concerns about competition in the market will remain.[79]** ***The responsibility for keeping roll-out costs under control and ensuring that benefits are passed on to customers rests with the Government and Ofgem. They must demonstrate how reforms to the market will achieve this and what action they will take if this is not achieved.***

36. **If consumers do not believe that they are benefiting significantly from roll-out, they could rightly perceive it as a costly project that they have paid for but gained little from. As we outlined in our** ***Consumer Engagement with Energy Markets*** **report, we are concerned that not enough is being done to make consumers aware of the need to invest in the UK's energy infrastructure. DECC has been focusing its consumer messaging on the relatively small energy and bill savings of around 2.8% that smart meters may help consumers to achieve.** ***We recommend that messages around smart metering should place greater emphasis on the wider benefits it will bring to the UK's energy infrastructure. We reiterate the call in our Consumer Engagement with Energy Markets report for greater transparency regarding the "contribution that consumers are being expected to make to ensuring that we have safe, secure and affordable energy supplies in future".[80]***

77 Ofgem has said that it will review "the retail energy market and the impacts of the RMR...in 2017." Energy and Climate Change Committee, Fifth Special Report of 2012-13, *Consumer Engagement with Energy Markets: Government and Ofgem Responses to the Committee's Fifth Report of Session 2012-13*, HC 1036, Appendix 2 – Ofgem response.

78 Q 287

79 Ofgem has said that it will review "the retail energy market and the impacts of the RMR...in 2017. Energy and Climate Change Committee, *Consumer Engagement with Energy Markets: Government and Ofgem Responses to the Committee's Fifth Report of Session 2012-13*, Appendix 2 – Ofgem response.

80 Energy and Climate Change Committee, Fifth Report of 2012-13, *Consumer Engagement with Energy Markets*, HC 554, para. 115

# 3 Roll-out stages and timescale

37. Roll-out will happen in two stages—foundation stage and mass roll-out, when the vast majority of smart meters will be installed. Foundation stage, which is currently under way, is seen as a period for learning about smart meter usage and dealing with teething problems. Energy suppliers have taken very different approaches to installing smart meters during this stage. When we asked how many they had installed to date, the figures they gave ranged from 5,000 to 1 million.[81] Mass roll-out is set to take place between autumn 2015 and the end of 2020, but when this inquiry was launched, mass roll-out was due to start at the end of 2014 and finish by the end of 2019. On 10 May 2013, DECC put the dates back by a year in response to concerns about timescale.[82]

## Concerns about the timescale for mass roll-out

38. A number of witnesses warned of the potential consequences of pressing ahead with mass roll-out, particularly with the 2014-2019 dates, before certain requirements had been met.[83] National Grid outlined its concerns as follows:

> Feedback gathered through our pricing consultation regarding the smart metering mass roll-out has indicated a general view that completion by the end of 2019 remains highly challenging...The uncertainties that still exist regarding technical and infrastructure requirements result in a slower roll-out profile than currently expected…with smart meter roll-out completion taking several years longer than currently forecast.[84]

39. Others raised concerns that if important technical and infrastructure requirements were not in place before roll-out, costs could increase significantly and some consumers could have a poor experience, which might have a reputational impact on the roll-out programme.[85] EDF and SSE described the potential for a "delivery bubble" towards the end of roll-out, with the cost of installing meters increasing as the deadline for completion approached.[86] EDF outlined the risks and the choices facing suppliers in this way:

> As the 2019 completion date is a Licence Condition, Suppliers have two choices: either to start the rollout ahead of the delivery of the key enablers, or delay rollout and compress the delivery period. Both choices are likely to increase the costs to consumers, deliver a sub-optimal customer experience and introduce unnecessary risk to the GB programme and the delivery of the expected benefits.[87]

81 Q 205 [Tony House, Paul Spence, Dr Andrew Pennington and Andrew Ward]; Q 258 [Stuart Rolland, Darren Braham and Don Leiper]

82 DECC, *Written Ministerial Statement by the Rt Hon Edward Davey MP: Secretary of State for Energy and Climate Change on Smart Metering*, 10 May 2013

83 Ev w5; Ev 80; Ev 87; Ev 99; Ev 126

84 Ev w5

85 Ev 80; Ev 87; Ev 99; Ev 126; Q 220 [Andrew Ward]; Q 247 [Tony House]

86 Ev 87; Ev 99

87 Ev 99. More on EDF's key enablers can be found in its submissions of written evidence Ev 99 and Ev 104, and in the oral evidence transcript at Q 211.

40. Andrew Ward of ScottishPower gave an example of how consumers could be affected if problems were found in smart meters after they had been rolled out on a wide scale and these problems then had to be rectified by reinstalling meters:

> Of the initial 30,000 meters that we deployed in 2010, we have had to replace 5,000 of the SIM cards that are in those meters. The understanding we had when we installed the meters was that the SIM cards would be sufficient to last the life of the meter, so that has gone wrong. We have had to interrupt the lives of 5,000 customers and reinstall those meters.[88]

Witnesses were particularly concerned about:

- the fact that the technical specifications that will ultimately need to be met by smart meters—SMETS 2—have not yet been finalised;[89]
- the need for the Data Communications Company (DCC) and communications system to be up and running for SMETS 2 meters to be fully operational;[90] and
- the need for proper end-to-end system testing before mass roll-out.[91]

We consider two of these key issues—SMETS 2 specifications and the DCC—in later chapters. The need for proper system testing is discussed below.

## System testing and analysis

41. Many witnesses highlighted the importance of ensuring that the smart metering system and smart grid were secure and that sufficient time was allowed for end-to-end system testing and analysis.[92] The Institution of Engineering and Technology (IET) said:

> Throughout the programme, the IET has repeatedly stressed that secure operation of individual components of the smart metering system, though important, cannot guarantee system security. End to end system security is critical...The tight time constraints should not be allowed to compromise rigorous end to end security analysis and testing of the resulting system.[93]

Dr Martyn Thomas of the IET emphasised the need for rigorous analysis "using mathematically formal specifications and the associated tools" to establish whether there were "vulnerabilities that could be exploited, or combinations of circumstances that might cause a significant failure, which would only appear later on and which would then cause a need for substantial rework."[94] He also noted that such analysis was "not particularly

88 Q 220 [Andrew Ward]

89 Ev 65; Ev w75; Ev 80; Ev w27; Ev 126; Ev 146; Ev 150. SMETS 2 = the second version of the Smart Metering Equipment Technical Specifications. SMETS are discussed in more detail in chapter 5.

90 Ev 65; Ev 121; Ev 104; Q 247 [Tony House]; See background section for more on the DCC. See also Chapter 4, where it is discussed in more detail.

91 Ev 65; Ev 80; Ev 126

92 Q 72 [Allen Creedy]; Q 75 [Audrey Gallacher]; Q 82 [Sean Weir]; Qq 170-73 [Dr Thomas]; Q 220 [Andrew Ward]; Ev 65; Ev w75; Ev 80; Ev 87; Ev 89; Ev 99; Ev w122; Ev 110; Ev 121; Ev 126

93 Ev 80

94 Qq 170-73

expensive", had "reduced the final cost of systems" everywhere it had been used, and would "reduce the testing times".[95]

42. Andrew Ward gave a practical example of what could go wrong:

> The risks are real...I will give you an example from part of our global group in America. They have now installed over 600,000 meters and I believe the common misconception is that software upgrades on the meters can be done electronically from a distance—you don't need to attend the property. As part of that deployment they rolled out, at the point of 200,000 meters they had to replace 5,000 meters because they could not update the communications over the wire. They had to again attend that property, a physical visit. It is a real example of what could potentially happen in the UK. That is why there is a desire from a ScottishPower point of view to test thoroughly what is actually in there before we mass deploy in the UK.[96]

### *New mass roll-out dates*

43. Several witnesses welcomed the new 2015-2020 timescale for mass roll-out.[97] Tony House of SSE said it would enable a lot of the risks that had been identified "to be mitigated", and Dr Neil Pennington of RWE npower agreed that the delay was "welcome".[98] British Gas, E.ON and First Utility thought the 2014-2019 timescale had been achievable, but also saw the change in timescale as "pragmatic".[99]

44. The IET was more cautious about welcoming the new dates. Dr Thomas told the Committee:

> They are better than the old dates, in that they do give us an additional year to make sure that the specifications are sound and to fit things in better to the engineering realities. However, since we don't have the full specifications, we don't know the details of the bids that have been put in by the DCC and other communication suppliers, we don't know what their proposals for assurance will be, we don't know what compromises will come out of the negotiations over those contracts, therefore we don't know the full engineering reality of the roll-out of that process. On that basis, setting timescales now is simply a mistake. At the very least we need to be flexible, once those things are known, and to be willing to adjust them again if necessary...timescales need to be driven by the engineering realities.[100]

Consumer Focus and the Federation of Small Businesses also thought that there should be sufficient flexibility in the timescale to ensure that roll-out was done well.[101] Audrey Gallacher commented:

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95 Qq 170-73

96 Q 220

97 Qq 215-19 [Tony House and Dr Neil Pennington]; Ev 104; Ev 145; Ev w136

98 Qq 215-19

99 Ev 110; Ev 71; Ev 85; Q 265 [Stuart Rolland, Don Leiper and Darren Braham]

100 Qq 175-77

101 Qq 74-5 [Audrey Gallacher and Allen Creedy]

> The way we look at it is that nobody is going to remember when roll-out commenced or whether it took five or six years. They are going to remember whether it worked. Let's not sacrifice what is, after all, a multi-billion-pound programme for the sake of meeting a date. Let's make sure it fulfils its objectives in terms of the consumers accessing the benefits of smart meters as well as industry.[102]

We asked DECC whether there would be flexibility in the timescale to accommodate any further possible problems. Baroness Verma said: "I don't see further delays...I think we are in a very good place now".[103]

45. **We welcome DECC's recent announcement that the dates for mass roll-out are being pushed back by a year. However there needs to be some flexibility in the new timetable, which should be driven by engineering and infrastructure requirements and the need to avoid artificial deadlines acting to push up programme costs.** ***DECC should be prepared to amend the timetable further if more time is needed to address any systemic issues that may arise, to respond to further delays to technical and infrastructure requirements for roll-out, or to prevent cost escalations for other reasons.***

102 Q 69

103 Q 343

# 4 Smart meter communications and coverage

## Data communication model

46. Smart meters will send and receive energy consumption and billing data so that energy suppliers will be able to read meters without having to come to the property and so that customers will be able to receive information about their energy consumption and costs in the home.

### *Communication between the smart meter and the energy supplier*

47. Information will be communicated between smart meters and energy suppliers, network companies and other authorised parties via a central communications hub. The hub will be provided and managed by a new Data Communications Company (DCC) and communication will be via a wide area communications network (WAN).[104] A range of technologies have been proposed for the WAN, including cellular, mesh radio and long-range radio.[105] DECC has stated that whichever technology is chosen for the WAN, the relevant provider will be required "to commit to eventual coverage levels of at least 97.5% of properties across Great Britain."[106] Baroness Verma told the Committee that "the licence conditions in the DCC will ask them to work towards 100%" and that by 2015 DECC "would expect all suppliers to be working towards getting a very high percentage of their coverage out there".[107]

### *Communication between the smart meter and the consumer*

48. Most domestic consumers will be able to see how much gas and electricity they are using and how much it is costing them on a small device called an in-home display (IHD), which they will be offered when their smart meter is installed.[108] The IHD will communicate with the smart meter via the home area network (HAN). Currently, suppliers are not obliged to offer non-domestic consumers an IHD.[109] Daron Walker of DECC explained that consumers who do not have an IHD will be able to use a separate consumer access device (CAD), to access their consumption data.

> We are not mandating that everyone has [an IHD]. We are mandating that everyone is offered one. So, if the consumer decides that they don't want the IHD and they want to opt for...[a] wizzy device...they can do that. One of the things that we are defining is the specification for something called a consumer access device, which

104 *Smart meters: information for industry and other stakeholders*, DECC webpage, 19 July 2013, https://www.gov.uk/smart-meters

105 Ev 93

106 Ev 93

107 Q 395

108 IHDs are discussed in more detail in Chapter 6 on consumer savings.

109 See chapter 6 for more on this.

> will allow consumers to buy other products that will allow them to extract [consumption] data...[110]

49. The CAD can be connected to the smart metering system via the HAN and is able to:

- display information directly to the consumer, like an enhanced IHD;
- act as a conduit to send the data up to the cloud, like a dongle or router;
- work in conjunction with smart appliances; or,
- act as a home energy 'hub' which uses consumption and tariff data in combination with non-energy data, such as temperature or information from motion sensors, and consumer preferences (either configurable or 'learnt') to manage energy use throughout the home. [111]

### Procurement

50. DECC has described the procurement process for the various bodies that will be involved in the smart meter communications system:

> DECC is conducting a competition to put in place a licensed Data and Communications Company (DCC) [and] is also undertaking the procurement of a Data Services Provider and up to three regional Communications Service Providers on behalf of the DCC that will deliver the data handling system and wide area communications network…All three of these competitions are well advanced. The procurements of both the Data Service Provider and Communication Service Providers are approaching the final tender stage and will conclude this June. DECC has received initial proposals from applicants for the DCC Licence and will evaluate these before negotiating improvements and inviting final proposals with a view to awarding the licence in July.[112]

### Criticisms of the communications model

51. Several witnesses have criticised the complexity of the communications model that DECC is adopting, with some highlighting the fact that other countries have taken a simpler approach.[113] However, DECC argues that this model will "put in place the necessary shared infrastructure to deliver the Programme's benefits in a way that allows consumers to switch energy supplier without changing meters or communications equipment".[114] **We note the concerns about the centralised DCC model proposed by DECC. *DECC should, in response to this report, set out the justification and cost implications of the DCC model.***

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110 Daron Walker, Q390

111 DECC, *Smart Metering Implementation Programme-Government Response to the Consultation on the second version of the Smart Metering Equipment Technical Specifications, Part 2*, July 2013, para. 167

112 Ev 93

113 Ev w1; Ev 80; Ev 126; Ev w136; Alex Henney and Ross Anderson, *Smart Metering – Ed Milliband's Poisoned Chalice*, (2012), http://www.cl.cam.ac.uk

114 Ev 93

## Communications challenges

52. If suppliers are unable to access consumption data remotely from smart meters over the WAN, they will have difficulty providing consumers with accurate, up-to-date billing information. Likewise, if the smart meter in a particular home is unable to send data to the CAD or IHD over the HAN, that customer's ability to access up-to-date billing and consumption data will be affected. There is a risk that if high levels of coverage are not achieved early on in mass roll-out, many consumers will have a poor experience with their smart meter and this will have an effect on public perceptions of smart metering.

### *Problems with HAN connectivity and particular building types*

53. Daron Walker explained the interaction between electricity and gas meters, the HAN and the WAN:

> The meters will be connected to the comms hub and then the comms hub will talk to the WAN...The comms hub is likely to be placed very near the electricity meter. You are then concerned about how you make sure you get the signal to the gas meter. So the comms hub will be very closely located.[115]

54. Smart meters with HAN connectivity problems may have problems connecting to the WAN or communicating data to the IHD or CAD over the HAN. ScottishPower listed specific property types that were likely to be affected by communication challenges, such as homes with thick solid walls, new builds with foil-covered insulation, and high-rise flats.[116] Siemens suggested that 60% of multiple dwelling units (MDUs) such as flats and converted buildings would be affected by HAN connectivity issues because of:

- The physical distance between the electricity meter, the gas meter (if dual fuel) and the IHD
- Building fabric limiting radio propagation i.e. meter rooms in basements
- Physical space limitations preventing the fitting of the communications hub[117]

Daron Walker agreed that there were "problems around multi-block buildings", but said that he did not "recognise" that 60% figure.[118] Darren Braham of First Utility suggested that problems with HAN communications "could be more of an acute issue" than achieving high levels of WAN coverage.[119] DECC has acknowledged that current HAN solutions will give coverage of only about 70%, so HAN connectivity problems may affect around 30% of properties.[120]

115 Qq 405-06 [Daron Walker]

116 Q 248 [Andrew Ward]

117 Ev w136

118 Qq 406-07

119 Q 279

120 Ev 99; Q 406 [Daron Walker]

55. Daron Walker outlined the work currently being done to get communications solutions for HAN connectivity that would give 100% coverage:

> We are clear that already the solution that we are putting into the [HAN] standard will cover 70% of homes. We have also identified solutions that are being developed that will take that up to 95%...[and we are] working with industry on...wired HANs. Our aspiration is to get to 100% of coverage. We believe there are already solutions there or being developed to get us to 95%, and we are now working on the wired HAN to get us all the way up to 100%.[121]

Much of this work is being done in relation to the second version of the Smart Metering Equipment Technical Specifications (SMETS 2)—the technical specifications that will ultimately need to be met by smart meters. As we discuss in the next chapter, SMETS 2 are still being developed and will have particular specifications, or standards, for the HAN. These specifications are expected to solve HAN connectivity issues, but SMETS 2-compliant meters are unlikely to be widely available before 2015.

### *Achieving close to 100% coverage over the WAN*

56. Some suppliers have raised concerns about the 97.5% or higher target outlined by DECC for WAN coverage.[122] Andrew Ward told us that there had been 98% coverage in a region where ScottishPower had conducted a trial in the previous year, but questioned whether this kind of coverage could be replicated in all areas.[123] However, Dr Pennington of RWE npower was more confident that high levels of WAN coverage could be achieved:

> We put our requirements in there and everything that we are getting back [from the Government] is telling us that they are going to deliver on their promise about the kind of coverage that we are after from a WAN communications perspective. There are a number of different technologies in there, everything from long-range radio to GPRS in the mix. They are running quite a comprehensive procurement there.[124]

Stuart Rolland of British Gas highlighted concerns about the length of time it would take to reach the target:

> Our concern on the 97.5% is how quickly it can be got up and running...By the time the DCC goes live, we will have an engineer population of 2,000 or 3,000 engineers who we do not want sitting on their hands because they can't commission a smart meter in that particular region.[125]

Darren Braham of First Utility said that it would have an adverse effect on smaller suppliers if there were significant gaps in coverage during mass roll-out:

121 Q 406 [Daron Walker]

122 Q 247 [Tony House]; Q 248 [Andrew Ward]; Qq 279-81 [Stuart Rolland and Darren Braham]; Ev 99

123 Q 248 [Andrew Ward]

124 Q 252

125 Q 279

> I think we have a slightly different perspective insofar as we are bringing on customers. Part of our sales message is smart and we pick up customers where we can. The point about technology is critical to us so we want a situation where we can carry on using GPRS, so if they do use some wireless technology that does not have the same coverage at the point of launch that would be a big problem for us because we do not have the luxury of saying, "Right, we will pick and choose you guys because we have coverage in that particular area." From a competition point of view and independent supplier perspective, that is an issue.[126]

SSE had particular concerns about communications in the northern reaches of Scotland.[127]

57. ScottishPower, SSE, E.ON and First Utility suggested that a mix of technologies would need to be deployed to get close to 100% WAN coverage.[128] Some witnesses suggested that a powerline carrier solution would have been better than wireless technology.[129] First Utility and British Gas agreed that there should be a contingency plan allowing the continuation of the current system using general packet radio service (GPRS) in case 97.5% coverage was not available from the start of mass roll-out.[130]

58. When witnesses' concerns about gaps in coverage and communications were put to DECC, Jacqui Russell described how, in the shorter term, some smart meters could be installed and operated in dumb mode until coverage was available, when they would "wake up":

> If you were an energy supplier, and...you needed to install a meter in 2015 [but] the coverage is not going to arrive until 2016, you install a smart meter, you walk away, it keeps operating in dumb mode and we have designed the system so that when the coverage arrives the meter wakes up on its own. You don't need to revisit the property, it becomes a smart meter and it starts talking to the system. That is a sort of interim approach while the coverage is rolling out...[131]

However, such an approach would mean that some consumers with smart meters would not be receiving the main benefits of smart metering—accurate billing and consumption data—straight away. It would also leave a gap between the installation process, when the customer should be shown how to interact with their smart meter, and the point at which they would be able to start doing that. We discuss this further in chapter 7.

59. Some suppliers said it was essential that the DCC should be up and running before mass roll-out began to ensure that customers got a good experience with their smart meter.[132] DECC recently acknowledged the validity in this view when it announced its decision to push back mass roll-out by a year partly for this reason:

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126 Q 281

127 Q 247 [Tony House]

128 Q 250 [Andrew Ward]; Q 251 [Tony House]; Q 279 [Don Leiper and Darren Braham]

129 Ev w140; Ev w52; Ev 58; Qq 181-84 [Alex Henney]

130 Qq 279-81 [Stuart Rolland and Darren Braham]

131 Q 397

132 Q 211 [Paul Spence]; Qq 247-48 [Tony House]; Qq 262-65 [Don Leiper]

> In December 2012, the Government committed to review the programme plan and timetable during the first half of 2013, taking into account...learning from energy suppliers from their early smart meter deployments and from bidders who wish to provide the common data and communication infrastructure (the "DCC services")...The consistent message was that more time was needed if the mass roll-out was to get off to the best possible start and ensure a quality experience for consumers. We therefore now expect suppliers to be ready to start their full scale roll-out by autumn 2015, supported by the DCC services.[133]

60. **We are concerned about WAN and HAN coverage in the short to medium term, and these will affect consumers' experience of smart meters. Communications issues must be resolved before installing smart meters in order to ensure that consumers have a good experience and are able to access the benefits of smart meters as soon as they are installed.** ***DECC must clarify how progress towards 97.5% coverage will be achieved.***

133 DECC, *Written Ministerial Statement by the Rt Hon Edward Davey MP: Secretary of State for Energy and Climate Change on Smart Metering*, 10 May 2013; Daron Walker, Q341

# 5 Smart meter functionality and interoperability

61. In order to ensure that the smart meters installed in people's homes meet certain standards and can be switched from one energy supplier to another, they will have to conform to DECC's Smart Metering Equipment Technical Specifications, known as SMETS. The first version of SMETS—SMETS 1—is available now and SMETS-compliant meters are being installed by some suppliers.[134] The second version of SMETS—SMETS 2—is still being agreed and will be the version that most people will receive during mass roll-out. Baroness Verma told us that these specifications were expected to be finalised in December 2014.[135] Until SMETS 2 meters are widely available, earlier versions will continue to be rolled out.

## Interoperability

62. Pre-SMETS meters are sometimes described as "non-compliant". If a customer with a non-compliant meter switches to a new supplier, the new supplier may be unable to obtain a remote reading from it if they use a system that is not compatible with that meter. If this is the case, they can replace it with another meter or operate it in "dumb" mode. Until recently, it was expected that all domestic SMETS 1 and non-compliant meters would eventually be replaced by SMETS 2 meters by the end of roll-out. Some suppliers have been reluctant to install pre-SMETS 2 meters because they believe it would be undesirable to have to replace them in a few years' time, partly because of the disruption this would cause to customers. Tony House of SSE said:

> It will be suboptimal if the meters that we put out are deemed to be non-compliant and we have to go back in short order and replace those meters, which means customers having to be at home yet again, having to have their supplies interrupted again to allow that meter to be exchanged.[136]

British Gas, which has installed large numbers of early smart meters, has criticised other suppliers for failing to "deploy in a meaningful way in the Foundation stage", suggesting that this has been partly responsible for stalling progress in delivery of the roll-out programme.[137]

63. On 10 May 2013, DECC announced plans to tackle concerns about interoperability and to encourage energy suppliers to "move quickly" on roll-out.[138] Under these plans, when a customer with a SMETS-compliant meter switches energy supplier, the new supplier will not be allowed to replace that smart meter with a dumb meter. DECC said:

134 Q 258 [Stuart Rolland and Darren Braham]

135 Q 345

136 Q 217

137 Ev 110

138 DECC, *Written Ministerial Statement by the Rt Hon Edward Davey MP: Secretary of State for Energy and Climate Change on Smart Metering*, 10 May 2013

> We have decided that from the end of this year, when a customer switches from a supplier who has provided them with a compliant smart meter, the new supplier cannot replace that smart meter with a dumb meter and must either rent the previous supplier's meter or install their own new smart meter. This will give greater confidence to early movers over their investments.[139]

In addition, SMETS 1-compliant meters will no longer have to be replaced by SMETS 2 meters by the end of roll-out, as was previously the case.[140] Instead, DECC wants suppliers to continue providing remote meter readings from compliant meters, so that "customers continue to receive one of the important benefits of smart metering: more accurate bills".[141] These changes should mean that once a customer has received a smart meter, that smart functionality should not be lost if they switch supplier. DECC hopes that the changes will give the industry "even greater investment confidence" to "roll-out in excess of 2 million compliant smart meters to customers over the next two years of the Foundation Stage".[142]

### *Small and micro businesses*

64. The Federation of Small Businesses is concerned that protections around interoperability do not apply to the non-domestic sector. For example, suppliers will not be obliged to replace non-compliant meters with compliant meters for non-domestic consumers.[143] The FSB is also concerned that many small businesses could have received non-compliant meters, and that this may affect their ability to switch to a new supplier if that supplier is unable to support their meter.[144] It sees interoperability as a key issue and has suggested that "energy suppliers who have jumped the gun and installed sub-specification meters should be forced to install smart meters of adequate specification in the small non-domestic sector at their cost."[145]

## Functionality

65. We received contradictory evidence on the difference in functionality between SMETS 2 and pre-SMETS 2 meters. SSE, RWE, ScottishPower, EDF, the IET and Consumer Futures all agreed that SMETS 1 meters might not provide the same functionality as SMETS 2 meters.[146] EDF said that the SMETS 1 meter was "appropriate for testing and trialling but not mass rollout", and outlined some of its "fundamental limitations":

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139 DECC, *Written Ministerial Statement by the Rt Hon Edward Davey MP: Secretary of State for Energy and Climate Change on Smart Metering*, 10 May 2013

140 Qq 362-63 [Daron Walker]

141 DECC, *Written Ministerial Statement by the Rt Hon Edward Davey MP: Secretary of State for Energy and Climate Change on Smart Metering*, 10 May 2013

142 DECC, *Written Ministerial Statement by the Rt Hon Edward Davey MP: Secretary of State for Energy and Climate Change on Smart Metering*, 10 May 2013

143 DECC, *Smart Metering Programme Foundation Smart Market-the Government Response to the Consultation on the Foundation Smart Market and Further Consultation*, May 2013, para. 3.48

144 Q 56 [Allen Creedy]; Ev 146

145 Q 56 [Allen Creedy]; Ev 146

146 Q 167 [Dr Thomas]; Q 206 [Tony House, Andrew Ward, Dr Neil Pennington and Paul Spence]; Ev 145; Ev 104

> In our opinion the SMETS 1 meter will not meet the enduring security standards, it will not work with other metering equipment in the home, it will not operate effectively in many property types, it will not deliver the expected network operator benefits and prior to the availability of the DCC it will result in poor consumer experience when moving home or on change of supply.[147]

66. However, First Utility, DECC and Ofgem suggested that there would be very little difference in functionality between SMETS 1 and SMETS 2 meters as far as consumers were concerned.[148] Daron Walker of DECC said that SMETS 1-compliant meters would "allow consumers to benefit from all of the things that are consistent with the business case in the smart metering programme", as they would "contribute to the suppliers' roll-out obligations...and the consumers will be getting all the benefits of accurate billing and remote readings."[149]

67. When pressed on what the difference between SMETS 1 and SMETS 2 meters would be, DECC explained that SMETS 2 meters would include different specifications regarding the home area network (HAN), and that these changes were important for ensuring that suppliers would be able to operate smart meters when customers switched.[150] Daron Walker told us:

> I think the main difference—because there are some smaller, technical differences—for SMETS 1 is we didn't define the HAN standard, so we effectively said, "You need to use an open standard, but beyond that it is for energy suppliers to choose". For SMETS 2 we have effectively chosen the HAN standard and defined that, and that is the work that needs to be done to work through into the detailed specifications that will be published in quarter 1 next year. That is really important for the interoperability, so that when the DCC systems are up and running, if you switch supplier, the new supplier will be able to use that equipment in the way that the previous supplier did. That is the main difference—the specification of the HAN communication standards.[151]

We note that DECC has suggested in its response to the consultation on SMETS 2 that SMETS 2 will contain "some additional functionality that will facilitate smart grids", but this additional functionality was not mentioned in evidence.[152]

147 Ev 104

148 DECC, *Written Ministerial Statement by the Rt Hon Edward Davey MP: Secretary of State for Energy and Climate Change on Smart Metering*, 10 May 2013; Q 260 [Darren Braham]; Q 291; Qq 354-59 [Daron Walker];

149 Q 354

150 Ev 98; Qq 346-66 [Daron Walker and Baroness Verma]. See next chapter for more on the HAN.

151 Q 346. For more on the HAN and DCC, see the next chapter.

152 DECC, *Smart Metering Implementation Programme-Government Response to the Consultation on the second version of the Smart Metering Equipment Technical Specifications, Part 2*, July 2013, p. 16

## Risks of rolling out pre-SMETS 2 meters

68. The IET, EDF, Consumer Futures and others have raised concerns about the cost and long-term impact of rolling out pre-SMETS 2 meters on a large scale before the final technical specifications have been agreed.[153] Dr Thomas of the IET said:

> Of course the dangers of rolling out before we have a full specification are significant and I hope the delay that has been announced recently will be used to make sure that the specification is firmed up before there is a mass roll-out. Clearly, it is not optimal to have a lot of meters already installed which turn out to be incompatible in some way with the specifications when they are produced in their final form.[154]

Consumer Futures believes that about 1 million customers have non-compliant smart meters that will need to be replaced, and has suggested that DECC's proposals "will have unintended cost implications and an impact long-term on the products and service available to customers with these early meters."[155] Tony House told the Committee that SSE had "concerns about the increasing volumes of meters that are out there that will need to be revisited because they are not compliant to today's specification, let alone SMETS 2, which we believe is ultimately the right specification to move forward to."[156] Stuart Rolland said that British Gas had installed about 500,000 non-compliant meters that would ultimately have to be replaced.[157]

69. SSE, RWE, ScottishPower, EDF and Consumer Futures all suggested that it would be better to wait for SMETS 2 meters than to install large numbers of SMETS 1 meters and then have to replace them later, which would incur a cost.[158] Tony House said:

> We think that the full and final specification should be the SMETS 2 meter, which ensures interchangeability, full security—all of those key requisites that we think need to be in place for a successful and beneficial experience for the customer through smart metering. It is for those reasons that we are trying to keep deployment volumes to a minimum to enable us to get the learning through foundation, before we get ourselves ready for pushing volumes to the much higher degree that we are going to need to do—8,000 or 9,000 a day when we get into the mass roll-out.[159]

First Utility, DECC and Ofgem argued that it was worth continuing to roll-out pre-SMETS 2 meters because they would provide the main benefits of smart meters—accurate bills and remote meter reading.[160]

153 Q 167 [Dr Thomas]; Ev 145; Ev 104; Ev 156

154 Q 167

155 Ev 145

156 Q 215

157 Q 259

158 Q 206 [Tony House, Andrew Ward, Dr Neil Pennington and Paul Spence]; Ev 145

159 Q 206 [Tony House]

160 DECC, *Written Ministerial Statement by the Rt Hon Edward Davey MP: Secretary of State for Energy and Climate Change on Smart Metering*, 10 May 2013; Q 260 [Darren Braham and Don Leiper]; Q 291; Ev 99

70. We asked DECC whether it would cost suppliers more to operate pre-SMETS 2 meters when they took them over from other suppliers than it would to operate SMETS 2 meters. DECC replied:

> We believe that there are important benefits from being able to enrol SMETS1 equipment into the DCC. We are currently consulting on the approach to allocating costs for that enrolment. Where SMETS1 meters are not enrolled in the DCC, the unit costs will depend on the contractual arrangements between the relevant suppliers, their service and meter asset providers. We are also consulting on the change of supplier arrangements that should apply during the Foundation period.[161]

71. **We see a fundamental inconsistency between DECC's position that there is little difference in functionality between SMETS 1 and SMETS 2 meters and its assertion that the new SMETS 2 standards are needed to ensure full interoperability. Given that some HAN communication issues are still being addressed as part of the SMETS 2 design process, it is clear that final SMETS 2-compliant meters should be less susceptible to HAN connectivity issues than SMETS 1-compliant meters. However, it is unclear how much difference there will be in functionality between SMETS 1 and SMETS 2 meters, particularly in the longer term in relation to the smart grid and smart appliances.** ***DECC should outline clearly what the difference between SMETS 1 and SMETS 2 meters will be, particularly in relation to longer-term functionality.***

72. **SMETS 2 meters are more likely to provide customers with a satisfactory smart metering experience than pre-SMETS 2 meters. We are also concerned that it may cost more to support SMETS 1 meters when customers switch and that these costs may be passed on to consumers.** ***Energy companies that wish to wait for SMETS 2 meters before engaging more fully in roll-out should not be pressed to deploy pre-SMETS 2 meters during foundation stage.***

161 Ev 99

# 6 Consumer savings

## Estimated savings

73. DECC has outlined the energy and bill savings that it expects consumers to make as a result of smart metering:

> Overall, and taking into account all costs and benefits, we expect the average dual fuel household to realise an annual bill saving of around £24 by 2020, in comparison to a situation without a smart meter roll-out. For non-domestic dual fuel customers, we expect annual bill savings of £164 by 2020.[162]

Several witnesses agreed that DECC's projections for savings by domestic consumers were achievable with the right information and support.[163] A few witnesses agreed with DECC that these projections were in fact conservative.[164] However, Policy Exchange was more cautious, stating that it was not clear whether the projected savings could be delivered.[165] Consumer Focus questioned how achievable the estimated savings for non-domestic consumers were.[166]

## The role of information provision

74. The extent to which consumers will benefit directly from smart meters through energy and bill savings, will depend largely on how willing and able they are to engage with smart meters and technology.[167] Dr Raw said that "the amount that consumers benefit is partly in their own hands [and] how they make use of the technology that is there".[168] Paul Spence said that EDF trials had been focusing on how to get "the right consumer engagement and the right behavioural change sustained over time to deliver those benefits."[169]

75. Witnesses agreed that the quality of information and support provided to consumers before, during and after smart meter installation were important, and that some people, particularly vulnerable consumers, needed more assistance than others.[170] Paul Spence reported some of the findings from EDF trials in this regard:

> One of the things that app trials and pilots have taught us is that we need to work especially hard to help segments of the consumers who are disengaged, either because they are vulnerable or because they do not want to engage, to understand

162 Ev 93

163 Q 59 [Audrey Gallacher]; Q 111 [Dr Raw and Dr Darby]; Q 161 [Dave Openshaw and Dr Raw]; Qq 294-304; Ev 85; Ev 99; Ev 106; Ev w118; Ev w122; Ev 110; Ev 126

164 Qq 330 and 384 [Baroness Verma]; Q 266 [Stuart Rolland]; Q 267 [Darren Braham]; Ev 93

165 Ev w127

166 Q 56 [Audrey Gallacher]; Ev 126

167 Q 59 [Audrey Gallacher]; Qq 60 and 76 [Allen Creedy]; Q 78 [Hans Kristiansen]; Q 163 [Dave Openshaw and Dr Gary Raw]; Q 221 [Paul Spence]; Ev 65; Ev 99; Ev 121; Ev 146; Ev w127

168 Q 163

169 Q 221

170 Qq 62 and 69-70 [Audrey Gallacher]; Q 115 [Dr Darby]; Q 123 [Dr Gary Raw]; Q 232 [Paul Spence]; Q 262 [Stuart Rolland]; Ev w47; Ev 126. See also summary notes of LBNL visit in Annex 1.

> smart meters…to understand whatever device they might use and…what it might require of them by way of behavioural change if they want to see the benefits of smart metering. We already know that we have to work particularly hard to make sure that we communicate right with different segments and it is not a one size fits all.[171]

Policy Exchange suggested that although the provision of up-to-date billing and consumption data would address one important barrier, other information barriers existed, such as knowing what action to take to reduce consumption, or how much energy particular actions would save.[172] The provision of information and advice is discussed in more detail in the next chapter on consumer concerns and engagement.

## The role of real-time feedback

76. As outlined in chapter 2, accurate billing and access to real-time consumption data are seen as being key to helping consumers manage and reduce their energy usage.[173] However, witnesses had mixed views on the best means of providing consumers with this data. Paul Spence said that "it is essential that you are given information about your consumption in a way that you can understand...It may be you want it on paper, on a display, on your smartphone, or on your computer. The range of devices that people use to access information is enormous."[174] Dr Gary Raw suggested that "what people benefit from most is really simple, direct information presented in a very visual fashion".[175] Sean Weir of SmartReach agreed that consumers need a simple means of accessing consumption data at first:

> We need to provide a basic service or basic device in the home so that all consumers have some level of information that enables them to understand their gas and electricity usage minute by minute, day by day. It is through that that they will start to change their behaviour.[176]

77. DECC believes that the in-home display (IHD)—a small device with a screen that displays up-to-date consumption and billing data—is key to providing this information, and has mandated that all domestic consumers should be offered one with their smart meter:

> To help consumers realise benefits, the Government is requiring energy suppliers to offer in-home displays (IHD). IHDs will give consumers easy access to information on their energy consumption in pounds and pence that will help them manage and

171 Q 232

172 Ev w127

173 Q 59 [Audrey Gallacher]; Qq 79 and 103 [Sean Weir]; Q 114 [Dr Darby]; Q 269 [Stuart Rolland]; Qq 294 and 303; Qq 385-86 [Baroness Verma]; Ev 93

174 Q 212

175 Q 122

176 Q 79 [Sean Weir]

> control their energy use. This requirement was informed by evidence that provision of real-time information is important in delivering energy savings.[177]

It said it was ensuring that the "design of the IHD is easily accessible to as many consumers as possible".[178]

78. Alex Henney felt that it was a waste of money to provide IHDs as a matter of course and suggested that consumers should buy their own if they wanted one.[179] He said:

> I have no problem with people going into a shop and buying an IHD. I have a lot of problem with £600 million worth of socialised costs, of which a significant proportion will get wasted.[180]

### *How useful do consumers find IHDs?*

79. Evidence on the extent to which IHDs help consumers to manage and reduce their energy use was varied, with some witnesses seeing them as a useful tool.[181] Baroness Verma said that consumers had told her that just having an in-home display had "made them think very carefully about how they use energy."[182] Jacqui Russell told us:

> The Energy Demand Research Project, which was carried out for a couple of years in the run up to 2011…showed that the combination of a smart meter and IHD made a real difference to the level of energy savings that people were able to make. That is what informed our requirement that all domestic consumers should be offered an IHD, because we saw a real difference in that trial.[183]

One witness described how useful he had found his IHD:

> I have one in the house and we sit down for tea at 6 pm and I can tell straight away whether the kids have left their lights on upstairs, because it is a little bit higher than it was the same time yesterday. I say to them, "What's going on?" and off they go and turn the lights off...you can see day to day, hour to hour what is going on, whether you have left lights on or put the tumble dryer on. It spikes up and you realise, "Actually, it's a sunny day, maybe I shouldn't have put the tumble dryer on today".[184]

80. Other witnesses were less enthusiastic, suggesting that IHDs might be used for only a short time before being shoved in a drawer, thrown away or otherwise falling out of use.[185] One witness described how his IHD had fallen out of use:

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177 Ev 93

178 Ev 93

179 Qq 181 and 194-96 [Alex Henney]

180 Q 195

181 Q 61 [Audrey Gallacher]; Q 104 [Sean Weir]; Q 119 [Dr Darby]; Q 124 [Professor Bulkeley]; Q 269 [Stuart Rolland and Don Leiper]; Qq 294 and 303; Qq 385-86 [Baroness Verma and Jacqui Russell]

182 Q 385

183 Q 386

184 Q 104 [Sean Weir]

185 Q 104 [Tony Taylor]; Qq 190 and 194-96 [Alex Henney]; Q 269 [Darren Braham]

> I had one in the house. I looked at it, I paid attention to it, the batteries ran out and I have not seen it since.[186]

Stuart Rolland said that British Gas had found "the level of engagement at the time of installation and individually thereafter with in-home display was very strong but it does not remain the centre of attention in the home for a very long time."[187] However, Don Leiper said that E.ON's research suggested "that after 12 months 94% of customers are still engaging with their in-home displays on a regular basis and 78% believe that they have changed their behaviour because of them".[188]

81. Professor Harriet Bulkeley outlined the findings to date from her research in relation to the Customer-Led Network Revolution project:

> We have spent almost 500 hours now speaking to people about in-home displays and smart meters...What we found is roughly two-thirds of the people that we have spoken to are very enthusiastic about their in-home displays, about one-third of them are less enthusiastic, and about 3% actively disconnect them, so very few actively move away from them.[189]

### *Should IHDs be offered to all consumers?*

82. Dr Raw and Professor Bulkeley thought that IHDs should be offered when smart meters are installed.[190] However, several witnesses suggested that instead of automatically being offered an IHD, consumers should be offered a choice of how to access their consumption data—for example, via a smart phone or tablet.[191] Tony House of SSE said:

> We think the IHD has its place and for [certain] customers...absolutely that would be something we would make available. However, we need to recognise that different segments have different expectations, so our suggestion is that we should be able to offer a multitude of different touch-points rather than just be focused on the IHD.[192]

Darren Braham suggested that consumers would benefit from a more sophisticated interaction with their consumption data:

> In our experience, our customers do not necessarily want a display…We think the enduring benefits do come from providing the information through a web interface or providing the sort of comparison data to similar homes that drives enduring behavioural changes and not through a display that primarily will show instantaneous changes in consumption.[193]

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186 Q 104 [Tony Taylor]

187 Q 269

188 Q 269

189 Q 124

190 Qq 132-35 [Dr Raw and Professor Bulkeley]

191 Q 78 [Hans Kristiansen]; Qq 190-94 [Alex Henney]; Q 231 [Tony House]; Q 233 [Andrew Ward]; Q 269 [Stuart Rolland and Darren Braham]

192 Q 231

193 Q 269

83. Professor Bulkeley agreed that "a large majority of people" would enjoy using other devices, but warned that it "won't suit everybody to interact with their in-home displays and their home systems in that way".[194] She described how easy some people found IHDs to use:

> The in-home displays we are looking at is a traffic light system—red, amber and green—and people find that intuitive. People don't even ask for it to be explained. People understand that if it is red, something is not quite right, if it is green it is fine, and they like that.[195]

Other witnesses pointed out that smart phones and other devices could be used in conjunction with IHDs. Sean Weir said that it was "entirely possible" to connect "through your iPhone, your iPad or on to the TV screen with smart TVs and so on...through this architecture".[196]

84. Several witnesses agreed that IHDs provided a useful starting point for understanding energy consumption, with some pointing out that this could lead to more sophisticated understanding of their consumption and interaction with smart technology.[197] Dr Darby said:

> There is a first order effect, which is that, for a lot of people, this particularly gives them an awareness of their electricity consumption that they did not have before and it gives them a tool that they can experiment with. They can switch things on and off and see what effect it has…In the longer term, it helps build up an energy literacy, so that they start to be more open to suggestions of the kind coming from people like London Power Networks about belonging to this whole thing, the grid, being active in it and being able to shift their consumption in such a way as to help the grid to function better.[198]

85. During our visit to California, Charles Goldman at the Lawrence Berkeley National Laboratory outlined the findings from a research study in Oklahoma that programmable thermostats might be more cost-effective than IHDs in helping consumers to manage their energy use and particularly in shifting consumption out of peak periods.[199] However, Dr Raw and Dave Openshaw warned that care should be taken in drawing comparisons between studies from different parts of the world, as differences in climate, heating/cooling needs, appliance types and power generation mix could all be significant.[200] Mr Goldman suggested that the UK should seriously consider doing large-scale pilots to develop realistic estimates of the savings that might be obtained from devices such as IHDs as well as from time-based pricing, and other enabling technologies such as programmable

194 Q 138

195 Q 123

196 Q 79

197 Q 79 [Sean Weir]; Q 119 [Dr Darby]; Q 133 [Dr Raw]; Q 269 [Stuart Rolland, Darren Braham and Don Leiper]

198 Q 119 [Dr Darby]

199 See LBNL visit summary notes in Annex 1.

200 Q 149

communicating thermostats.[201] As we heard from Professor Bulkeley and Dave Openshaw, such pilots are currently under way.[202]

### *How accurate is the information on IHDs?*

86. Consumer Futures has suggested that "the figure on the IHD may not include any debt, Green Deal charge or standing charge" and so could be "significantly lower" than a customer's actual bill and therefore affect their ability to budget for their energy costs.[203] Audrey Gallacher told the Committee:

> [IHDs] are only really going to be helpful if they do what customers want...Right now you can get information, or it is planned that you will have information, about your energy costs in pounds and pence, but that is only going to be an indicative cost. Research we have done says that about 93% of people would really value knowing through the IHD what their current spend was and what their obligation to the supplier was in terms of their bill. Right now, we are not going to have that completely accurately.[204]

She suggested that it might be worth investing a little more to ensure that the information displayed on IHDs was accurate and up to date rather than "wasting quite a lot of money because we are not giving customers what they want" from them.[205]

**87. The provision of real-time consumption and billing data is central to consumers' ability to manage their energy use, but it is unclear just how accurate the billing information provided on IHDs will be. We accept that many consumers will want to access their data via smart phones, tablets and other means, but we are also convinced that in-home displays (IHDs) help many consumers to gain a basic understanding of their energy consumption and costs. If the projected consumer savings and other benefits of smart meters are to be achieved, consumers must be presented with the best opportunity to gain a fuller understanding of their energy usage from the moment they receive their smart meter. We support DECC's position that all households should be offered an IHD with their smart meter. *However, we also recommend that more should be done to ensure that these devices provide accurate information so that they can be used most effectively by consumers.***

## Small and micro-businesses

88. Consumer Focus has raised concerns that although projected figures for energy savings among domestic consumers seemed "achievable", it was "unclear how realistic" the projections for average savings of £191 by 2020 were for small businesses.[206] It was particularly concerned that there was "no requirement to provide any kind of real-time

201 See LBNL visit summary notes in Annex 1.

202 Q 108

203 Ev 126

204 Q 61

205 Q 61 [Audrey Gallacher]

206 Ev 126

information", which it sees as the "big key for behaviour change".[207] For example, suppliers will not be obliged to provide small and micro-businesses with IHDs. The FSB suggested that micro-businesses were "broadly similar to domestic households in terms of energy consumption" and should therefore receive the "majority of safeguards proposed for the domestic sector".[208] Both Consumer Focus and the FSB felt that small businesses should be offered IHDs or other means of accessing their consumption data without charge.[209]

89. DECC and Ofgem argued that IHDs would not suit all businesses' needs and that they could buy their own if they wanted one.[210] Jacqui Russell said:

> Non-domestic consumers is a different group of people from domestic. It is quite a diverse group...Some of those non-domestic businesses employ energy managers. They are already quite active. They may have advanced metering already, and it is someone's job to worry about energy. Actually, an IHD in that context is not likely to make a lot of difference. If businesses think an IHD or a wizzy gadget in their home with real-time in front of somebody relevant is what they need, they will be able to access those from the market and connect them to their meter within the home. What there isn't is a business case for saying, "Every non-domestic premises should be offered an IHD".[211]

However, she also accepted that the energy behaviour of many small and micro-businesses is "more like" that of domestic consumers.[212]

90. Ofgem suggested that different businesses had different data requirements and that smaller businesses were not being charged to access their consumption data:

> In the non-domestic market, the level of data provision and the complexity of the data service offers may vary and there are no rules governing charging for metering or data services. In practice, early experience from the installation of smart-type electricity meters to smaller non-domestic sites indicates that consumers are not being separately charged for access to half-hourly consumption data at the moment.[213]

Ofgem has also clarified that the Government intends to extend to smaller non-domestic consumers the requirement that already exists for larger non-domestic consumers to "be given timely access to the data provided by their advanced meter, on request".[214] It has also noted that "smaller non-domestic consumers with a SMETS 2 compliant meter will be able to directly access detailed consumption information held by the meter, for free...via the Home Area Network (HAN), using a compliant Consumer Access Device."[215] However,

207 Q 59 [Audrey Gallacher]

208 Ev 146

209 Q 63 [Allen Creedy]; Ev 126

210 Q 304; Q 391 [Jacqui Russell]; Ev 79

211 Q 391

212 Q 394

213 Ev 79

214 Ev 79

215 Ev 79

this may require them to purchase a device on which the data can be displayed. Also, it is unclear whether small businesses with pre-SMETS 2 meters will have similar access to their consumption data.

91. **We see a fundamental incongruity in DECC and Ofgem's position that on the one hand IHDs are integral to domestic consumers' ability to reduce and manage energy consumption and should therefore be offered to them, but that on the other they need not be offered to small and micro-businesses. We question how the ambitious energy savings that have been projected for the non-domestic sector can be achieved by small and micro-businesses if they are not given the same opportunities as domestic consumers to access their consumption data. It is in all our interests to engage as many consumers as possible with smart meters in the short term, as this may increase their ability and willingness to engage with more sophisticated demand response incentives in the long term which could bring wider benefits.** ***We recommend that small and micro-businesses should be given the same offer of an in-home display, free of charge, that domestic consumers will get upon installation of a smart meter. At the very least, they should have free access to the consumption and billing data that IHDs are expected to provide.***

# 7 Consumer concerns and engagement

## Public attitudes to smart metering

92. Many witnesses agreed that public acceptance of smart metering is crucial to its success.[216] Smart meters are not mandatory, and if large numbers of consumers do not want to receive them, roll-out will be hindered and costs are likely to increase as suppliers struggle to gain access to people's homes and have to invest more in trying to persuade them to have smart meters. Currently, about half of British consumers have heard of smart meters, and enthusiasm for receiving one is mixed.[217] Stuart Rolland said that British Gas had found that "probably fewer than half of customers contacted to make an appointment to put a smart meter in their home actually will say yes".[218] Paul Spence described how lack of interest and logistical difficulties had affected EDF's success rates in getting consumers involved with the Low Carbon London trial:

> Our experience when we have tried a geographically focused trial...[is that] it is more difficult than we expected to reach consumers in the first place. There are a lot of those consumers, when we do reach them, who are just genuinely not interested in wanting a smart meter. Even when they do, convenience for the appointment means that we do not fulfil or their building means we can't fulfil. All of those are things that we need to learn as we go through and to do it we would suggest will take some real scale co-ordinated trialling.[219]

93. There was wide agreement among witnesses that consumers need to be sufficiently engaged with smart technology to maximise the benefits they could gain from it.[220] Potential barriers to realising those benefits include apathy, distrust, lack of knowledge about energy consumption and concerns about cost.[221] Consumer Focus found that people were interested in using smart meters to save money, budget more effectively and control their energy consumption, and that they thought "accurate bills, access to detailed data so they could get the best deal, and having a reliable energy supply were important smart benefits".[222] The same research found that customers were worried about the cost of roll-out, the effect that smart meters might have on energy costs and whether smart meters were really worth the hassle or cost.[223] Tony House described the importance that SSE places on consumer acceptance of smart meters:

> I think the success for the smart metering programme overall is around consumer acceptance of smart metering. The supplier owns that relationship with the customer

216 Q 69 [Audrey Gallacher]; Qq 60 and 76 [Allen Creedy]; Q 78 [Hans Kristiansen]; Q 163 [Dave Openshaw and Dr Raw]; Q 227 [Tony House]; Ev 65; Ev 71; Ev w75; Ev w115; Ev 99; Ev 110; Ev 121; Ev 146; Ev w127; Ev 150

217 Ev 74; Ev 93; Ev 126; Q 242 [Paul Spence]; Q 273 [Stuart Rolland]

218 Q 273

219 Q 242

220 Q 69 [Audrey Gallacher]; Qq 60 and 76 [Allen Creedy]; Q 78 [Hans Kristiansen]; Q 163 [Dave Openshaw and Dr Raw]; Ev 65; Ev 99; Ev 121; Ev 146; Ev w127

221 Ev 65; Ev 99; Ev 126; Ev w127

222 Ev 126

223 Ev 126

> and we will do our utmost to make sure that that is a very positive experience…We have a once in a lifetime opportunity to have a face-to-face touch-point with each consumer and be able to use that opportunity to best effect and to really sell the benefits of smart metering.[224]

94. The vast majority of written evidence we received from members of the public and interest groups flagged up concerns about health, data protection and privacy, but many other witnesses agreed that public concern about these issues was generally low.[225]

## Potential for consumer concerns to affect roll-out

95. The evidence from roll-out programmes in other countries shows that concerns about data protection, privacy and health can cause a consumer backlash against roll-out.[226] Consumer Focus noted that "very few public concerns" had been voiced about smart meter data or health in the UK as yet, but added that "the potential for these to become issues that jeopardise consumer engagement and result in customer detriment should not be underestimated."[227] During our visit to California, we heard directly from utility companies Pacific Gas & Electricity (PG&E) and the Sacramento Municipal Utilities District (SMUD) about the effect that consumer concerns about smart meters, particularly in relation to health and privacy, had had on roll-out. There had been pockets of resistance across California, and in some areas opposition had been so strong that local politicians had considered banning further smart meter installations.[228] In Santa Cruz county, for example, the local board of supervisors put in place a moratorium on smart meter installations in response to local concerns about potential health issues.[229]

96. PG&E described how local people in one town had suggested that meter installers should be arrested if they attempted to install smart meters, and how in another town police had accompanied meter installers to prevent interference with installations.[230] Another way in which consumers had affected roll-out was by repeatedly not being at home when installers came to install smart meters.[231] SMUD told us how it had stopped its roll-out and rethought its approach when it had heard about PG&E's problems. It had then embarked on a large consumer engagement campaign, telling people about smart meters and getting local politicians and others involved, before recommencing roll-out. This approach had helped it to avoid running into many of the problems experienced by PG&E.[232]

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224 Q 227

225 Ev 74; Ev 93; Ev w118; Ev 99; Ev 110; Ev 126; Qq 148-57 [Professor Bulkeley and Dr Raw]; Q 276 [Stuart Rolland, Darren Braham and Don Leiper]

226 Ev 93; Ev w5; See also PG&E and SMUD visit summary notes in Annex 1.

227 Ev 126

228 See PG&E and SMUD visit summary notes in Annex 1.

229 "Over union objection, Santa Cruz County extends SmartMeter moratorium", *Santa Cruz Sentinel* online, 24 January 2012, http://www.santacruzsentinel.com; "Meter Moratorium Continues", *Good Times* online, 31 January 2012, http://www.gtweekly.com/index.php/santa-cruz-news

230 See PG&E visit summary note in Annex 1

231 See PG&E visit summary note in Annex 1

232 See SMUD visit summary note in Annex 1

## Consumer concerns

### *Health*

97. A substantial amount of the evidence we received from members of the public focused on health. Concerns were raised about the potential harmful effects on health of the electromagnetic fields (EMFs) or radio frequencies (RFs) emitted by smart meters.[233] Some witnesses stated that they were adversely affected by EMFs or RFs and outlined symptoms they had experienced such as headaches, fatigue, dizziness, nausea, sleep disturbance, fevers and heart palpitations.[234] Some said that they suffered from electrosensitivity, or particular sensitivity to EMFs/RFs.[235] Others did not outline personal experience of such symptoms but raised concerns about the potential for exposure to EMFs/RFs to cause cancer, infertility, DNA damage or other negative health effects.[236] Stop Smart Meters (UK) said:

> There are thousands of studies that are showing biological effects at levels well below the ICNIRP [International Commission on Non-Ionizing Radiation Protection] safety levels and evidence that harm from the radiation could be acute. Studies have shown links with headaches, insomnia, anxiety, depression, memory and concentration problems, arrhythmias, things like that. Then there are chronic effects from long-term exposure such as cancer, infertility, dementia, genetic damage, immune system dysfunction and damage to foetuses. We are aware of many respected organisations that are calling for a precautionary approach regarding exposure to this sort of radiation, particularly for children. So we are very concerned that the proposed smart meter roll-out is with wireless technology rather than wired technology.[237]

98. However, we heard convincing evidence from Public Health England (PHE)—formerly the Health Protection Agency—and the IET's Biological Effects Policy Advisory Group (BEPAG) that the balance of evidence to date suggests that current guidelines regarding low-level exposure to radio waves are correct and that smart meter exposures fall well within these guidelines.[238] Dr Jill Meara of PHE told us:

> From what we know about smart meters already, those used in the UK in a small way and elsewhere, the radio wave exposures from smart meters are small in relation to a lot of other radiofrequency applications and very small in relation to the guideline

233 Public Health England uses the term EMF to cover fields in the frequency range below 300 gigahertz (GHz). It says that electromagnetic fields include "static fields such as the Earth's magnetic field and fields from electrostatic charges, electric and magnetic fields from the electricity supply at power frequencies (50 Hz in the UK), and radio waves from TV, radio and mobile phones, radar and satellite communications." *Electromagnetic Fields*, Public Health England, 19 July 2013, http://www.hpa.org.uk/Topics/Radiation/

234 Ev w7; Ev w26; Ev w41; Ev w46; Ev w51; Ev w51; Ev w59; Ev w77; Ev w77; Ev w77; Ev w81; Ev w82; Ev w84; Ev w88..

235 Ev w7; Ev w27; Ev w51; Ev w67; Ev w68; Ev w77; Ev w77; Ev w81; Ev w84; Ev w88; Ev w91; Ev w110

236 Ev w8; Ev w10; Ev w11; Ev w14; Ev w16; Ev w17;Ev w25; Ev w32; Ev w41; Ev w50; Ev w52; Ev w54;Ev w55; Ev w59; Ev w64; Ev w66; Ev w68; Ev w69;Ev w75; Ev w81; Ev w83; Ev w84; Ev w90; Ev w91; Ev w91; Ev w96; Ev w97; Ev w113; Ev w115; Ev w117

237 Q 1 [Dr Liz Evans]

238 Q 2

> levels. In particular, the exposures to members of the public are likely to be thousands of times lower than those they would get from using a mobile phone.[239]

Dr John Swanson of BEPAG explained that there were systems in place to ensure the public were protected and that the scientific evidence was kept under review:

> The Institution and myself completely recognise that there is some scientific evidence relating to health effects and that scientific evidence mandates further research, keeping a very close eye on any scientific developments and having in place a system to ensure the correct protection of the public. That system is in place through authoritative international and national review bodies that review the science and then bodies...which set exposure limits. The technologies that will be used in smart meters will comply with those exposure limits by...a remarkably large margin...We need a system to protect the public, and in the shape of the exposure guidelines we do have such a system. Any residual concerns should not be sufficient to halt the roll-out of the smart meter programme.[240]

99. Dr Swanson went on to outline the careful and methodical process behind the EMF/RF exposure guidelines, which involved weighing up all the evidence regarding the potential health effects of such exposures.[241] We were not convinced that the science relied on by Stop Smart Meters (UK) and other witnesses who raised concerns about the potential health effects of smart meters was similarly rigorous. For example, many witnesses relied on the BioInitiative Report, which Dr Swanson told us was "out of line with what one could call the mainstream view or the international consensus".[242] He also suggested that its authors had not performed a "dispassionate weight of evidence approach" in reaching their conclusions.[243] Many witnesses also cited as a cause for concern the fact that the International Agency for Research on Cancer of the World Health Organisation (IARC) had classified radiofrequencies as a possible group 2B human carcinogen. However, Dr Meara assured us that this did not mean that current RF guidelines on safe exposure levels needed to be reclassified.[244] She said:

> That is by far from the strongest classification. There is also probable and certain carcinogen. Among the probable carcinogens is shift working. Among certain carcinogens are alcoholic drinks. Besides radio waves, other agents with this 2B classification are petrol car exhaust, surgical implants and coffee.

## *Data protection and privacy*

100. Data access and privacy have been major consumer issues for roll-out programmes in other countries.[245] In the Netherlands, for example, they "played a key part in the consumer

239 Q 2

240 Q 2

241 Q 17

242 Q 27

243 Q 27

244 Qq 25-26

245 Ev 93; Ev w5. See also the summary note of the meeting with representatives of the California Senate Committee on Utilities and Commerce in Annex 1.

backlash against smart metering".[246] The evidence we received suggests that levels of public concern about data protection and privacy in the UK are currently low.[247] For example, expert witnesses and energy suppliers told us that few consumers taking part in trials had raised concerns about privacy data or security.[248] Professor Bulkeley said that only 2% of those taking part in the Customer-Led Network Revolution trials had opted out of allowing their trial data to be shared on privacy grounds.[249] However, she also noted that this could have been partly because those involved in the trial had "a good deal of trust in that side of things", and suggested that attitudes might be different if consumers did not have that level of trust.[250]

### *Responding to consumers' concerns*

101. In California, the consumer backlash against smart meters was ultimately brought under control by allowing people to opt out of having a smart meter and by improving communications with customers.[251] For most of these customers, SMUD had simply disabled the transmission facility in the smart meter and operated it in dumb mode, although for a small minority who were not satisfied with this solution it agreed to replace their smart meters with analogue meters.[252] Both PG&E and SMUD had put consumers who did not want smart meters on to a 'delay list', and many of these had ended up accepting smart meters at the end of the programme—some because they had seen them in use and no longer had concerns and others when they realised that there would be charges for opting out.[253] Opt-out charges are discussed below.

### *Health*

102. In the Netherlands, consumer concerns about health were partly addressed by giving consumers control over whether smart meter communications systems in the home were on or off. Consumer Focus has suggested that a similar approach could be adopted here.[254] Audrey Gallacher said:

> We know that in some countries, for example, you can control whether the meter is transmitting. You can switch the home area network off at night, for example, in the Netherlands...The other point is what you tell people and how people are reassured.[255]

DECC said that it was "working with consumer groups, suppliers, the HPA and Department of Health to ensure that clear and easily understood information on the

246 Ev 93

247 Ev 93; Ev 126; Qq 148-57 [Professor Bulkeley and Dr Raw]; Q 276 [Stuart Rolland, Darren Braham and Don Leiper]

248 Qq 148-58 [Professor Bulkeley and Dr Raw]; Q 276 [Stuart Rolland, Darren Braham and Don Leiper]

249 Qq 157-58

250 Qq 157-58

251 See California Energy Commission, PG&E, SMUD and Senator working lunch visit summary notes in Annex 1.

252 See SMUD visit summary note in Annex 1.

253 See PG&E and SMUD visit summary notes in Annex 1.

254 Ev 126

255 Q 68

evidence relating to smart meters and health is available to all consumers", and that it was considering further "how best to respond" to such concerns.[256]

### *Data protection and privacy*

103. DECC has said that "an expectation has been set at EU level that all countries should seek to address" data protection and privacy issues. It went on to outline that it was "undertaking 'privacy by design', meaning that privacy issues are considered and embedded in the programme from an early stage."[257] Consumer Focus said that DECC had "been proactive in taking steps to address customer concerns around privacy while also seeking to promote competition and the potential for wider benefits that data access can deliver" and "should be praised on...[its] collaborative approach to this sensitive issue".[258]

104. **We welcome the action that DECC is taking to respond to public concerns about health, data protection and other issues in relation to smart meters. We also welcome the fact that it is considering further "how best to respond" to such issues.[259]** ***We urge DECC to take into account solutions that have worked in other countries and to outline, before the commencement of mass roll-out, what further action it will take to address consumer concerns. DECC must ensure that these issues are given sufficient and timely attention in consumer engagement campaigns before and during roll-out.***

## Opt-out and charging

105. During our visit to California, we heard that consumers who opt out of having a smart meter pay extra charges to cover the cost to the company of reading their meter manually. PG&E outlined how the Californian regulator—the California Public Utilities Commission (CPUC)—had set opt-out charges at a one-off charge of $75 and a monthly charge of $10.[260] DECC has said that UK consumers will not be obliged to have a smart meter, so they will be able to opt out, but it is unclear whether they might be charged for this.[261] When we asked suppliers whether they would charge consumers for opting out, SSE, EDF and RWE npower said that they first needed more clarity from DECC and Ofgem on what was expected of them in terms of encouraging consumers to accept smart meters.[262] Tony House said:

> We have a mandated obligation to demonstrate that we have taken all reasonable steps to encourage customers to take smart meters. We are keen to have that determined so that we all know where the bar is, effectively. Once we know that, we can then start to address those concerns and try to work through and maybe adjust the approach through the initiatives that we might have ourselves, and particularly

256 Ev 93

257 Ev 93

258 Ev 126

259 Ev 93

260 See PG&E visit summary note in Annex 1.

261 *Smart meters: a guide*, DECC website, 19 July 2013, https://www.gov.uk/smart-meters

262 Q 243 [Tony House]; Q 245 [Paul Spence]; Q 246 [Dr Pennington]

> through the Central Delivery Body, to try to break down some of the barriers that hopefully the minority might push forward.[263]

Don Leiper of E.ON agreed that it would be useful to have clarification on the definition of reasonableness, and added that the "$10 a month or something like that, as well as a one-off charge" in America "does not seem disproportionate" to the cost of meter reading.[264] Dr Pennington of RWE npower said:

> We would like good understanding of what all reasonable endeavours means, because if you have a refuser you have called 14, 15 times that is not a great customer experience.[265]

106. We asked DECC and Ofgem to clarify what was meant by the obligation on suppliers to "take all reasonable steps" to install smart meters in all homes. Baroness Verma said:

> Again, it is about being able to ensure that those people who want to have a smart meter get a smart meter...We have kept it reasonably flexible to be able to ensure that all suppliers are working towards 100% coverage. It is in the interests of suppliers. Ultimately it reduces their costs, so they would see it as a benefit to try and get 100% coverage in the end."[266]

Ofgem said that the "all reasonable steps" caveat had been included in the supplier obligation to recognise that "there may be instances where installation is impossible" and that suppliers were generally "best placed to decide how to manage their own rollouts". It went on:

> Although, Ofgem can issue guidance to suppliers as to what might constitute all reasonable steps we do not consider it appropriate to do so at this early stage. This is because the difficulties that suppliers may face when installing meters and the solutions they may deploy to mitigate these difficulties are not yet understood. Guidance without this information could be misplaced, resulting in lower incentives on suppliers to find best-fit solutions for difficult installations and, consequently, a worse outcome for consumers. We will, however, keep this under review as the rollout progresses...With regards to customers who wish to opt out of having a smart meter, the Government has stated that it does not expect suppliers to take legal action to fit one if they cannot get the householder's co-operation.[267]

107. We also asked DECC and Ofgem whether consumers could be charged for opting out of having a smart meter. Maxine Frerk of Ofgem said that this should not happen before the end of roll-out, but that there were "real costs to suppliers of maintaining two systems, so it may well be that in future we would say it was reasonable for suppliers to charge".[268]

263 Q 243

264 Qq 277-78

265 Q 246

266 Q 415

267 Ev 79

268 Qq 314-15

Baroness Verma said that it was a matter for suppliers to decide.[269] When pressed on whether the charge would be regulated, Maxine Frerk replied: We have a competitive market. We don't regulate prices."[270] Baroness Verma also referred to the competitive market, adding that if consumers felt they were being treated unfairly, they would have recourse through Ofgem.[271]

108. **We note Ofgem's reasons for not wanting to give detailed guidance at this stage regarding the obligation on suppliers to install smart meters in all homes, and we agree that it is important that suppliers should aim to install smart meters in as many homes as possible. However, we also believe that suppliers would benefit from having a clearer understanding of what is expected of them in cases where customers refuse a smart meter so that they can plan how to respond.** ***We therefore recommend that DECC and Ofgem should provide some guidance in this regard.***

109. **We agree with Ofgem that it may be reasonable, once roll-out is complete, to charge consumers who opt out of having a smart meter. This would help to protect other consumers from picking up the increased costs of reading "dumb" meters, but any such charge would have to be reasonable. We do not believe it would be appropriate to impose a similar charge on consumers who are prevented from receiving a smart meter by HAN or WAN communications issues.** ***Ofgem and DECC should provide guidance on the circumstances in which it may be appropriate to charge consumers for opting out of having a smart meter. If charging does occur, Ofgem should monitor the charges and be prepared to set a cap if charges appear to be excessive.***

## Consumer engagement

110. The overriding message that we took away from our discussions with utilities in California was that good consumer engagement was crucial to a smooth roll-out. PG&E, SMUD and the California Energy Commission (CEC) all highlighted the importance of ensuring that consumers were fully informed about roll-out well in advance, and suggested using a variety of messengers, including local politicians and groups, company customer relations staff and community groups.[272] SMUD in particular had found its consumer engagement strategy crucial to building consumer understanding and acceptance of smart meters before and during roll-out.[273] Many witnesses also outlined the need for good consumer engagement before mass roll-out.[274] Audrey Gallacher highlighted the need to begin consumer engagement at the right time:

269 Q 413

270 Q 316

271 Qq 413-14

272 See California Energy Commission, PG&E and SMUD visit summary notes in Annex 1.

273 See SMUD visit summary note in Annex 1.

274 Q 68 [Audrey Gallacher and Allen Creedy]; Q 238 [Tony House, Andrew Ward, Dr Pennington and Paul Spence]; Qq 262 and 272 [Stuart Rolland and Don Leiper]; Q 335 [Baroness Verma]; Ev 65; Ev 71; Ev w27; Ev w47; Ev w75; Ev 87; Ev 93; Ev 99; Ev w118; Ev 106; Ev 110; Ev 121; Ev 126; Ev w127; Ev 150

> There is a worry that if we are not proactive in telling consumers about smart meters and the benefits and, indeed, the risks, we will leave a vacuum that is not necessarily going to be helpful.[275]

111. As outlined in the previous chapter, the quality of information and support provided to consumers when smart meters are installed and subsequently are crucial to achieving consumer benefit and savings from smart meters. EDF survey data from smart meter trials showed that customers would have valued more engagement and instruction during installation of their smart meter and in-home display (IHD).[276] Several witnesses agreed that the provision of energy advice and technical information upon installation would help consumers to benefit from smart meters.[277] DECC said that "the installation visit offers an important opportunity to provide consumers with advice on how to use their smart meter and IHD to improve their energy efficiency."[278] Jacqui Russell outlined the information and advice that installers would have to provide during the installation visit under the Smart Metering Installation Code of Practice (SMICoP):

> [The SMICoP] specifies...that they must demonstrate the smart metering system and the IHD to the customers, so they actually get to see it work. They must provide them with energy efficient advice, and that has to include pointing people towards independent advice from people other than their own supplier. It has to include giving generic information about schemes like the Green Deal...We hope the Central Delivery Body will come along and make some of that real.[279]

112. **The provision of good-quality information and support regarding smart meter usage and energy efficiency will be crucial to consumer benefit from smart meter roll-out. We applaud the action that DECC and Ofgem have taken to ensure that consumers receive information and advice about smart meters and energy efficiency when their smart meter is installed. However, we are concerned that the benefits of receiving this information may be lost, or significantly reduced, if smart meters are installed in areas where communication gaps mean that they will be operated in "dumb" mode for some time after installation. *DECC should amend the Smart Metering Installation Code of Practice to ensure that consumers whose smart meters do not have smart functionality at the point of installation receive appropriate information and advice when this functionality is enabled.***

## The consumer engagement strategy and the Central Delivery Body

113. DECC has produced a consumer engagement strategy "in close consultation with stakeholders" to "direct work to raise levels of consumer awareness and support for smart

275 Q 68

276 *Energy Demand Research Project: Final Analysis*, Aecom and Ofgem, June 2011, Executive Summary, p. 4, http://www.ofgem.gov.uk/Sustainability/EDRP/Documents1

277 Ev 71; Ev 110; Ev 146

278 Ev 93

279 Q 393

metering as well as to enable energy saving-behaviour change." [280] It has identified the strategic aims of the strategy as:

- building consumer support for the roll-out by building confidence in benefits and by providing reassurance on areas of consumer concern;
- delivering cost-effective energy savings by helping all consumers to use smart metering to better manage their energy consumption and expenditure; and
- ensuring that vulnerable and low-income consumers can benefit from the roll-out.

DECC has also outlined how the strategy will be implemented:

> Suppliers will have the primary consumer engagement role as the main interface with their customers before, during and after installation. Supplier engagement will be supported by a programme of centralised engagement undertaken by a Central Delivery Body (CDB). The CDB will be funded by larger energy suppliers, with smaller suppliers contributing to fixed operating costs. Larger suppliers will be required to set up the CDB by June 2013 and will be accountable for ensuring that it delivers its objectives (which broadly align with the aims of the Consumer Engagement Strategy). The body will have an independent Chair and consumer groups will be represented on the board of directors.[281]

Baroness Margaret McDonagh was recently appointed as the CDB's chairman, and the organisation formally came into existence on 30th June 2013.[282]

114. Several witnesses have highlighted the fact that lack of consumer trust in suppliers may be a barrier to roll-out.[283] This is one reason why some witnesses are concerned about the fact that the CDB is supplier-funded and led.[284] Audrey Gallacher said that the energy industry was "characterised by a lack of trust".[285] The FSB suggested that "careful consideration" needed to be given to the CDB's governance and structure "to ensure its independence from energy suppliers in order to give small businesses confidence in its role".[286] Don Leiper said that E.ON supported the CDB but also thought it should be as independent as possible:

> We have always been very supportive of the CDB being in place. I think it is really important that it is as independent as it can be from the industry and that it gets its information from further independent parties as well so it can be out in the press and

280 Ev 93

281 Ev 93

282 *Baroness McDonagh appointed Chairman of Central Delivery Body*, Energy UK, 19 June 2013, http://www.energy-uk.org.uk/press-releases

283 Q 57 [Audrey Gallacher]; Q 288; Q 339 [Baroness Verma]; Ev 99; Ev w118; Ev 126; Ev 146

284 Ev 146; Q 272 [Don Leiper]

285 Q 57

286 Ev 146

> the media confirming the benefits of smart metering, debunking myths and engaging with real issues where there are real issues to be engaged with.[287]

115. During our visit to California, SMUD and the California Energy Commission (CEC) highlighted the importance of using local messengers and forums in consumer engagement strategies.[288] Many witnesses agreed that the involvement of charities, local authorities and other trusted third parties in the consumer engagement programme would be an important means of building trust before and during UK roll-out.[289] Dr Raw said that messages needed "to come from multiple sources...from everyone involved. It needs to be trusted public figures who have been brought in, who are entirely independent."[290] Baroness Verma said:

> It is a huge task for suppliers to be able to build up that trust, but with the steps that we are taking in consumer engagement, whereby we have suppliers and other stakeholders, such as third party trusts like charities, all coming together through the Central Delivery Body, we anticipate that we will be able to start breaking down some of the barrier creep over the last few years, in as much as the consumer does not, by and large, trust suppliers.[291]

116. Policy Exchange suggested that the consumer engagement programme should be linked to roll-out:

> Wherever possible, the communications strategy should be co-ordinated with energy companies so that it reflects where the roll-out is taking place. This means working on a city-by-city or regional basis where possible (without compromising the operational efficiencies that suppliers can deliver).[292]

Stuart Rolland said that the setting up of the CDB had been "a little late in the day" and that British Gas was "very keen to see it very active as soon as possible."[293] The FSB highlighted the need for small businesses to receive information and advice about smart meters, and suggested that the Central Delivery Body (CDB) "should be specifically tasked with engaging the micro-business sector."[294]

117. **Public engagement should begin before the start of mass roll-out. We hope that energy suppliers will learn from the US experience of roll-out and start engagement early.** ***We welcome the setting up of the CDB and suggest that changes to the timescale for mass roll-out present a welcome opportunity to ensure that the consumer engagement programme is well under way before mass roll-out commences.***

287 Q 272

288 See California Energy Commission, PG&E and SMUD visit summary notes in Annex 1.

289 Ev 71; Ev w27; Ev 89; Ev 93; Ev 99; Ev w118; Ev 106; Ev 121; Ev 126; Ev w127; Qq 159-60 [Dr Raw]; Q 160 [Professor Bulkeley]; Q 238 [Dr Pennington]; Q 339 [Baroness Verma]

290 Q 159 [Dr Raw]

291 Q 339

292 Ev w127

293 Q 272

294 Ev 146

118. **Energy companies still have a long way to go in putting right past failures and building trust among consumers. It is therefore essential that information and support from a range of messengers, including charities, local authorities and other trusted third parties, is available to consumers before, during and after roll-out.**

# 8 Conclusion

119. We support the Government's ambitious roll-out programme and the important objectives it aims to achieve. At present the emphasis is on the potential changes in consumer behaviour arising from greater consumer awareness of their energy consumption. But the strategic role of the project in facilitating safe, secure and affordable energy supplies in future must be clarified, costed and explained to consumers. Smart meters have the potential to deliver efficiencies and reductions in consumer bills, but this will only happen if consumers are genuinely engaged and if smart meters provide accurate, real-time consumption and billing data. In time, consumers are likely to want to access energy consumption data in a variety of ways such as through smart phones or tablets. In the meantime, provision of in-home displays will be crucial to enhancing better understanding of energy usage and encouraging behaviour change.

120. We welcome the decision to push back the timetable for roll-out. There is now an opportunity for the Central Delivery Body to address public concerns about health and privacy head on, and ensure that consumer engagement is well under way before mass roll-out begins. This may help to avoid the consumer backlash that has been experienced in other parts of the world. Government should also be clear about what it regards as a reasonable effort by energy companies to ensure the widest possible take-up of smart meters by consumers, and whether it expects customers who refuse to have a smart meter to be charged for the ongoing cost of manual meter-readings.

# Conclusions and Recommendations

## The cost-benefit case for roll-out

1. *Ofgem must be prepared to strengthen the requirements on suppliers to provide accurate bills if there is evidence that consumers are not receiving accurate bills and/or that they are being back-billed months after smart meters have been installed.* (Paragraph 13)

2. *We recommend that suppliers work together to achieve efficiency savings during roll-out. This would help to ensure efficiency and the widest possible coverage of the WAN (Wide Area Network). DECC should draw up a co-operation protocol and require suppliers to sign up to it.* (Paragraph 26)

3. Smart metering has the potential to bring wide benefits to our energy infrastructure and to consumers, and we welcome this investment in the UK's energy system. The development of a smart grid will be key to meeting future energy challenges, but the extent to which smart metering will facilitate that is unclear, and not enough has been done to quantify the benefits of a smart grid. Greater transparency is needed for the true costs and benefits of roll-out to be assessed. *DECC should clarify the extent to which smart metering will facilitate the development of the smart grid and should publish its analysis of the financial costs and benefits of a smart grid.* (Paragraph 34)

4. There is a clear risk that the £6.7 billion net benefit projected by DECC may not be achieved if costs spiral or if consumers do not realise the expected energy and bill savings. There is also a risk that the benefits that accrue to suppliers as a result of roll-out will not be passed on fully to consumers. We are not convinced by the argument that competition in the market will ensure that costs are kept down and benefits are passed on to consumers. Until Ofgem can provide concrete evidence that competition has increased—for example by publishing its analysis of market performance against agreed indicators of competitiveness or by publishing a review of the impact of its RMR reforms—serious concerns about competition in the market will remain. *The responsibility for keeping roll-out costs under control and ensuring that benefits are passed on to customers rests with the Government and Ofgem. They must demonstrate how reforms to the market will achieve this and what action they will take if this is not achieved.* (Paragraph 35)

5. If consumers do not believe that they are benefiting significantly from roll-out, they could rightly perceive it as a costly project that they have paid for but gained little from. As we outlined in our *Consumer Engagement with Energy Markets* report, we are concerned that not enough is being done to make consumers aware of the need to invest in the UK's energy infrastructure. DECC has been focusing its consumer messaging on the relatively small energy and bill savings of around 2.8% that smart meters may help consumers to achieve. *We recommend that messages around smart metering should place greater emphasis on the wider benefits it will bring to the UK's energy infrastructure. We reiterate the call in our Consumer Engagement with Energy Markets report for greater transparency regarding the "contribution that consumers*

*are being expected to make to ensuring that we have safe, secure and affordable energy supplies in future*". (Paragraph 36)

## Roll-out stages and timescale

**6.** We welcome DECC's recent announcement that the dates for mass roll-out are being pushed back by a year. However there needs to be some flexibility in the new timetable, which should be driven by engineering and infrastructure requirements and the need to avoid artificial deadlines acting to push up programme costs. *DECC should be prepared to amend the timetable further if more time is needed to address any systemic issues that may arise, to respond to further delays to technical and infrastructure requirements for roll-out, or to prevent cost escalations for other reasons.* (Paragraph 45)

## Smart meter communications and coverage

**7.** We note the concerns about the centralised DCC model proposed by DECC. *DECC should, in response to this report, set out the justification and cost implications of the DCC model.* (Paragraph 51)

**8.** We are concerned about WAN and HAN coverage in the short to medium term, and these will affect consumers' experience of smart meters. Communications issues must be resolved before installing smart meters in order to ensure that consumers have a good experience and are able to access the benefits of smart meters as soon as they are installed. *DECC must clarify how progress towards 97.5% coverage will be achieved.* (Paragraph 60)

## Smart meter functionality and interoperability

**9.** We see a fundamental inconsistency between DECC's position that there is little difference in functionality between SMETS 1 and SMETS 2 meters and its assertion that the new SMETS 2 standards are needed to ensure full interoperability. Given that some HAN communication issues are still being addressed as part of the SMETS 2 design process, it is clear that final SMETS 2-compliant meters should be less susceptible to HAN connectivity issues than SMETS 1-compliant meters. However, it is unclear how much difference there will be in functionality between SMETS 1 and SMETS 2 meters, particularly in the longer term in relation to the smart grid and smart appliances. *DECC should outline clearly what the difference between SMETS 1 and SMETS 2 meters will be, particularly in relation to longer-term functionality.* (Paragraph 71)

**10.** SMETS 2 meters are more likely to provide customers with a satisfactory smart metering experience than pre-SMETS 2 meters. We are also concerned that it may cost more to support SMETS 1 meters when customers switch and that these costs may be passed on to consumers. *Energy companies that wish to wait for SMETS 2 meters before engaging more fully in roll-out should not be pressed to deploy pre-SMETS 2 meters during foundation stage.* (Paragraph 72)

## Consumer savings

**11.** The provision of real-time consumption and billing data is central to consumers' ability to manage their energy use, but it is unclear just how accurate the billing information provided on IHDs will be. We accept that many consumers will want to access their data via smart phones, tablets and other means, but we are also convinced that in-home displays (IHDs) help many consumers to gain a basic understanding of their energy consumption and costs. If the projected consumer savings and other benefits of smart meters are to be achieved, consumers must be presented with the best opportunity to gain a fuller understanding of their energy usage from the moment they receive their smart meter. We support DECC's position that all households should be offered an IHD with their smart meter. *However, we also recommend that more should be done to ensure that these devices provide accurate information so that they can be used most effectively by consumers.* (Paragraph 87)

**12.** We see a fundamental incongruity in DECC and Ofgem's position that on the one hand IHDs are integral to domestic consumers' ability to reduce and manage energy consumption and should therefore be offered to them, but that on the other they need not be offered to small and micro-businesses. We question how the ambitious energy savings that have been projected for the non-domestic sector can be achieved by small and micro-businesses if they are not given the same opportunities as domestic consumers to access their consumption data. It is in all our interests to engage as many consumers as possible with smart meters in the short term, as this may increase their ability and willingness to engage with more sophisticated demand response incentives in the long term which could bring wider benefits. *We recommend that small and micro-businesses should be given the same offer of an in-home display, free of charge, that domestic consumers will get upon installation of a smart meter. At the very least, they should have free access to the consumption and billing data that IHDs are expected to provide.* (Paragraph 91)

## Consumer concerns and engagement

**13.** We welcome the action that DECC is taking to respond to public concerns about health, data protection and other issues in relation to smart meters. We also welcome the fact that it is considering further "how best to respond" to such issues. (Paragraph 104). *We urge DECC to take into account solutions that have worked in other countries and to outline, before the commencement of mass roll-out, what further action it will take to address consumer concerns. DECC must ensure that these issues are given sufficient and timely attention in consumer engagement campaigns before and during roll-out.* (Paragraph 104)

**14.** We note Ofgem's reasons for not wanting to give detailed guidance at this stage regarding the obligation on suppliers to install smart meters in all homes, and we agree that it is important that suppliers should aim to install smart meters in as many homes as possible. However, we also believe that suppliers would benefit from having a clearer understanding of what is expected of them in cases where customers

refuse a smart meter so that they can plan how to respond. *We therefore recommend that DECC and Ofgem should provide some guidance in this regard.* (Paragraph 108)

**15.** We agree with Ofgem that it may be reasonable, once roll-out is complete, to charge consumers who opt out of having a smart meter. This would help to protect other consumers from picking up the increased costs of reading "dumb" meters, but any such charge would have to be reasonable. We do not believe it would be appropriate to impose a similar charge on consumers who are prevented from receiving a smart meter by HAN or WAN communications issues. *Ofgem and DECC should provide guidance on the circumstances in which it may be appropriate to charge consumers for opting out of having a smart meter. If charging does occur, Ofgem should monitor the charges and be prepared to set a cap if charges appear to be excessive.* (Paragraph 109)

**16.** The provision of good-quality information and support regarding smart meter usage and energy efficiency will be crucial to consumer benefit from smart meter roll-out. We applaud the action that DECC and Ofgem have taken to ensure that consumers receive information and advice about smart meters and energy efficiency when their smart meter is installed. However, we are concerned that the benefits of receiving this information may be lost, or significantly reduced, if smart meters are installed in areas where communication gaps mean that they will be operated in "dumb" mode for some time after installation. *DECC should amend the Smart Metering Installation Code of Practice to ensure that consumers whose smart meters do not have smart functionality at the point of installation receive appropriate information and advice when this functionality is enabled.* (Paragraph 112)

**17.** Public engagement should begin before the start of mass roll-out. We hope that energy suppliers will learn from the US experience of roll-out and start engagement early. *We welcome the setting up of the CDB and suggest that changes to the timescale for mass roll-out present a welcome opportunity to ensure that the consumer engagement programme is well under way before mass roll-out commences.* (Paragraph 117)

**18.** Energy companies still have a long way to go in putting right past failures and building trust among consumers. It is therefore essential that information and support from a range of messengers, including charities, local authorities and other trusted third parties, is available to consumers before, during and after roll-out. (Paragraph 118)

# 9 Annex– Summary notes from committee visit

## Summary note of the working dinner hosted by PG&E

## Tuesday 19 March

### *Members present:*

Mr Tim Yeo (Chair)
Dr Phillip Lee
Albert Owen
John Robertson
Sir Robert Smith
Dr Alan Whitehead

### *PG&E representatives present:*

Cliff Gleicher, Senior Director, smart meter programme
Brian Rich, Vice President PG&E
James Meadows, Director, smart meter programme

### *Introduction*

Mr Tim Yeo made an opening speech regarding the Committee's inquiry into a smart meter roll-out in the UK and the possibility of learning from the experience in California. Some of the differences between the UK and California were noted—for example that PG&E does not have pre-pay meters. Committee members enquired about policies focused on the use of gas and PG&E stated that there is no advance pricing on gas meters; instead, a reading is given every hour so that computers can calculate the billing.

### *PG&E roll-out and barriers to roll-out*

PG&E outlined that California's policy discussions about a smart meter roll-out started approximately 10 years ago. Approximately six years ago (from November 2006), PG&E had begun installing smart meters, and roll-out was now 96% complete. With opt-outs (initiated in 2012), the number of meters accounted for was 50,000 higher as of March 2013.

Much time and effort had been spent addressing issues that had not been anticipated. Several cities had attempted to ban smart meters through local measures, but this was unlawful because the State had ruled to implement smart metering. Early on there had been concerns about smart meter accuracy, but PG&E said that many complaints about overcharging had been found to be due to a broken pool pump or other source of high electricity consumption that the customer did not know about and that the smart meter had helped them find. In some cases when customers had thought that their smart meter was overcharging, PG&E suggested that in fact their previous, older analogue meter had

slowed due to weather and had become inaccurate and had undercharged them, and that was why their bills were now higher. Very few customers had raised concerns about privacy, which was heavily regulated in California.

### Health concerns

The main issue of concern for some consumers, and the most publicised subject of discussion in California, had been around radio frequency (RF) and electro-sensitivity. PG&E reported that scientists believed that although people who claimed to be electro-sensitive genuinely experienced symptoms, those symptoms had not been found to be attributable to RF or smart meters. It was also noted that many of those who protested against smart meters used cell phones and microwaves. PG&E did not know of any credible evidence linking smart meters to any of the claimed health effects.

PG&E had retained scientists formerly or presently with the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the World Health Organisation (WHO), and the Federal Communications Commission (FCC) to advise it and report on RF and the claimed adverse effects associated with smart meters. In addition, it noted that the FCC and the California Council on Science and Technology (CCST) had found that current standards were well under the limits known to cause thermal effects, and the CCST reported that studies had not confirmed any negative health effects from non-thermal sources. However, opponents argued that it would be at least 10 years before any non-thermal effects were known.

### Consumer backlash and the opt-out approach

A consumer backlash against smart meters had not been anticipated. Benchmarking reflected that sending a letter or leaving a door hanger on people's doors would be sufficient advance information about smart meter installation, but this had turned out not to be the case for some customers. In some parts of California, localities imposed ordinances against the installation of smart meters. In one small town, it had been suggested that PG&E staff attempting to install smart meters should be arrested. This revealed the intensity of certain viewpoints.

In November 2011, PG&E had responded to some customers' concerns by proposing that customers be permitted to opt out, with those opt-out customers paying the overall costs of opting out. PG&E proposed to enable customers to opt out of having a smart meter by paying a one-time charge of $270 and a monthly charge of $14, but this had not been accepted by the regulator (the CPUC) which had reduced the one-time charge to $75 and had introduced a lower monthly charge of $10. Low-income customers paid a $10 one-off charge and $5 per month. This system had been implemented in February 2012.

Other jurisdictions in the United States have taken a different approach: in Naperville, mid-west Chicago, police had accompanied smart meter installers on installation visits and people had been arrested for interfering with smart meter installation. Some utilities had said that they were not going to have an opt-out programme, but then experienced similar issues and chose to offer an opt-out alternative.

When asked whether PG&E could have refused to supply electricity to homes that would not agree to have a smart meter, PG&E advised that its tariffs allowed for that, but that it would not have been good customer relations. It reported that the regulator was examining whether whole communities should be allowed to opt out.

For people whose meters repeatedly were not accessible when a meter installer visited their home to install a smart meter, PG&E had the ability to invoice the bill payer for the opt-out charge. That way the customers ultimately had to decide either to pay the opt-out fee or have a smart meter. If people failed to pay the invoice charge, they could be disconnected. Prior to opt-out, for customers who were uncertain about smart meter installation, PG&E had kept a 'delay list' and had come back to them after meters had been installed in properties where there was no objection. Once these customers had found out about the opt-out charges, many of them had ended up accepting a smart meter after all.

There were many anti-electromagnetic field (EMF) organisations in the US, with many in northern California, southern California, Texas and the north-east (including Maine and Chicago), but there were few such places in-between. Interestingly, the areas that PG&E had expected to be most pro-smart meter—liberal urban environments—also had many anti-smart meter customers.

PG&E felt that the tide was now turning with public opinion regarding smart meters being higher due to the introduction of the opt-out system, which had given customers a choice that they had not previously had. There has been much less change among those who had opted out, and some of those people still were not satisfied with the opt-out system because they did not want their neighbours to have smart meters either. Overall, about 35,000 of PG&E's customers had opted out of having a smart meter—less than 1% of its 5 million electricity customers.

### *The practicalities and cost of roll-out*

A street-by-street roll-out approach had been adopted by PG&E, which was the sole electricity supplier in its area. This approach had also been followed to some extent with gas meters, but these were more difficult to install and so some of these installations remained outstanding. On the whole, there had not been too many difficulties with gaining access to meters as most of them were on the outside of the property, but there had been an occasional locked gate or basement to access. In one day, more than 18,000 smart meters had been installed in an urban area. It had been reported that one workman could install 30 to 40 per day. However, this was less feasible in rural areas. Replacing old meters with smart meters was not always simple due to the complexity of having different meters to replace. PG&E had trained its own staff and contractors, who had different levels of expertise to address different installation types.

It was less expensive to read smart meters remotely than to read meters manually, and the cost per meter of manual meter reading had increased now that those meters were less common and therefore further apart.

### Consumer benefit

Committee members commented that consumer benefit was a central focus of roll-out in the UK and asked what benefits were being realised by consumers in California. PG&E's initial focus in its business case had been about reducing operational costs, particularly from discontinuing manually reading meters. Reductions in operational costs contributed, as did other efficiency enhancements, to maintaining affordable rates. PG&E was also looking at consumer benefit. The idea was that the savings from smart meters would be passed on to consumers and that consumers would have the benefit of being able to view their energy use information to inform their choosing new rate plans to save money. PG&E is now piloting the installation of in-home displays (IHDs), which all its smart meters had the capability to communicate with.

PG&E supported a move towards customers using the internet to check their usage. Some 45% of PG&E customers now had an online "My Account." PG&E also used print mailers with energy efficiency tips and mobile phone SMS energy alerts. For example, customers could be sent an energy alert by text to let them know when their usage had reached a certain pre-agreed level or when their usage was moving them into a new pricing tier. These communication methods were also useful for informing customers about outages and when these were being dealt with. Before smart meters, companies had needed customers to report outages, but now smart meters let them know when there was a problem. Smart meters also had the ability to receive signals to: generate a usage profile; provide a current analysis and progressive analysis; and implement smart usage of devices.

PG&E was interested in enabling people to put their usage information into a system which then told them which of PG&E's approximately 170 tariffs would be best for them. Committee members commented that the number of tariffs available in the UK was being reduced because having a large number of tariffs had not been found to increase competition. PG&E suggested that the rate analysis option that could be offered with the information gleaned from smart meters would give consumers the best tariff based on behavioural use.

### Time-of-use tariffs and demand response benefits

PG&E emphasised the potential green benefits of smart meters in reducing consumption. More aggressive pricing led to better demand response. For example, a critical peak pricing shift from 40 cents per kWh to $1 per kWh encouraged commercial customers in particular to alter their usage. Some 80,000 domestic PG&E customers had opted into a critical peak-pricing tariff and 400,000 PG&E customers overall, including commercial customers, were on time-of-use tariffs. PG&E had also introduced a programme under which customers' air-conditioning units could be cycled on and off to smooth out demand during periods of peak demand.

Committee members asked about inclining block tariffs, which had been legislated for in California. When asked whether smart technology was used to send signals to electric vehicle charging points, saying when was the best time to charge, PG&E reported that the capacity to do this was there but it was not currently used. More information was needed about how many cars were near to a transformer.

### *Smart grid*

PG&E has been beginning to integrate smart meters into smart grids. So far, this has been used for remote billing, remote meter reading, and remote connection when a customer moved house or disconnection when bills were not paid. Smart meters allowed PG&E to collect more granular data, which helped with demand planning for gas and electricity.

The smart grid allowed for the remote use of switches to diagnose and fix problems. However, as yet there was no data interchange between smart meters and substations. PG&E described "incredible outage benefits", and also reported that the revenue theft network monitoring possibilities were excellent. There were three high-powered transmission grids across the state, balanced through an independent system operator which utilities sold to and bought back from. Utilities had to do wholesale and retail load forecasting, and smart meters made this easier. Smart meters also had advantages for self-generators, including the 60,000 solar customers who were able to export the energy they generated to the grid more easily. For this purpose, net metering as opposed to feed-in tariffs were used, which enabled forecasting of the net contribution of a household to the grid.

### *Conclusion*

PG&E representatives agreed that customer communication was key and that PG&E had not anticipated that when it started its smart meter programme. If it was beginning a roll-out now, PG&E would focus on communications, particularly to help customers to better understand smart meter benefits early on. Holding meetings with electors, city halls and other stakeholders was a good way of promoting such communication.

## Summary note of the Committee's meeting with the California Energy Commission (CEC)

## Wednesday 20 March 2013

### *Members present:*

Mr Tim Yeo (Chair)
Dr Phillip Lee
Albert Owen
John Robertson
Sir Robert Smith
Dr Alan Whitehead

### *CEC representatives present:*

Drew Bohan, Chief Deputy Director, Office of the Executive Director
Kevin Barker, Advisor to Chairman Robert Weisenmiller
David Ashuckian, Deputy Director, Efficiency and Renewable Energy Division
Roger Johnson, Deputy Director, Siting, Transmission and Environmental Protection Division
Mike Gravely, Manager Energy Systems Research Office, Energy Research and Development Division
Ivin Rhyne, Manager, Energy Systems Research Office, Electricity Supply and Analysis Division

### *Introduction*

The Chair of the Committee, Mr Yeo, explained that the Committee was conducting an inquiry into smart meter roll-out in the UK and was therefore interested in California's smart metering experience, and also outlined Committee's wider interest in energy efficiency.

Drew Bohan, Chief Deputy Director, Office of the Executive Director, gave an overview of utilities in California, with three investor-owned utilities and about 40 public/municipal utilities. He also outlined the CEC's role, including its responsibilities for granting licences for solar developments.

### *Smart meter roll-out in California*

CEC representatives explained that smart meter roll-out was nearly complete for the domestic sector in California, and that roll-out for the industrial sector had been completed 10 years ago. The Lawrence Berkeley National Laboratory (LBNL) was doing research on how well smart meters had been accepted.

### Public concerns about accuracy and charging

There had been problems in one particular area—the Bakersfield Revolt—when consumers' bills had gone up and people had thought they were being charged more by smart meters.

David Ashuckian had worked with the Division of Ratepayer Advocates when he had worked at the California Public Utilities Commission (CPUC). He explained that the first smart meter roll-out in Bakersfield had coincided with a rate rise but people had not realised and so had blamed smart meters for their increased bills. There had also been complaints about accuracy, but some utilities had responded that smart meters were more accurate than the old analogue meters, some of which must have been inaccurate, and that this accounted for any apparent change in consumption levels. However, the DRA and CPUC had heard about some cases of inaccuracy, with about 100 meters transferring erroneous information to suppliers. In one case, a farmer had had a meter on a pump, which had not been turned on but for which he had received a bill for thousands of dollars. It turned out that smart meter accuracy could fluctuate slightly above or below the actual reading, and because this meter had not gone above nought, a fluctuation to slightly below the actual reading had resulted in a false reading of minus 1, but this had been expressed as 999 kwH, instead of minus 1 and so a large bill had been generated as a result.

Dynamic and tiered rates were relevant because they could cause bills to go up. There was therefore a perception that smart meters would cause higher tariffs and it was a substantial public image challenge to address this. The Lawrence Berkeley National Laboratory had done some research in this area. On the whole, opposition to smart meters in California opposition seemed small and was based on misperceptions.

### Public concerns about health

There had been some public concerns about health impacts, similar to those about cell phones, due to the two-way communications system. However, no convincing evidence had been found to support those concerns. Some public utilities took a more proactive approach and this was thought to be an issue primarily of education.

### Communications and consumption data

Smart meters in California used ZigBee Smart Energy Profile (SEP) wireless technology, rather than WiFi, and there had been some throughput issues. The transfer of information had been so great that the system had not been prepared for it.

Smart meters could be used to give consumers a good analysis of their consumption data to show their habits and how they could reduce their consumption. There had been much more public outreach of this sort among non-investor-owned utilities such as the Sacramento Municipal Utilities District (SMUD), whose customers had received smart meters much positively as a result of better provision of information from SMUD.

It was a challenge to sort through all the data that came from smart meters in a useful way and some utilities had been struggling with this. Consumers could use a green button on energy company websites to release their data to any third party offering to help them

reduce their energy demand.[295] Other challenges with smart meters included: developing products that would be of use to consumers; managing the standard of communications and how open should this be; and addressing privacy issues.

### Public concerns about privacy

There had not been much concern among consumers about data privacy. There was good data encryption with smart meters, but most meters had not had the home area network (HAN) capability initiated anyway because consumers did not have in-home displays (IHDs).

### Opt-out

Before the opt-out had been introduced, about 200 customers at a time would parade in front of utilities protesting about smart meters.

### Best practice for roll-out

Other companies or areas commencing roll-out would be well advised to:

- give consumers sufficient information about smart meters and the practicalities of roll-out, explaining potential benefits and addressing potential concerns.
- use local groups, the company website, customer relations staff and correspondence to communicate with customers about roll-out and how to benefit from smart meters.
- phase in dynamic rates and use an opt-in system for critical peak pricing.
- ensure that privacy is protected and that data is secure.
- ensure the technology is robust and interoperable through testing and that it can be updated remotely as far as possible.
- be proactive about avoiding some of the pitfalls that have occurred elsewhere.

### Smart grids

Committee members asked whether there was potential for the smart grid to help reduce demand among heavy users and whether there was a need for new generating capacity for peak supply.

CEC representatives explained that while California was a world leader on energy efficiency, it was not as advanced when it came to demand response. It would be helpful to use the smart grid to shave off use at peak load times, but this was complicated operationally. Shaving peaks would not obviate the need for new power stations, but would allow existing plant to operate more efficiently and enable better distribution.

295 http://energy.gov/data/green-button

Electricity demand in California peaks in the summer and troughed in winter. Many consumers managed their energy well. However, some people wanted greater use of solar energy and electric cars, which would make demand response even more important in managing peaks. The technology required for greater use of electric cars existed already, but the grid was not currently capable of managing the demand that would be created.

On demand response, more had been done with flexible demand than with day-ahead demand. The CEC had been working with the military to help them achieve their emission reduction targets. The smart grid in itself did not achieve aims in relation to energy consumption, but it was a tool to help increase efficiency. Currently, about half of meters' capability to interact with smart technologies had not been used and the utilities had not initiated this functionality.

The concept that energy flowed one way to the end user was changing. Solar PV was being used more widely but this created new problems in smart grids with real-time information flow and interconnection.

### *Energy storage*

There was more interest than ever at investor, state and national level in energy storage. Following the passage in California of AB2514, the Energy Storage Bill, research was being done on whether batteries could be put into homes to store energy and whether local networks could work in this way.

Home storage and distribution systems were being implemented as part of micro grid. Systems were now entering the 5-10 MW range. Such systems were very versatile but cost was a big factor. Demand response offered a fast change and efforts were being made to use storage facilities to offer fast response as well. However, this solution was more expensive and so different technologies were being explored.

### *Energy efficiency*

#### *Legal and policy interventions*

Various legal and policy interventions to increase energy efficiency in California were in place, including:

- Executive Order S-20-04, signed on 14 December 2004, which required State of California buildings to be graded LEED (Leadership in Energy and Environmental Design) silver or better.
- The Global Warming Solutions Act 2006, which introduced a target to reduce greenhouse gas emissions to 1990 levels by 2020.
- The 2009 California Scoping plan, under which homes had to be zero net energy by 2020, State of California buildings had to be zero net energy by 2025 and commercial buildings had to be zero net energy by 2030.
- The loading order for electricity resources, under which energy efficiency and demand response came first, new generation from renewable energy and distributed generation

resources came second, and clean fossil-fuelled generation and transmission infrastructure improvements came afterwards.

On demand response, things were not really there yet. There was a desire to be able to cycle people's freezers off for short periods on peak days. However, demand response solutions would not necessarily mean that new power plants did not have to be built.

### *Energy efficiency drivers*

Energy efficiency drivers included greenhouse gas targets. Regulation, rather than a market-led approach had been key to increasing energy efficiency. Regulations had saved California $74 billion in energy savings, and California's per capita energy consumption had been flat for the past 30 years whereas the national average has increased—this was thought to be mainly due to energy efficiency savings. Before new regulations were implemented, it had to be shown that their aims could be achieved cost-effectively, so there was a strong link to available technology.

### *Regulations on energy efficiency in appliances*

Appliance efficiency regulations usually related to performance, but sometimes applied to design. Without such regulations, many manufacturers would not have been producing goods that achieved energy efficiency aims. TVs had been made more efficient as a result of regulations—for example, by reducing the number of diodes—and this had had quite an effect given the number of TVs now in use.

California's use of regulation did not conflict with the market. Regulation created a level playing field for competitors and set parameters. Many Californian standards had been taken up in other states and the Californian economy had continued to flourish. This was because regulations applied to products being sold in California, not just to those manufactured there (it did not have a large manufacturing base), so manufacturers elsewhere made products to meet those regulations and sold the same products elsewhere as well. Making a product more efficient did not necessarily use any more energy during manufacturing, but the energy efficiency gains are large.

### *Building regulations on energy efficiency*

Building energy efficiency standards had first been adopted in 1978 and were updated every three years. These standards were developed in an open, public process involving regulated industry, utilities and other stakeholders. Examples included requirements regarding heating and cooling, lighting, roofing and water heating.

Under the 2009 California Scoping plan, homes had to be zero net energy by 2020, State of California buildings had to be zero net energy by 2025, and commercial buildings had to be zero net energy by 2030. This meant that buildings would have to have a solar panel or other renewable energy source on site to ensure they achieved zero net energy over the year.

### *Renewable targets*

There was a regulation on utilities to meet 33% of their load requirements through renewable by 2020. This target did not include large hydro power, which was considered to be environmentally damaging. Negotiations for 6,000 MW of combined heat and power were ongoing and there was a moratorium on new nuclear power stations.

Members of the Committee asked whether consumers were concerned about the renewables targets, particularly in relation to cost. CEC representatives explained that this was not the case yet, although utilities had started to say that the smart grid would cost consumers more.

The stringent air quality standards in California meant that oil-powered stations could not be used. Under the Renewable Portfolio Standard (RPS), power from plants outside California also had to meet the same standards. California had the most aggressive renewable targets in the US.

There was no official state policy on energy independence, but discussions were ongoing about increasing the renewables standard and having a 50-80 % emissions cut by 2050 which might bring about de facto independence.

## Summary note of the Committee's meeting with the Sacramento Municipal Utilities District (SMUD)

## Wednesday 20 March 2013

## Members present:

Mr Tim Yeo (Chair)
Dr Phillip Lee
Albert Owen
John Robertson
Sir Robert Smith
Dr Alan Whitehead

## CEC representatives present:

Jim Parks, Programme Manager, Smart Grid
Anita Clay, Economic Development and Partnerships

## Introduction

Jim Parks, Programme Manager, Smart Grid gave some brief background about SMUD, which he said served an area of 900 sq miles with a population of 1.4 million and had 600,000 customers. It was the second-largest municipal utility in California and the 6th-largest in the US. SMUD provided only electricity (no gas or water) and had a peak load of 3,299 MW.

Mr Parks explained that SMUD had a monopoly in the area that it served but that its prices were 26% cheaper than those of local investor-owned utilities, so SMUD customers did not mind the monopoly. It received about $1.4 billion in revenues in 2011, but was a not-for-profit organisation so revenues were reinvested. It had an elected board of directors and therefore was not regulated by an external body as the investor-owned utilities were by the California Public Utilities Commission (CPUC). Anyone except SMUD employees could stand for election to the board.

## Emission reduction aims

SMUD had set itself the ambitious target of reducing greenhouse gas emissions by 90% from 1990 levels by 2050. This was more ambitious than the state goal of achieving an 80% reduction by 2050. Its projected resource mix for achieving this included hydro, natural gas generation (until 2037), energy efficiency measures and renewable. However, these projections showed an energy gap starting in 2019 and widening out to about 8,000 GWh a year by 2050; SMUD did not currently know how it was going to fill this gap if it was to achieve its 90% reduction target.

## Smart grid vision

Mr Parks presented SMUD's smart grid vision, which included a microgrid and local energy production and storage facilities. One source of local energy in the vision was the "poop to power" biogas digesters that would use cow manure to generate electricity. SMUD had also considered using fat, oils and grease (FOG) to generate electricity at one of the dairy digesters, but had rejected this idea because of air quality issues. FOG has been used on other generation projects. Residential homes in the vision had smart meters, home area networks (HANs), smart appliances and electric vehicles. Commercial buildings had energy management systems and their car parks had electric vehicle charging stations.

In October 2009, SMUD had received $127.5 million of Department of Energy Smart Grid Investment Grant (SGIG) money towards its $308 million smart grid project. This grant made up 65% of the $203 million SGIG money that went to California.

## Smart meter roll-out

SMUD had now completed its roll-out of smart meters, having installed more than 620,000 smart meters. It had started its roll-out in rural areas and dense urban areas, but had halted its programme after 60,000 installations when PG&E had started having problems with customer refusal. At this point, SMUD had rethought its approach, trained staff to give presentations on smart meters and gone to local government and city council members to solicit support. Before recommencing roll-out, SMUD had embarked on a large consumer engagement campaign, telling people about smart meters and getting local city councillors involved. The fact that SMUD was community owned may have helped with consumer trust. PG&E has made some blunders over the years and so trust levels had been low before roll-out. However, if it had done more community engagement that would have helped significantly.

During roll-out there had been some concerns among consumers about privacy and the effect of electromagnetic frequencies on health. Customers had been given the option of postponing having a smart meter installed and initially 2,500 had done this. These had been moved to the end of the programme and many of them had eventually had smart meters installed when they had seen them elsewhere. There had been a small but vocal minority linked to nosmartmeters.org, who had particular concerns about health, including a man who said he had got throat cancer a month after getting a smart meter.

### *Opt-out*

By the end of roll-out, 313 customers (0.05%) had decided to opt out of having a smart meter and most of these had a smart meter with the smart functionality switched off. However, 54 customers had refused this option and wanted an old analogue meter. SMUD was going to let them do this because of their persistence in regularly speaking up at board meetings.

Opt-out programmes were costly but were still subsidised by other customers. SMUD customers opting out had initially been charged an up-front fee of $127 and a monthly fee of $39.40. However, SMUD had since moved to quarterly rather than monthly meter reading for non-smart meters and this had allowed it to reduce the monthly fee to $14.

In contrast, the fees that investor-owned utilities were able to charge had been set by the regulator, the CPUC, at $75 up-front and $10 a month. However, SDG&E and SCE had requested the ability to charge higher fees and the CPUC was expected to rule on this in April 2013.

### *Communications strategy*

SMUD's advice to another utility rolling out smart meters would be to do as much communications as possible in advance, to have a communications strategy and to use local forums for communicating with the public. Its communications strategy had included:

- discussions with customers long before the first meters were installed
- focus groups with customers
- web information about roll-out, including an interactive meter installation map
- regular public committee and board meetings
- more than 200 community presentations
- direct communication with customers.

## Smart meter and smart grid usage

SMUD took hourly reads from smart meters, and customers could access their consumption data online the next day. They benefited from having secure online access to daily and hourly energy usage information, faster reconnection upon moving house, shorter outage periods and from having in-home displays and time-based tariffs. Customers could also receive messages by email, SMS or a message on their thermostat to let them know when they had reached a certain point in their consumption, eg $75. Large differentials in off-peak and on-peak pricing (eg 7.5 cents to 75 cents per kWh) would be likely to bring about behaviour change.

Under the current tariff structure, higher users were subsidising lower users because of the step up from one tier to the next. Time-of-use (ToU) tariffs and critical peak pricing were being tested with 8,000 customers. It was likely that they would be mandatory in future as customers would be expected to reduce their consumption. SMUD's current rate process proposes mandatory ToU tariffs for all residential customers beginning in 2018.

SMUD had an automated demand response (ADR) system in use in buildings in which loads exceed 300 kW. One plant could be shut down completely on peak days. Another way of achieving load reductions was by cycling residential air-conditioning units on and off, or by raising the temperature on the thermostat. SMUD had been reluctant to use the air-conditioning cycling system since a problem when a member of staff not used to operating the system had turned off 100,000 residential air conditioners for four hours instead of cycling it every 15 minutes. This was on a hot day after a series of hot days and many residents did not want to continue being signed up to the air-con cycling programme after that.

## Comparison between consumer-owned and investor-owned utilities

California had three investor-owned utilities and about 40 municipals. Mr Parks thought that consumer-owned utilities had a greater incentive than investor-owned utilities to encourage consumers to reduce their usage, as it was in their interests to benefit consumers.

Consumer-owned utilities were not regulated externally as investor-owned utilities were by the CPUC because they had an elected board of directors who were accountable to local residents.

## Summary note of the working lunch with Senators at State Capitol

## Wednesday 20 March

### *Members present:*

Mr Tim Yeo (Chair)
Dr Phillip Lee
Albert Owen
John Robertson
Sir Robert Smith
Dr Alan Whitehead

### *Senate representatives present:*

Senator Jean Fuller
Senator Carol Liu
Senator Kevin de León
Rachel Wagoner, Chief Consultant, Senate Committee on Environmental Quality
Henry Stern, Principal Consultant to Senator Pavley
Melinda Pickerel, Senate Office of International Relations
Kellie Smith, Principal Consultant, Senate Standing Committee on Energy, Utilities and Communications

### *Introduction*

Senator Fuller reported that the smart meter installation had suffered from poor timing, as roll-out had begun in August when prices were high due to the hot weather. Senator Liu stated that consumer education was key to a successful campaign. The senators agreed that there was a political need to find the 'urban adopters', so that if there were a mishap the programme might still be salvaged.

The Chair Tim Yeo suggested that SMUD (Sacramento Municipal Utility District) was ambitious in its greenhouse gas reduction targets and enquired whether the senators had experienced any consumer resistance to such ambition. Senator de León confirmed that in the US there was also resistance and controversy generated by price rises and the subsidisation of industry. Senator de León described a 'tipping point' when price becomes an issue. The subsidy comes from government, and while those with the affluence to install solar PV do so, those on a lower income scale might not benefit. There might be a 'price point shock' for the consumer, who might not understand the wider, more abstract discussion of energy policies. A central concern was ensuring consumer support for policies.

John Robertson enquired how the senators had responded to complaints from constituents who were struggling with higher bill costs. Senator de León highlighted that constituents' primary concerns related to public safety, crime and education issues, particularly for the lower income strata of the public. Senator Liu reported that the government had used the income from utility companies to supplement general budgets.

John Robertson enquired what measures were being taken to assist vulnerable people, since it was often the case that little help was available and there might be a risk of disconnection. Senator Liu stated that there was a care programme available. John Robertson reported that the main problem was lack of understanding on the part of consumers. Senator Fuller responded that in general, lower-income consumers did not make complaints; additionally, if income was below a certain amount then a reduced rate was payable. The senators stated that taxes levied in the State responsibility area could be very unpopular, with a number of constituents having written letters to object. For Senator Fuller's counties, which covered a very large area, there was a rule service fee in place. Occasionally there were disconnections, and in this case, NGOs were available to assist people on a one-off basis. Water was a different issue: rates were rising and people are concerned by the 30% rise. The rate was increasing due to the need for infrastructure improvements, and the lack of a good water base.

John Robertson enquired whether smart meters had made a difference. Senator Fuller stated that currently it was too early to tell – some people were still concerned and others were less interested, since they were already aware of when peak times were. Senator Liu pointed out that SMUD provided a comparison between current use and the previous year's use, which was very instructive.

Albert Owen enquired how Senators had responded to health concerns about smart meters. Senator Liu highlighted that opponents were in a small but very vocal minority. It was agreed that there would always be individuals who objected and that the situation was easier now with the opt-out tariff in place. It was stated that press coverage of smart meters had focussed on the cost spike that accompanied their introduction, rather than the health issues. Coverage has also been limited to local rather than national press.

Senator Liu explained that there had been an agreement between the Public Utilities Commission (PUC, the regulator) and the utility companies to carry out smart meter roll-out. Dr Alan Whitehead enquired whether the company benefits involved had come to the fore of public debate on smart metering. In fact, it was reported that the focus had been more on job losses caused by operational cost savings, such as the laying off of smart meter readers in some cases. SMUD, for example, had been obliged to lay off staff. Senator Liu stated that companies might have saved money, which might not have been passed on to consumers as yet. It was agreed that lower-income customers were not so vocal on the need for consumer savings, but that those in the higher economic strata were vocal on this point. Senator de León stated that questions remained about the cost savings for rate payers and the relationship between the regulator and the state.

It was confirmed that the state goal was to be more energy efficient and address climate change through a formal proceeding of consultation which addressed cost and other issues. Regulators were much more powerful in the US, since they determined how much money a company could make. Dr Phillip Lee asked why the municipal utility companies had not taken over, given that the rates they offered could be much lower. Senator Liu reported that the municipals would have to raise their rates in time, and informed Members that the territories were determined by history. PG&E and SMUD had established their jurisdictions over time; SMUD would have to buy out the investor-owned utility if it wished to expand its customer base – a past attempt had failed due to the extensive

litigation required and the lack of public support. PG&E had mounted a scare campaign warning of massive costs to existing SMUD customers, were SMUD to expand.

It was reported that gas prices were continuing to rise in California, despite the discovery of shale gas in the US. Senators stated that approximately 80 % of gas was imported, with oil deliveries to the Los Angeles and Long Beach ports, through two pipelines out of the Arizona area. Senators observed that shale gas would not affect prices if it could not enter the state.

In fact, California was more likely to gas price reductions from over-supply in states such as Alaska, for example. Senator Fuller explained that in California, development occurs very slowly due to extensive regulations. Nobody wanted a transmission line, or other piece of infrastructure, in their back yard although everyone wants the energy product. For example, the Monterrey coastline was very beautiful, and the public did not want to see interventions in this area. Dr Phillip Lee asked whether there were any concerns over the possibility of inducing earthquakes with fracking, due to the fault line. In Senator Fuller's area, this was not considered an issue, as oil had been pumped in the region for decades. By contrast, in North Dakota for example fracking was different, due to different conditions. There was some concern, but the main fear was that the aquifer could become polluted. Senator de León pointed out that the Los Angeles basin could have the richest in the world but regulations were too strict to explore the possibility. The Senators also pointed out that currently the State was grappling with the renewable portfolio; if fracking were to begin then this portfolio would not be fulfilled, and more ambitious goals for cap and trade and energy efficiency would not be reached. The key issue was how to soften the blow regarding increasing energy prices.

Chair, Tim Yeo, highlighted that in California, large-scale solar projects were decided centrally, unlike in the UK. The Chair asked whether there was any resentment or sense of disenfranchisement as a result. Senator Fuller explained that many planning regulations were already in place, which ensured that people could make themselves heard. Where there were acres of empty space, the State could exploit these areas first which tended to be less controversial. John Robertson pointed out that the Scottish mountains could be considered a desert equivalent, however after 14 years the required upgrade and transmission lines were still not in place.

Chair, Tim Yeo, enquired about the progress of the planned high speed railway across California, linking San Diego with San Francisco and Sacramento. Senator Liu explained that this was highly controversial due to the high costs involved and the perception that the rail would not in fact be fast enough to be termed "high speed".

Albert Owen raised the subject of opposition to nuclear power in the State. Senator Liu stated that there were mixed opinions on the subject, however there was currently no political would for nuclear new build. In addition, the US had not yet developed reprocessing of nuclear fuel. However, the general consensus was that alternative sources of energy were needed, such as the solar towers which Senators observed during a recent visit to Spain.

## Summary note of the meeting with representatives of the Senate Committee on Utilities and Commerce

## Wednesday 20 March 2013

## Members present:

Mr Tim Yeo (Chair)
Dr Phillip Lee
Albert Owen
John Robertson
Sir Robert Smith
Dr Alan Whitehead

## Assembly representatives present:

Assembly Member Steven Bradford, Chair of the Assembly Committee on Utilities and Commerce
Sue Kateley, Chief Committee Consultant for the California State Assembly Committee on Utilities and Commerce
Davina T Flemings, Principal Consultant, Assembly Committee on Utilities and Commerce

## Introduction

Mr Steven Bradford, Chair of the Assembly Committee on Utilities and Commerce, welcomed the Committee to California and gave an overview of the work of the Assembly Committee, particularly in relation to smart meters

Sue Kateley provided a presentation on the Committee's experience of smart meter implementation, in her capacity as the committee consultant on the Assembly side of the Legislature dealing with smart meter and energy efficiency issues.

The Committee on Utilities and Commerce addressed a broad range of climate change legislation and issues, in particular the issue of rates and rate reform. The Committee was examining the higher tier rates, which impose higher charges on high consumption, and exploring how this could be adjusted to balance the payment of tiers. Chair Steven Bradford also explained the difficulty of implementing new policies due to extensive regulation – in some cases, simply felling a tree could take many years. There were many challenges in this area.

Chair, Tim Yeo, pointed out that some of California's climate change targets were highly ambitious, and enquired about consumer pushback on such policies. Chair Steven Bradford agreed, explaining the need for policies to have tangible consumer benefits, such as the Proposition 39 on energy efficiency which had just been passed. Concerns remained that there would be a backlash which would undermine the state's tiered-rate model. Currently residential customers are able to opt in to time of use tariffs, however in future

there may be a mandatory tiered time of use structure which may cause confusion for consumers.

In a more general discussion of renewable technologies, the Chair, Tim Yeo, reported that marine renewables remained about 10 years from commercial viability, and transmission issues were significant. Offshore wind remained unpopular due to its adverse aesthetic effects upon the coast line.

### *Smart Meters*

Although smart meters appeared to have been implemented more widely in Democrat areas, it was reported that the penetration of smart meters in the US was a reflection of the readiness of technologies rather than a party political issue.

The delay to smart meter installation was largely due to privacy concerns. There was significant public concern about privacy issues relating to Home Area Networks (HANs), and also instances of predatory selling. There was a widespread concern that data regulation would somehow undermine entrepreneurship, leading to a reluctance to legislate in this area. Indeed, California deployed smart meter technology far before the standards, codes and regulations were in place.

Some studies seem to suggest there could be health impacts from smart meter radio waves, although public opposition had been largely overcome with the introduction of an opt-out.

The tiered system meant that energy prices went from 11 cents to 42 cents per KWh. Some consumers attributed the increase in rates to smart meters. PG&E had made the top two tiers the same rate, since the bottom two tiers were capped, which increased energy bills for more intensive users. In addition, some smart meters had given false readings, although this had happened only during initial deployment due to a short-term software malfunction. The loss of employment for meter readers as a result of remote reading was also a concern.

Public support for energy efficiency was high in California, but the costs of renewable contracts would be substantial, pushing energy rates up. Chair, Tim Yeo, pointed out that the benefits from smart meter roll-out appeared to accrue almost entirely to energy suppliers, which was likely to undermine public support. Indeed, one of Sue Kateley's reports questioned the benefits for consumers, particularly for natural gas consumers. An additional benefit, which could potentially be added to smart meters for gas would be the detection of gas leaks, but this feature was not currently installed. An unexpected benefit of smart meter installation was reduced vehicular accident rates, due to meter reader vehicles no longer being needed.

A wider issue in California related to whether the state regulator could manage the utilities. There was a lack of fiscal management of these companies, leading to concern that the California Public Utilities Commission (CPUC) might not be monitoring the accounts with the requisite care and attention. Another of Sue Kateley's reports examined the costs of smart meter roll-out for small-scale versus large-scale utilities. Further issues of interest included making data on energy efficiency programmes more transparent, so that outcomes of the $1 billion expenditure in this area were clear. A forthcoming Committee evidence hearing would examine the network security issue in more detail.

## Visit to Lawrence Berkeley National Laboratory (LBNL)

## Thursday 21 March 2013

### *Members present:*

Mr Tim Yeo (Chair)
Dr Phillip Lee
Albert Owen
John Robertson
Sir Robert Smith
Dr Alan Whitehead

## LBNL staff present:

Chuck Goldman, Head of the Energy Analysis and Environmental Impacts Department (EAE)
Mary Ann Piette, Head of the Building Technology and Urban Systems Department and Director of the Demand Response Research Centre (DRRC)

## Introduction

Mr Yeo explained the purpose of the Committee's visit to California as part of its inquiry into smart meter roll-out in the UK as well as its wider interest in energy efficiency. He noted that there were some similarities between California and the UK, such as the vociferous minority of opponents to roll-out and the difficulty of convincing consumers of the benefits, particularly if they appeared to accrue mostly to suppliers. Dr Whitehead commented that the area-based approach to roll-out in the US might be better than the approach being taken in the UK, and added that it was surprising that the benefits appeared to accrue mainly to suppliers.

Chuck Goldman, Head of the Energy Analysis and Environmental Impacts Department (EAEI), gave some background about the Lawrence Berkeley National Laboratory, his role and the energy landscape in the US, noting that about 15 states allowed retail competition and that the uptake had been significant among larger commercial/industrial customers, but much lower for domestic, residential customers.

Mr Goldman explained that he led the EAIA, which did work in several areas: energy efficiency policy and programme design; sustainable energy; electricity markets and policy; indoor environmental quality; international energy studies; and energy policy, modelling and efficiency in China. The China Energy Group had been doing work in relation to China for 30 years. He also managed a technical assistance programme targeted at state energy regulators for the Department of Energy in relation to energy efficiency and smart grid implementation issues. In that context, he had supported the regulatory commissions and their staff in regulatory proceedings and workshops in a number of states, including Michigan and Maine, on smart grid implementation issues, including on health and privacy aspects of smart meters and enabling technologies to facilitate demand response and dynamic pricing.

The Environmental Energy Technologies Division (EETD) was one of the largest divisions in LBNL, taking up about 10% of its staff and budget. In total, the annual budget was about $100 million, and 13 Nobel prize-winning scientists had worked at the lab since it was founded in 1931. Currently, most of its funding came from the Department of Energy, but some came from the State of California.

### *Energy efficiency*

Mr Goldman outlined the benefits of energy efficiency as a resource, such as reduced consumption and costs, and noted that smart meters were not necessary for energy efficiency.

He explained that customers in the US contributed to energy efficiency programmes worth $5 billion and that they were informed what this money was spent on. They paid about one third of a cent per kWh towards these programmes, with retail electricity prices for residential customers ranging from 6 to 20 cents per kWh depending on the utility and state. However, 68% of this spending was concentrated in 10 states, with California having by far the highest spend on energy efficiency programmes (one fifth of the overall spend).

Certain states had particular policy and legislative requirements regarding energy efficiency. For example, six states required utilities to acquire cost-effective energy efficiencies, 15 states had energy efficiency resource standards, and 28 states required utilities to have demand-side management plans or energy efficiency budgets. However, spending on electricity and gas energy efficiency programmes in the US was expected to double or even triple (to $10 billion or $15 billion) by 2025. This kind of spending had the potential to nearly flatten load growth by 2025 in some states. Indeed, California's per capita energy consumption had been flat for the past 30 years, while average per capita consumption had risen steadily for the US as a whole. This achievement was largely a result of California's investment in energy efficiency measures, including appliance standards, building standards and obligations placed on utilities. Mr Goldman described a 'labyrinth of energy efficiency policies' in California, including the energy efficiency resource standard, the Renewable Portfolio Standard (RPS), and integrated resource planning. These measures were estimated to have saved $65 billion-worth of electricity and gas between 1976 and 2003, with 40,000 GWh of electricity a year being saved in 2003 (against 1976 levels).

A key aspect of the energy efficiency measures involved increasing the energy efficiency of buildings, but this had to be done cost-effectively. The most aggressive energy efficiency work had been done in the public sector, partly because of federal targets to reduce energy use in federal facilities. Every federal agency was ranked on its performance and given funding accordingly. Many military facilities wanted to be self-sufficient in terms of reliability and had attempted to procure on-site generation because they saw access to energy as a security issue. Much of this change in energy efficiency investments in the US had been driven by economics from the customer and utility perspective and not necessarily by concerns about climate change. For example, commercial landlords benefited from lower operating costs when they increased the energy efficiency of their buildings because they had obligations to keep certain comfort levels in buildings; increasing energy efficiency made it cheaper for them to do this. Mr Goldman pointed

out that smart meters would not 'save the day' in terms of addressing poor housing stock, and that energy efficiency policies could be of use prior to the installation of meters.

### *Advanced and smart meters*

When putting forward their plans for implementing smart meters, utilities had had to show that what they wanted to do was cost-effective to utility customers in terms of either operational savings or peak demand/demand response benefits as part of a business case proceeding to state regulators. In typical business cases, most utilities projected that about 80% to 85% of the benefits of smart meters/the smart grid would come from operational savings, with demand response (e.g. peak demand savings, need to build fewer peaking resources) and smoothing making up a good portion of the remainder. Based on experience to date with rolling out smart meters, many utilities had reported that operational savings from smart meters had been realized in the field.

The EETD had been working with 10 utilities that were rolling out smart meters, including some that offered in-home displays (IHDs) and various types of time-based tariffs to customers, including critical peak pricing, time-of-use (TOU) tariffs, and peak time rebates. Part of this work involved randomised control trials with large numbers of households. In aggregate over the 10 utilities, about 150,000 households had been assigned to treatment and control groups. Aspects being studied included: what motivated customers to sign up to and stay on time-based tariffs; how customers responded to time-based tariffs; whether better results were gained when customers had to opt into having a time-based tariff or when they were automatically put on one and had to opt out if they wanted a different tariff. Studies and evaluations of dynamic pricing had also been done over the past seven to eight years at a number of other utilities, although in many cases with somewhat less rigorous experimental designs.

Many utility programme managers at these 10 utilities had reported, as they had been rolling out smart meters and time-based tariffs, that there were major gaps in consumer knowledge. For example, many customers did not understand why electricity cost more at peak times, and many did not fully understand the rates they were on. Some customers did not believe there should be a link between the cost of providing power and the rates they paid. Many consumers thought that all energy in California was clean and that energy from non-clean sources out of the state did not have an impact on them. Many did not know which appliances, other than air-conditioning units, used a lot of power. Mr Goldman suggested a large educational effort was needed to overcome consumer resistance.

### *Oklahoma demand response study*

In Oklahoma, there had been a very successful roll-out of smart meters, and mechanisms such as variable peak pricing and ToU tariffs were being used. An Oklahoma Gas & Electric (OG&E) demand response study had looked at the energy savings achieved by customers using either: programmable thermostats; in-home displays (IHD); web-based consumption data; or all three. The study had found that those with the programmable thermostats saved the most, whereas those with IHDs saved the least—considerably less than those with the programmable thermostats. Customers with the web option saved

slightly more than those with IHDs, and customers with all three saved slightly less than those with just programmable thermostats.[296] As a result, Mr Goldman suggested that information/feedback to customers was essential and that there were many delivery channels that could provide this information, such as web-based portals, IHDs and smart thermostats. However, at OG&E, the results from programmable thermostats seemed particularly promising in terms of cost-effectiveness compared to the current generation of IHD devices, because cost differences were not significant and summer peak demand savings appeared to be more predictable and larger. A policy issue to consider was the extent to which it was worth subsidising such control devices (eg, smart thermostats) in order to get better demand management.

Mr Goldman noted that historic billing practices in the US were very different to those in the UK for domestic customers. In the US, domestic customers were used to getting monthly utility bills, and 30 to 40 utilities now offered energy information/feedback programmes that provided information to customers on how their usage compared to that of their neighbours, identified energy saving opportunities and showed trends in usage and bills over time. Savings from these energy information programmes for large groups of customers had been in the 1% to 2% range, with rigorous experimental designs (randomised control trials with treatment and control groups) being used. In most cases, utilities presented this energy information/feedback to customers either through mail-marketing materials (eg bill stuffers in their utility bill) or through web-based portals.

US customers had received monthly bills and known about their energy consumption for a long time but this had not necessarily prompted behaviour change until utilities had started offering energy information/feedback programs. With the roll-out of smart meters, some of these energy information/feedback programs now had even more granular—hourly or daily—information, which showed how quickly and for how long customers responded to energy information/feedback messages. Many US utilities might decide to combine time-based pricing with energy information/feedback programs because initial research suggested that most of the behavioural response from domestic customers lasted only for days or weeks in the absence of emergency or crisis conditions.

Mr Goldman urged that the UK should seriously consider doing large-scale pilots using rigorous experimental designs to develop realistic estimates of the savings that might be obtained from time-based pricing, information/feedback devices such as IHDs and other enabling technologies such as programmable communicating thermostats, particularly given the historic differences in utility billing practices, consumption and usage patterns among domestic customers.

### *Home Area Networks (HANs) and gateways*

The EETD had found from its smart meter research that having the HAN integrated into the smart meter was not an optimal strategy. For example, issues had been raised in relation to customer privacy, as the integrated home gateway could be accessed, and this

296 This research is expected to be published in summer 2013

system did not work well when the meter was far from the device, so it was not always reliable for demand response signals.[297]

An alternative system would be to install smart meters with lower functionality and to use gateway boxes rather than smart meters to provide a HAN. This system would require only one-way communication between the smart meter and the HAN would therefore be more secure. The gateway boxes could be used in conjunction with secure servers to provide customers with price signals, messaging and other information via the internet and smart phones rather than via an IHD. An internet-based gateway would also enable companies such as Siemens or Google to monitor price signals over the internet and build technologies and applications for consumers accordingly.

Gateway boxes had the advantage of being easier to upgrade and keep up with technology, and they would not need to use Zigbee, with which there had been some technical issues. Zigbee 1.0 was currently used in the US and the UK was expected to use Zigbee 1.2. The gateway boxes cost about $200 and they were already being used in the US to control appliances. The EETD recommended this gateway approach because it was more secure and because technology and software companies were better placed than smart meter manufacturers to design HAN hardware and software. Mr Goldman suggested that although manufacturers were currently using the specification SEP 1.0, SEP 2.0 should be used as standard for the next generation of meters.

### *Consumer ability to opt out of having a smart meter*

As few as 2% of consumers had chosen to opt out of having smart meters and numbers tended to decline as the benefits of smart meters became more apparent. People's reasons for opting out were diverse but health concerns remained unproven and smart meters had been proven to be accurate. However, there was little to be gained from arguing with consumers about opting out and refusal could result in costly legal battles. A good compromise was to allow consumers to opt out and then to charge them according to what this cost the supplier.

Utilities could act to minimise concerns by engaging with consumers before roll-out; ensuring that expectations were realistic and that the accuracy of meters could be verified; and by helping to ensure that consumers would be able to derive the expected benefits from their smart meters.

## *Demand response (DR) and time-based pricing*

DR had been shown to shave the top off expected peaks in demand by a maximum of 1,191 MW or 2.9% of system demand in 2006. DR capability during peak times was now as high as 10% in a few states and could be as high as 16% by 2032. However, energy efficiency was still important in reducing consumption overall, as were static ToU tariffs, which allowed customers to alter their consumption patterns to take advantage of lower prices during off-peak times. Pilots to date showed that the opt-in approach to ToU tariffs favoured the status quo, with fewer than 20% of customers opting in. There had been less research on

297 This research is expected to be published in summer 2013

opt-out tariffs. Another option was mandated choice, with consumers having to make a decision.

Mary Ann Piette, Head of the Building Technology and Urban Systems Department and Director of the Demand Response Research Centre (DRRC) explained that the DRRC had developed open automated demand response (OpenADR) to help reduce peak load and prevent it from rising any higher. It was currently used mainly in commercial properties, and some utilities were able to get a 10% reduction on the peak when the price went up and commercial buildings took immediate action to reduce their consumption. For example, a bakery had bought extra pans so that it could turn the dishwasher off at those times. [NB, with this kind of dynamic pricing, customers receive price signals during peak demand periods and take immediate action to cut consumption, whereas with static ToU tariffs, customers know which times of day are cheaper and plan their everyday consumption patterns to take advantage of these cheaper periods.] Other possibilities for immediate responses to price signals included lighting that dims automatically during peak pricing times and automated thermostats that adjust by a couple of degrees at peak times but which can be overridden if the customer feels uncomfortable with the adjusted temperature.

Many organisations, small and large, were now using OpenADR, including Siemens, Honeywell and Mitsubishi. It was being used in Scotland and Japan, there were active pilots in Australia and China, and other countries were also interested.

The Demand to Grid (D2G) Appliance Research Lab was researching the use of OpenADR with appliances in the home.

## Building Technology and Urban Systems Department

Mary Ann Piette gave an overview of the BTUS department's work. Homes in California would have to be net zero energy by 2020, and commercial buildings by 2030. The department had worked on several innovations that could help to achieve that aim. Successes included:

- Energy efficiency windows, including for the New York Times building
- Lighting sources and controls
- Energy-efficient data centres – 2-5% of energy use in the US is from data centres.
- Healthy homes – ensuring that energy efficient homes are properly ventilated so that emissions from carpets, etc, are released.
- Automated demand response
- Cool roofs – roofs that look dark but that reflect infra-red rays
- DOE2 and Energy Plus – tools for low-energy design optimisation and retrofit analysis to support energy savings of 10-30% per building

The department was working on modelling buildings so that they did not need air conditioning, controlling the level of solar gain through windows, and enabling buildings

to have more flexible energy use—although such platforms are currently expensive. This flexibility would be crucial when there was greater use of wind and other intermittent loads on the system.

# Formal Minutes

## Tuesday 16 July 2013

Members present:

Sir Robert Smith, in the Chair

| | |
|---|---|
| Ian Lavery | Christopher Pincher |
| Dr Phillip Lee | John Robertson |
| Mr Peter Lilley | Dr Alan Whitehead |

Draft Report (*Smart meter roll-out*), proposed by the Chair, brought up and read.

*Ordered*, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 120 read and agreed to.

Annex and Summary agreed to.

*Resolved*, That the Report be the Fourth Report of the Committee to the House.

*Ordered*, That the Chair make the Report to the House.

*Ordered*, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

Written evidence was ordered to be reported to the House for printing with the Report (in addition to that ordered to be reported for publishing on 26 February, 14 May and 4 June).

[Adjourned till Tuesday 10 September at 9.30 am

# Witnesses

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# Oral evidence

## Taken before the Energy and Climate Change Committee

## on Tuesday 23 April 2013

Members present:

Mr Tim Yeo (Chair)

| | |
|---|---|
| Dan Byles | Albert Owen |
| Barry Gardiner | Sir Robert Smith |
| Ian Lavery | Dr Alan Whitehead |

### Examination of Witnesses

*Witnesses:* **Mike Mitcham**, Stop Smart Meters! (UK), **Dr Liz Evans**, Stop Smart Meters! (UK), **Dr Jill Meara**, Public Health England, and **Dr John Swanson**, Biological Effects Policy Advisory Group, gave evidence.

**Q1 Chair:** Good morning, thank you very much for coming in. We are quite tight for time this morning so we will save time by not having long formal introductions. I am hoping to get through this session in about 40 minutes or so. Could I start with the two representatives from Stop Smart Meters!? I would like you, if you would, just to outline to the Committee, for the record, what your main concerns are about smart meters.

***Dr Evans:*** Good morning, everyone. At Stop Smart Meters! (UK) we have five main areas of concern. The first two are related specifically to pulsed microwave radiofrequency radiation, which is linked to wireless smart meters. So the first concerns are about health risks. There are thousands of studies that are showing biological effects at levels well below the ICNIRP safety levels and evidence that harm from the radiation could be acute. Studies have shown links with headaches, insomnia, anxiety, depression, memory and concentration problems, arrhythmias, things like that. Then there are chronic effects from long-term exposure such as cancer, infertility, dementia, genetic damage, immune system dysfunction and damage to foetuses.

We are aware of many respected organisations that are calling for a precautionary approach regarding exposure to this sort of radiation, particularly for children. So we are very concerned that the proposed smart meter roll-out is with wireless technology rather than wired technology.

The other issue that we are concerned about, which relates to this radiofrequency radiation, is the environmental impact that that can have. There are hundreds of studies showing biological effects and harm from this sort of radiation to plants, trees, animals and insects, including bees and migratory species. Birth defects have been reported in calves as well as fertility problems in herds that have been exposed to this sort of radiation.

We also feel it is not very green to use wireless technology, and that would be backed up by the Melbourne Centre of Energy Efficient Communications, which has commented on wireless technology, "It is the modern way but wireless is an energy monster, it is just inherently inefficient". So we feel that that would go against the claim that smart meters are green.

Our other main concerns around smart meters are to do with cyber-security and problems to do with people hacking into your smart meter. You are effectively putting your home, and therefore the country's utility supplies, on to the internet, which will be vulnerable to hacking, cyber warfare, cyber attacks and also solar activity if it is a wireless system.

We have issues around data privacy. The European Data Protection Supervisor last year said that smart meters enable massive collections of personal data, which can track what members of a household do within the privacy of their own home. We are very concerned as to who will have access to that data and what they would do with the data.

Finally, an area of concern is higher bills for consumers. We are aware of a survey in Toronto that found that after a year of installation of a smart meter 80% of homes had higher bills, and often this was over 50% higher than they had prior to smart meters, and similar stories have been reported in the US. Those are our areas of concern.

**Q2 Chair:** That is a fairly comprehensive list. We will return to some of those points in a few minutes' time. Can I just ask our other two witnesses whether they have any concerns about the use of smart meters?

***Dr Meara:*** Can I just summarise the Public Health England view? You will probably be aware that Public Health England, which I call PHE, took over the functions of the Health Protection Agency on 1 April. We are quite new but we are doing the same job, a statutory role, to advise the Government on the public health implications of radio waves.

We are clearly aware of all the concerns that have been expressed around the world about smart meters and other radio-wave technologies, and we know that in some cases it is difficult for the public to access accurate information about them. However, there is a substantial body of scientific evidence about the effects of exposure to radiowaves, and there are internationally agreed guideline levels for limiting exposures that have been set based on this evidence and based on the levels at which effects are found.

From what we know about smart meters already, those used in the UK in a small way and elsewhere, the radio wave exposures from smart meters are small in relation to a lot of other radiofrequency applications

and very small in relation to the guideline levels. In particular, the exposures to members of the public are likely to be thousands of times lower than those they would get from using a mobile phone. That is the summary I have.

**Chair:** That is very helpful.

***Dr Swanson:*** Can I just say on the record that I am representing today the Institution of Engineering and Technology? My day job is with National Grid but I am not representing any part of industry today and National Grid does not have a direct interest in smart meters.

The Institution and myself completely recognise that there is some scientific evidence relating to health effects and that scientific evidence mandates further research, keeping a very close eye on any scientific developments and having in place a system to ensure the correct protection of the public. That system is in place through authoritative international and national review bodies that review the science and then bodies such as—it has already been mentioned—the International Commission on Non-Ionizing Radiation Protection, ICNIRP, which set exposure limits. The technologies that will be used in smart meters will comply with those exposure limits by, as my colleague Dr Meara said, a remarkably large margin, for various reasons. We consider that that is the necessary reassurance that the public are being protected. We need a system to protect the public, and in the shape of the exposure guidelines we do have such a system. Any residual concerns should not be sufficient to halt the roll-out of the smart meter programme.

**Q3 Chair:** Dr Meara, the HPA said that it would be conducting independent assessments of exposures from smart meters in the UK as the programme was rolled out. Has that work started now?

***Dr Meara:*** We have assessed exposure to the public based on several factors so far. Firstly, there is what we know about the technical parameters of the existing systems. We have looked at measurement reports from other countries and we have done a very small number of preliminary measurements with meters that are currently in use in the UK, and all those data concur with one another. We have to await the detailed assessments until decisions have been made on the specific technology that is going to be rolled out in the UK, because otherwise we could have tested the wrong type of technology and people would, I think, rightly complain that we had not hit the right target.

What we will do when we have done those studies is use them to confirm the predictions that we have made from the evidence we have at the moment to allow more precise comparisons between smart meters and other technologies that people might use or have in their homes, and also to provide more reassurance about the levels of exposure and the expected compliance well below the ICNIRP guidelines.

**Q4 Chair:** Do you feel that maybe some of that should have been done before meters started to go into people's homes?

***Dr Meara:*** That would have required an early decision on what type of meters were going to be used. I do not think that the potential exposures justify that because if they look like ducks and quack like ducks—and all the ones we have measured and are in use elsewhere are ducks—I do not think it is very likely that you are going to get high exposures from the meter solution that is used in the UK, because technically they do not have that much oomph in them.

**Q5 Sir Robert Smith:** I want to pursue a bit more the health effects. I think, Mr Mitcham, you were nodding in a negative way to the idea that mobile phones had more electromagnetic effects than smart meters. What was the reason for that?

***Mike Mitcham:*** It is a common argument, and unfortunately it is a fallacious one. A study and information that we have published, courtesy of Daniel Hirsch, who is a senior lecturer in nuclear policy at the University of California in Santa Cruz, took the California Council for Science and Technology's own data and reinterpreted it so that it more accurately represented entire body exposure. What it showed was that smart meters can expose human biology to between 140 and 800 times as much microwave radiation as mobile phones.

**Q6 Sir Robert Smith:** Can you send us a copy of that?

***Mike Mitcham:*** There is a graph on our leaflet, which I will give you, and I will certainly send you a copy of that information.

**Q7 Sir Robert Smith:** Has it been peer-reviewed?

***Mike Mitcham:*** The information was put forward by the CCST as a means of deflating some of the arguments against smart meters. Daniel Hirsch took it upon his own back to publish the information that reinterpreted the information. Whether it is peer-reviewed or not I do not know, but it has not been successfully rebutted, to my knowledge.

**Q8 Sir Robert Smith:** Do the other witnesses have a view on this?

***Dr Meara:*** Yes, the science of dosimetry, where you move from the technical specifications of radio waves in the air into what happens in people, is a very complex and technical science and I am not qualified to talk about that. However, if smart meters gave exposures that were 800 times mobile phones, they would bust the ICNIRP guidelines. Some of the mobile phone exposures from some of the more powerful phones are hitting not far from the ICNIRP guidelines, so compliance with ICNIRP is not possible if the exposures are that much more. Dr Swanson may have some more technical details.

***Dr Swanson:*** To give a bit of context, the smart meter technology involves two bits of what are likely to be wireless communication. There is the wide area network communicating from the meter to the outside world and the home area network, which is rather lower-power because it only has to extend within the home. As far as the wide area network goes, one of the technologies that is being considered for deployment is literally the guts of a mobile phone. It uses the same frequencies, the same protocols, so if

the smart meter is essentially transmitting as a mobile phone it is hard to see how it can produce higher exposures than using a mobile phone does.

The evidence that I have seen suggests that the average exposures received by people roundabout the home and in the environs of the home from a smart meter is lower for two reasons. One is the distance factor—you use a mobile phone very close to the body, and although it is possible, you do not often get that close to the smart meter. The second is the time factor—that smart meters will only need to communicate over the wide area network for a small fraction of the day. There is quite a lot of conflicting data about exactly how small, and that may change in the future as the technology develops. I think everybody is agreed it is small; there is just disagreement over exactly how small. So the combination of a distance factor and a time factor, on my understanding, would reduce the average exposure a person receives from a smart meter compared with what they would receive from a mobile phone.

***Dr Meara:*** So maybe this calculation has assumed emissions being constant and close to the body when in fact they are infrequent and far from the body.

***Mike Mitcham:*** It is at a distance of three feet. One of the issues is that you cannot necessarily legislate, for example in a neighbour's house, for where they may locate their smart meter. In many situations in residences in the States and Canada where smart meters have already been deployed and heavily campaigned against, many people have found banks of smart meters right outside their bedroom. So you cannot legislate for where these meters are going to be.

Another issue is that I think we need to move away from this wrong argument that smart meters emit less or expose people less to less microwave radiation, in that the exposure from smart meters is acute. Similar reports showed that—

**Q9 Sir Robert Smith:** What do you mean by "acute"?

***Mike Mitcham:*** Immediate or short-term versus chronic exposure, so with a smart meter you are chronically exposed over a longer period of time day in, day out.

**Q10 Sir Robert Smith:** I thought you said a smart meter was acute.

***Mike Mitcham:*** I am sorry if I misspoke. A mobile phone is acute radiation and you have a choice of whether or not you use it. With a smart meter you do not have a choice of whether or not your neighbour has a smart meter and is constantly exposing you to the radiation.

**Q11 Sir Robert Smith:** What if your neighbour has a mobile phone?

***Mike Mitcham:*** The likelihood of your neighbour spending 24 hours a day on the mobile phone is low.

**Q12 Sir Robert Smith:** But would the smart meter be on 24 hours a day?

***Mike Mitcham:*** Yes.

***Dr Meara:*** But it is not transmitting all week, 24 hours a day.

***Mike Mitcham:*** Excuse me, may I answer the question. A court case in California resulted in disclosure of information that smart meters can emit up to 190,000 pulses of intense microwave radiation per day, and these pulses are so short-lived that taken together and sandwiched together, the average exposure is very short, in the same way that your exposure to the bullet from a rifle is very short-lived but that tiny fraction of a time where it enters your body and does damage—

**Q13 Chair:** Are you trying to allege that there is some similarity of the effect of a bullet from a rifle and the effect of a smart meter?

***Mike Mitcham:*** Why not?

**Q14 Chair:** A bullet from a rifle kills you instantly normally, does it not?

***Mike Mitcham:*** Well yes, and a smart meter—

**Q15 Chair:** So are people going to die instantly from having a smart meter in their neighbour's house? That is a ridiculous statement.

***Mike Mitcham:*** I am making an equivocation to the difference between acute and then averaging the number of acute exposures into a short amount of time. I am arguing that it is a fallacious argument and unfortunately what is not being taken into account is that these pulses are incredibly damaging.

***Dr Evans:*** Also, I would like to raise the query about the ICNIRP guidelines, which were developed in 1998, but they were never designed to protect against damage from chronic low-level long-term exposure. If you are following the ICNIRP guidelines you can guarantee that you will not, in a period of six minutes, heat up or get an electric shock. That is the only thing that they will protect you against. So they are not fit for purpose for protecting us against chronic, long-term, 24-hours-a-day, 7-days-a-week, 365-days-of-the-year exposure to a lower level of radiation, which has been shown in many studies to have biological effects at levels thousands of times lower than the ICNIRP guidelines. Actually, 40% of the world's population have chosen to have exposure guidelines that are much more rigorous than the UK. We follow the ICNIRP guidelines, which are 9 watts per metre squared. Russia and Italy have gone for 0.1 watts per metre squared, so that is about 100 times lower.

**Q16 Sir Robert Smith:** Italy has smart meters?

***Dr Evans:*** They are wired. They are wired in through the power supply and apparently there was very little resistance to them going in. The same has happened in Idaho. There was a lot of public resistance, so they have gone for fully wired smart meters, which basically completely eliminate this risk to public health, about which we cannot be sure at the moment whether it could be disastrous.

The BioInitiative Report that has just been released in 2012 has called for safety levels of 0.000005 watts per metre squared, which I think is hundreds of thousands times lower than the ICNIRP, and that is based on the fact that biological effects have been

found at levels just above 0.000005. So I do not think just sticking to the guidelines is necessarily particularly helpful.

***Mike Mitcham:*** May I add to that? In 2008 the European Commission took a vote on the ICNIRP standards and voted overwhelmingly against them, calling them obsolete and out of date. What Dr Meara mentioned was that we have internationally agreed standards and I do not agree with that. The ICNIRP would encourage everybody to use their standards but many people have done away with them completely because they are obsolete and out of date and not fit for purpose.

I have here a graph that shows other countries in comparison to the United Kingdom. We have Austria, Belgium, Bulgaria, Luxembourg, Ukraine, Switzerland, China, Hungary, Italy, France, Poland and Russia, all well below 10 microwatts per centimetre squared, and here we have the United Kingdom at 1,000 microwatts per centimetre squared. We are not taking into account non-thermal effects of microwave radiation. It seems as though many others are.

**Q17 Chair:** Dr Meara, would you like to comment on that?

***Dr Meara:*** Yes, thank you. First of all, about the non-thermal effects argument. That is taken into account in the ICNIRP guidelines, because it considers all the studies related to health and exposure to radio waves. What they find, in summary, is that the potential harmful effects begin to occur consistently at the same level at which heating also occurs, in single cells or in whole animals. Therefore the guidelines protect against the adverse health effects, whether or not those health effects are caused by heating—they just happen to occur at that same temperature.

In terms of adopting different exposure guidelines in different countries, in fact all countries in Europe have adopted the ICNIRP guidelines through the 1999 EU Council recommendations. What some countries have done is adopt additional measures, which involve further exposure restrictions applied to particular situations and particular sources in certain ways, and they differ from country to country in a rather piecemeal fashion. When you read the governmental reports on these different standards, it is clear that these extra measures are not argued in terms of comprehensive reviews of the scientific evidence, but are there to reflect the political responses to public concerns, so not necessarily science-based.

The view of Public Health England is that if you advise these piecemeal, ad hoc reductions in certain types of exposures that are not related to a sound scientific basis, that is bound to lead to inconsistencies both for radiofrequency technologies and for how we apply regulation to all sorts of other things in our environment.

In terms of the European Parliament motion that was passed, I think you should be aware that the EU has three official expert scientific committees, one of which is officially mandated to look at the health effects of new technologies, and it is called SCENIHR, and if I think hard enough I might work out what the acronym stands for. SCENIHR has a mandate to review the health effects of emerging and new potentially harmful technology, and that officially mandated body has done reviews of radiowaves and come out with conclusions that are in line with the international consensus and the ICNIRP guidelines.

However, clearly actions that are needed on a political level are for the individual member states to decide upon. The internationally mandated guidelines are driven by the science, and it is not clear in that European Parliament motion exactly what evidence they looked at and what was presented to them before that motion was passed.

***Dr Swanson:*** It might be helpful to add a word about how the scientific process works, because there is a vast literature of scientific studies on potential health effects, and many of those studies apparently report health effects. Science does not proceed by picking on one study and uncritically saying, "Oh, well, that is the answer". Science proceeds by carefully weighing the totality of the evidence, looking at each individual study, making an assessment of its quality, crucially making an assessment of whether it has been reproducible by other scientists and then taking an overall weight of evidence using experts from different disciplines to reach an overall judgment. That is the sort of process that ICNIRP and the World Health Organisation and IARC and other bodies internationally have done: the Health Protection Agency, Public Health England and the Institution of Engineering and Technology in the UK have done so. Using that sort of careful, methodical, weight of evidence approach is what leads to the conclusion that Dr Meara reported—that the place at which the evidence becomes strong enough to take protective measures is, broadly speaking, the threshold for thermal effects. The studies that report effects below that level should not be ignored, and they should certainly be used to prompt directions for further research, but they are not strong enough to justify setting protective measures.

***Dr Evans:*** Can I just go back to the guidelines?

**Chair:** Can we have very brief answers? We are running out of time.

***Dr Evans:*** I do not know whether the other members of the panel are aware that Paolo Vecchia, who was the ICNIRP Chair, is on record as saying that his guidelines are "neither a mandatory prescription for safety nor the last word on the issue nor a defensive wall for industry or others", and that their own commentary that they published says, "Different groups in the population may have a lower tolerance to radiofrequency radiation, for example, children, the elderly, the chronically ill. Even if you adjust guidelines to deal with these groups you may still not provide adequate protection for certain sensitive individuals or with concomitant exposure to agents that exacerbate the effects of the non ionizing radiation".

If the Government are planning to put 30 million smart meters into different people's homes, you have to listen to what ICNIRP are saying about these vulnerable groups in the population. The guidelines, they have admitted, will not protect against these groups of people. If you are putting them into

everyone's homes you have to think about the most vulnerable, not the least vulnerable.

**Q18 Barry Gardiner:** Mr Mitcham, in your biography I was interested to see that you work in information technology, particularly with systems development integration and delivery. What is the nature of the systems that you deliver?
***Mike Mitcham:*** They are platform technologies for delivering applications on desktops.

**Q19 Barry Gardiner:** Do your clients operate on a wi-fi or wired basis?
***Mike Mitcham:*** Some of them unfortunately do, others do not.
**Barry Gardiner:** Sorry, which?
***Mike Mitcham:*** I am sorry?
**Barry Gardiner:** The question I asked you was, do you operate on a wi-fi or a wired basis?
***Mike Mitcham:*** In answer to your question whether my clients use wi-fi: some of them do, some of them do not.
**Barry Gardiner:** Some of them do operate on a wi-fi basis?
***Mike Mitcham:*** Yes.

**Q20 Barry Gardiner:** So you designed, developed, integrate and deliver wi-fi systems for people?
***Mike Mitcham:*** No. I am involved in the design delivery, the management of application platform technologies. Whether our clients use wi-fi is up to them. What is the point of your question, please?
**Barry Gardiner:** Consistency.
***Mike Mitcham:*** Consistency in what?
**Barry Gardiner:** Consistency in argument.
***Mike Mitcham:*** How is that—
**Barry Gardiner:** I am asking the questions, not you, Mr Mitcham.
***Mike Mitcham:***—in the remotest concerned with my consistency of argument?

**Q21 Barry Gardiner:** Mr Mitcham, it is important that you are consistent in what you do. If you do not understand that—
***Mike Mitcham:*** I would say this is maybe bordering on an ad hominem attack here. We are here to present information and evidence in relation to our concern about smart meters. What I do for a living has very little to do with it.

**Q22 Barry Gardiner:** Not at all. You provided it to the Committee in your biography.
***Mike Mitcham:*** I was asked for a biography.

**Q23 Barry Gardiner:** It is the expertise that you claim to possess.
***Mike Mitcham:*** I am here as a citizen who is concerned about the smart meters programme. I am not here in a professional capacity.

**Q24 Barry Gardiner:** Mr Mitcham, if you claim to possess that expertise, and that is the basis on which you are presenting to the Committee, that is what you have told us.
***Mike Mitcham:*** I was asked for a biography.
**Barry Gardiner:** Yes, indeed.
***Mike Mitcham:*** So I provided one.
**Barry Gardiner:** That is what you put in your biography.
***Mike Mitcham:*** I do not have anything to hide in that respect.
**Barry Gardiner:** Good, but all I am asking for is a bit of consistency.
***Mike Mitcham:*** I do not think that is relevant.
**Chair:** I will decide what is relevant.

**Q25 Barry Gardiner:** Dr Meara, the International Agency for Research on Cancer of the World Health Organisation recently classified radiofrequencies as a possible group 2B human carcinogen. Do you think that current guidelines on safe exposure levels also should be reclassified?
***Dr Meara:*** The IARC process is part of an ongoing process that looks at all sorts of potential hazards, and they have a very systematic approach for getting the evidence together and coming up with their views. In 2011 they considered radiowaves and they had a group of experts with a very wide range of opinions and positions, including authors of the BioInitiative Report. The resulting bottom line was, as you said, that radiofrequencies were graded as a possible carcinogen. That is by far from the strongest classification. There is also probable and certain carcinogen. Among the probable carcinogens is shift working. Among certain carcinogens are alcoholic drinks. Besides radio waves, other agents with this 2B classification are petrol car exhaust, surgical implants and coffee.
***Mike Mitcham:*** Excuse me, 10 cups of coffee per day.
***Dr Meara:*** Actually, Mr Mitcham makes a good point. All that the IARC classification does is say whether something could be a carcinogen or not, it does not go into risk and dose. There is another process to produce things called Environmental Health Criteria, which look at the public health implications. If something is a carcinogen but is only going to affect one person every million years, you do not have to do much about it. The Environmental Health Criteria process for radiowaves is currently under way.
Obviously, in terms of protecting the public, each classification has to be considered on its own merits, and you cannot wait until you have the Environmental Health Criteria once you have some data. However, we feel a proportionate response to a 2B classification is to inform the public and to advise about possible precautionary measures—particularly for the highest exposures, which would be mobile phones in this case, and for the most at-risk groups, which might be children in this case. The UK did this as far back as 2000 after the Stewart report with its advice to users of mobile phones to limit their children's use of phones.
The smart meter exposure, as we have explained, is much lower than those from mobile phones, thousands of times lower, and therefore they do not merit the precautionary advice because, as Mr Mitcham was sort of hinting, you go for the high risk activities.

**Q26 Barry Gardiner:** So, in answering the question, should current guidelines on the safety exposure levels also be reclassified. Just for the sake of clarity and brevity, what is your answer?
***Dr Meara:*** No. Sorry, I gave a rather long answer if that is all you wanted.

**Q27 Barry Gardiner:** Dr Swanson, the BioInitiative Report concluded that bioeffects can occur from just minutes of exposure to mobile phone masts, wi-fi and wireless utilities—smart meters—that produce whole-body exposure. How do you understand that the BioInitiative Report has been received within the academic community? Do you know whether it has been peer—reviewed and, if so, what other scientists have made of it?
***Dr Swanson:*** The BioInitiative conclusions are clearly out of line with what one could call the mainstream view or the international consensus. That has been recognised by other scientists in commenting on BioInitiative. The specific question was, has it been peer-reviewed? I believe it was initially published in non peer-reviewed form, but subsequently the individual chapters have been published in peer-review journals.
I think the interesting question is, why did the BioInitiative enterprise result in conclusions so different from those reached by each of the other bodies that have looked at this subject? I think that relates to my earlier comment about the way in which science is done—the business of dispassionately looking at the totality of evidence, weighing the strength of individual pieces of evidence and reaching an overall conclusion through a multidisciplinary weight of evidence process,. My view, certainly, and that of the institution I am representing, and I think of many other scientists, is that BioInitiative did not perform that sort of dispassionate weight of evidence approach.

**Q28 Barry Gardiner:** Let me be clear exactly what you are accusing them of, because some of them are scientists in their own right. We are talking about scientists—the World Foundation for Natural Sciences and Dr Elizabeth Evans—so I just want to be clear what you are accusing them of doing. Are you saying that they deliberately set out to find evidence for a proposition that they wished to prove?
***Dr Swanson:*** I would not say they deliberately set out to find such a conclusion. I would say that the way in which that exercise came about and the way in which it was structured perhaps created a disposition to find such a conclusion.

**Q29 Barry Gardiner:** Why would they have any desire to engage upon such false practice?
***Dr Swanson:*** I am just hesitating when you talk about false practice.

**Q30 Barry Gardiner:** You are saying that the practice is out of line with normal scientific procedure. What I am asking you is, was it ill motivation, or was it by some flaw in the way in which they conducted their research? If it is because of the latter, then what was the flaw in the way in which they conducted their research?
***Dr Swanson:*** BioInitiative, as I understand it, came about because there was a group of people who felt that the prevailing international consensus was not a true consensus, not a fair reflection of the science. I do not in any way impugn the individual beliefs of those scientists who reached that conclusion and then came together to produce a report that would put a different viewpoint and, in their view, the correct viewpoint.
In the scientific endeavour, there is room for all viewpoints, and it is often very helpful to have viewpoints from outside whatever the prevailing mainstream consensus is in order to prompt those more within the consensus to be challenged—are we considering all the right issues? Are there things we have overlooked? So I do not in any way dispute the right of the individuals to hold those views or indeed to publish those views, but I am trying to understand how a group of people who, broadly speaking, held those views, came together with a purpose of challenging the orthodoxy. I think that is what lies behind how they came to a rather different view to the mainstream view.

**Q31 Barry Gardiner:** The Advisory Group on Non-Ionizing Radiation stated that it had found little or no evidence linking symptoms that the BioInitiative Report had linked with exposure to RFs and EMFs. Did they have full access to the information that the BioInitiative Report had prepared?
***Dr Swanson:*** Broadly speaking, yes. There will always be individual studies that one group happened to have picked up and another group happened not to have picked up. However, I believe such individual studies do not make a very material difference to the overall view, and I think essentially each of the groups—the International Commission, Public Health England in the UK, and BioInitiative—were drawing on the same evidence base.

**Q32 Barry Gardiner:** Dr Evans, you wanted to come in?
***Dr Evans:*** Yes, I wanted to clarify a few things about the BioInitiative Report, just for the record. It was 29 independent scientists, and I think it is the independence of the scientists that is unusual. A lot of the other big reviews have been done by people with questionable links to industry. There were three former presidents of the Bioelectromagnetics Society on the BioInitiative. There were the Chair of the Russian National Committee on Non-Ionizing Radiation Protection and the senior adviser to the European Environmental Agency, so these are not just a bunch of people who do not know what they are talking about.
**Barry Gardiner:** I had tried to make that clear, I think.
***Dr Evans:*** There is a lot of talk about a prevailing consensus. There are a lot of groups that have been calling for a precautionary approach that would disagree with that, including the Council of Europe, as we mentioned, which had its report in 2011 and Resolution 1815 in 2011 or 2012, calling for a

precautionary approach and a right to a healthy environment, especially for children and future generations. The European Environmental Agency calls for levels as low as reasonably achievable. The American Academy of Environmental Medicine specifically opposes smart meters based on the health effects that it can see from the literature. The Irish—

**Q33 Barry Gardiner:** Strictly speaking, Dr Evans, you are no longer commenting on the question I asked Dr Swanson. I think we understand—
***Dr Evans:*** We were talking about this prevailing public opinion, but I am saying all around the world there are big groups, the Austrian Medical Association—
**Barry Gardiner:** I think we understand that.
***Dr Evans:*** So there are lots of big groups who are—

**Q34 Barry Gardiner:** Can I just ask Dr Meara; much of the scientific data on electromagnetic frequencies focuses on the potential harmful effects of mobile phones. We heard from Mr Mitcham his view about the relative acute and chronic phases of this. I wonder if you could comment on how you believe the scientific data on phones translates to smart meters.
***Dr Meara:*** We believe there is sufficient analogy that you can use the same sets of ICNIRP guidelines and of course, just to reiterate, the calls for a precautionary approach. There is a precautionary approach to use of radiowaves in the UK in relation to children and mobile phones, but with smart meters the average exposures are much lower, they are further away and they are not broadcasting as often, and therefore we feel that similar precaution is not required.

**Q35 Sir Robert Smith:** Are children obeying the precautionary principle?
***Dr Meara:*** Unfortunately they are not following our advice.
***Mike Mitcham:*** Unfortunately what we are seeing is a 50% increase in brain tumours over the last 10 years.

**Q36 Dan Byles:** I would like to move on specifically from the health concerns of Stop Smart Meters! (UK) to some of your wider concerns. You said that there has been little to reassure consumers that their data will be secure or private. What do you think could be done within the programme to give greater reassurance in that regard?
***Mike Mitcham:*** Unfortunately, with the nature of the programme as it is currently standing, I do not think there is any assurance you can provide. There is a fairly poor track record of protecting data here in the UK, and the nature of the current smart meter solution means that it is susceptible to hacking and cyber attack, so data loss is unavoidable with the current design. I do not think there is anything you can do to assure the public.

**Q37 Dan Byles:** So you do not think it is something that can be mitigated? You think it is a clear-cut thing
***Mike Mitcham:*** I think if you were to have a very different smart grid solution or smart metering solution then it could look quite different, and maybe some of the security risks could be mitigated more robustly, but as it currently stands it is a recipe for disaster.

**Q38 Dan Byles:** Are you talking about wired solution rather than wireless solution?
***Mike Mitcham:*** Yes, a wired solution, there could be enclave network usage or a more regional or local networking arrangement, but the problem is that there are going to be some incredibly sensitive data being collected about people from smart meters. By the very definition of the fact that you are collecting that data, you are unfortunately making it vulnerable to exposure and falling into the wrong hands and being used for the wrong purposes.

**Q39 Dan Byles:** In terms of the costs of roll-out, which you have suggested will far outweigh any savings by consumers for many years, can you just elaborate on how you calculated these costs and these savings in order to come to that conclusion?
***Mike Mitcham:*** A study that was submitted to another committee in 2011 by Professor Ross Anderson of the University of Cambridge—he works for one of the information technology units there—commented that the project was potentially going to be the biggest IT project failure in history because of many overlooked aspects, which I cannot comment on. I could happily provide you with a copy of his and his colleagues' document. They studied it extensively.
Energy theft is a big problem. Many Government security agencies have commented about this smart grid solution as it stands. The CIA's former director, James Woolsey, has said, "This is not a smart grid, this is a very, very stupid grid". The FBI has commented on the fact that energy loss and energy theft are rising. There are gangs in Mexico that are going around reconfiguring smart meters on a commission basis to be able to provide people with lower bills, and while that might sound good to some people, unfortunately the costs are likely to be socialised through higher bills for everybody else.

**Q40 Dan Byles:** I presume that is predominantly anecdotal, but in terms of actual studies—
***Mike Mitcham:*** It is an FBI report, so I could again provide you with a copy of that.

**Q41 Dan Byles:** Is it principally Ross Anderson's report, in terms of the costs and savings in the UK, that you are basing that on?
***Mike Mitcham:*** No, not at all. We have massive cyber-security risks. There was a report published very recently about cyber-security spend that had not been earmarked in the US. I am not sure how much has been earmarked for cyber-security here in the UK, but by 2020 cyber security for smart grid is expected to reach over $7 billion.

**Q42 Dan Byles:** Specifically for energy smart grids, $7 billion?
***Mike Mitcham:*** Correct. Specifically cyber-security for the smart meters. We have the likelihood that when the World Health Organisation and the IARC upgrade their classification from a 2B to a 2A, that is going to mean that all smart meters in the UK are going to

need to be replaced if they are wireless. That cost probably has not been factored in. There are health problems and associated downstream costs associated with treating those health issues, sleep problems causing accidents to people, and so on.

One big issue with all of this, as well, and possibly a question for the panel, is, who is picking up the liability for the smart grid and specifically for the health issues? Is it going to be the energy companies or is it likely to be the taxpayer? My understanding is that DECC is specifying the requirements for smart meters. That potentially puts the liability for all of these health issues and any other issues in the lap of the Government and the taxpayer.

**Q43 Dan Byles:** Just very briefly, in terms of the upgrading from 2B to 2A, can I just ask Dr Meara, do you think that is likely?

***Dr Meara:*** At the moment, the big scientific document that underlies the 2B classification was published last Friday, and I have not had the chance to get through the 450 pages. However, my assessment, and from talking to our member of staff who is part of that process, is that radio waves are currently at the bottom end, the safer end of 2B. They do not seem to be hitting up against 2A.

In the future obviously people will have been using mobile phones for tens and twenties of years and we could look for secular trends in some of the health effects that are alleged, particularly brain tumours.

**Q44 Dan Byles:** So you could not rule it out?

***Dr Meara:*** Eventually we shall know, but at the moment I do not think it is heading for a 2A classification.

***Dr Evans:*** Can I just say that Annie Sasco, who is with the IARC, was already calling at the last classification for it to go up to a 2A? She felt that some of the evidence that was not considered would have promoted it up to a 2A. Also, we are now seeing lots of spikes of cancer rates. The Danish Cancer Society last year noticed a doubling of glioblastoma cases over 10 years. Our own Office for National Statistics last year released statistics showing that brain tumours had increased by over 50% from 1999 to 2009 and are now the leading cancer death in children.

China announced last year an increase of childhood cancers of 3,000%, and Israel, just this year, has announced that over the last 10 years thyroid cancer has gone up by 250% in Arab women and 67% in Jewish women. We have lots of statistics that are pointing towards the fact that something is raising cancer rates, and it goes alongside the rise in wireless technologies. That could mean in 10 to 15 years' time, the classification could go up. I think it is reasonable to assume that it may do.

**Q45 Dan Byles:** I do not want to get back into the health debate too much.

***Dr Evans:*** No, no.

**Dan Byles:** Thank you for clarifying that. I am conscious that we are quite short of time and there are other areas we want to discuss. You said that the Government should terminate the smart meter implementation programme before any more lives and money are wasted—I think that is the term you used. Are there any circumstances in which you would support the introduction of smart meters, for example if a cheaper wired solution were proposed, or some alternative method of roll-out or implementation?

***Dr Evans:*** Yes.

***Mike Mitcham:*** We will be publishing shortly a report that was done just a few months ago called *Getting Smarter About The Smart Grid*. That proposes some robust alternatives to the smart grid, as it is currently designed and proposed, that do not compromise people's health, that do not put our grid at risk from cyber attack, that do not compromise our security, that put power back in the hands of consumers. So, yes, there are circumstances, but smart meters as they currently stand are not smart at all.

**Dan Byles:** Okay, thank you.

**Q46 Dr Whitehead:** Can we just get a feeling from you, Mr Mitcham, as to the relative weight of risk that you ascribe to smart meters as opposed to any other form of electronic communication? Are you saying to us today that smart meters represent a unique or advanced cyber risk in the extent to which the information can be accessed and how the arrangements can be compromised? I presume that also goes for any sort of radio communications on a smart grid, for example substation status and so on. Or are you saying that everything that relates to radio wi-fi type communications, such as banking, traffic management and so on, is similarly compromisable on a similar scale to what you are report as far as smart meters are concerned? Is it a general point that you are making about the compromisable nature of wi-fi, or is it a point you are making about the compromisable nature of smart meters?

***Mike Mitcham:*** The unfortunate reality that we live in is that cyber-warfare is on the increase. We have Boeing, which has developed electromagnetic pulse missiles recently. We have various rogue nations being talked about as having EMP-capable ballistics. An electromagnetic pulse, whether it is natural or man-made, could devastate our energy supplies.

There is a difference in my mind, which is why we initiated this campaign, from if a bank gets hit by cyber-security. In fact, there is an ongoing cyber-security attack in the US financial system currently. We recently saw the biggest ever distributed denial of service attack on the internet, levelled against a company on the European continent that handled spam, and fortunately that attack was seen off only because it had specialist expertise and engineers on site to be able to fend off such an attack. What we are talking about here is neither a bank going down nor a spam hosting company or a traffic light system going down. We are talking about the UK's entire domestic energy and utility supply being put on to the internet, being given an IP, a publicly addressable address, with functionality within the smart meter to remotely disconnect your utility and your power, potentially at a time when you need it most.

Smart meters as well are designed to fail to off. If they are compromised or they are hacked or if you stop paying your bill, services can be remotely

disconnected. If your utility can remotely disconnect you, somebody in any given nation you care to mention, whether they are Government, rogue or citizen who is bored one day, with the right technical know-how, can potentially disconnect a house, a block, a community, a town, a series of businesses or even an entire nation.

**Q47 Dr Whitehead:** That also goes for your computer and your bank account and your Tesco card.
***Mike Mitcham:*** Yes, it does, but at least I will be able to cook my dinner and get a drink of water.
**Dr Whitehead:** I am just trying to get a view of the relativity.
***Mike Mitcham:*** Yes, there is risk, and those risks are taken on board by private businesses whenever they web-enable anything. However, what we are talking about here is the UK's domestic energy and utility supply being put on to the internet, and in my mind that is reckless.

**Q48 Chair:** Who funds the work of Stop Smart Meters!?
***Mike Mitcham:*** We are self-funded.
***Dr Evans:*** Self-funded.

**Q49 Chair:** Do you publish accounts?
***Mike Mitcham:*** No.
***Dr Evans:*** We just spend our own money. It is completely for the—

**Q50 Chair:** So the report you just did—you just referred to publishing a report.
***Mike Mitcham:*** The report that I just referred to was by Dr Tim Schoechle on behalf of—I cannot remember the name of the national institute, but it was not commissioned by us. It was done in the States and many of the recommendations are very sound and very positive.

**Q51 Chair:** What about the one you said you were about to say something about, was it *Smart Meters Aren't Smart*? The one you said you were trailing?
***Mike Mitcham:*** *Getting Smarter About the Smart Grid*, yes.

**Q52 Chair:** Right okay, but that has not yet appeared.
***Mike Mitcham:*** I am sorry?
**Chair:** That report has not yet appeared.
***Mike Mitcham:*** It is available online. We will publish it later today.
***Dr Evans:*** It is on our website.

**Q53 Chair:** So that was commissioned by you, that one.
***Mike Mitcham:*** It was not submitted in evidence by us, no.

**Q54 Chair:** No, I said was it commissioned by Stop Smart Meters!?
***Mike Mitcham:*** No.
**Chair:** I see, okay. Thank you very much for coming in.

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## Examination of Witnesses

*Witnesses:* **Audrey Gallacher**, Consumer Focus, and **Allen Creedy**, Federation of Small Businesses, gave evidence.

**Q55 Chair:** Good morning. Thank you very much for coming in. As you will have heard, we are quite tight for time so I will not delay us with much formality. Could I ask first of all whether you think that smart meter roll-out will deliver value for money for consumers?
***Audrey Gallacher:*** How we rely on the benefits to be delivered is probably up for question. If we are solely relying on the competitive market to keep costs at a minimum, then I think that is probably fairly naive given the history that we have seen and the lack of competition. Wholesale reduction has not been passed through on to retail bills. So there is probably a lot more that needs to be done to ensure not only value for money but that consumers are adequately protected and that they get the benefits of smart meters as well.
***Allen Creedy:*** Certainly for small businesses at the moment, the Federation of Small Businesses does not see joined-up thinking and joined-up delivery sufficient to deliver the energy efficiency savings and carbon savings that we need to make. Quite where the smart meters fit into that energy efficiency journey we are unclear at the moment.

**Q56 Chair:** In terms of the balance of advantage to suppliers and consumers, is there anything that can be done to make sure consumers are getting the main benefit out of this?
***Audrey Gallacher:*** I suppose the issue we have is what benefits we want to see from smart meters. In the past, we have asked DECC to try to outline this: what is it that we want, can we get a bit of a roadmap on how we get there, and can we report on progress towards it? We think there have probably been quite a few fairly fundamental issues that have been missed. Certainly small businesses are second-class citizens in this roll-out. We are also quite worried that some of the advantages that could be delivered for low-income and vulnerable consumers are going to be missed, and that real improvements in the prepayment meter market will not be delivered. There are quite a lot of specifics that we could address. The issue is about pinning them down. I have some examples if you want me to go through them—things like accurate bills and ending estimated bills. In the current trials, we still see consumers not getting accurate bills. We could have some proper targets in place around back-billing, for example ending back-billing if a consumer has a smart meter.

We also feel that potentially, energy saving benefits might not be delivered to low-income and vulnerable consumers who are already rationing their energy use. We need much more co-ordination around other schemes, not new money but energy efficiency programmes, wider social programmes and benefit checks. We are calling for an extra help scheme to be put in place to ensure that wider benefits are delivered for consumers who might not get energy savings. As I have already mentioned, we probably need a much greater focus on prepayment. We had great hopes that smart meters would address the price inequality that we currently see for prepayment meter tariffs and that we could have much better customer service around top up option and more competitive markets with changes of supplier. It does not appear that those things are coming through, certainly not at this point in time, or that they have been given sufficient prominence.

***Allen Creedy:*** Small businesses are like the domestic sector, but as the smart meter roll-out is currently planned, we do not seem to be getting many of the protections that the domestic sector is getting.

If I may, there just a couple of issues that I would like to raise. On inter-operability, smart meters are already being rolled out. They are being rolled out to many of our members and many of the small businesses across the country, and that is before DECC has agreed the specifications. Many of our members have those smart meters. They are unclear about the benefits. Recent research from British Gas and Consumer Focus has illustrated that most of our members and most of the businesses only see them as a dumb meter. They do not see the benefits for energy efficiency, improved service or taking ownership of their energy bills. So inter-operability is one of the key issues.

As British Gas and others roll them out, they are company-specific. We are most concerned that if you receive a smart meter from one energy company, that ties you into that company and there is no guarantee that you are going to be able to switch. Despite DECC and everybody else's, and Ofgem's, best efforts to allow our members and small businesses that choice in the marketplace, if you receive a smart meter from company A, we are not convinced at the moment that that will allow you to switch in the future.

***Audrey Gallacher:*** Do you mind if I just add something? One of the issues around ensuring value for money or mitigating the increased costs is probably around co-ordination. So the shape of the roll-out that we have currently is supplier-led and competitive-based. DECC itself in the IA that there was a more co-ordinated approach we could see savings of at least £10 per installation, for customers who take gas and electricity from separate suppliers, because you would not be travelling as far and could do more work. However, we have not really seen a huge amount of effort to tackle this on a more collective or co-ordinated basis.

We have heard that there are potentially some concerns around competition, and that it will not necessarily happen. I think in places like blocks of flats and multiple occupancy dwellings, there is a lot that could be done, particularly around the communications. That is linked quite clearly into some of the stuff we have heard already this morning about health concerns. We could do much more, probably much more cheaply, and have a much better consumer experience, because there will not be a requirement for multiple visits to the home. That is probably quite important, and that is something that we do not really see a lot of effort being put into at the moment.

**Q57 Chair:** Those are some powerful points. This is a very ambitious programme. We are talking about 10 million installations a year for the next few years. Is there a risk that the programme is going to have a significant cost overrun, do you think?

***Audrey Gallacher:*** I think there is quite a significant risk associated with that. You have mentioned the technology and the compressed time scales that we are seeing for roll-out. That is before we even tackle things like consumer acceptance. We have done some research about people's concerns around health, and we have compared it to some of the mobile and wireless technology and how they feel about that. About 57% of consumers say they are not really too bothered, but that is against the backdrop of nobody telling them that they need to be bothered or should be bothered. So there are huge challenges, most particularly for people opening the door. We have an industry that is characterised by a lack of trust, and this might be a bit of a make-or-break situation.

**Q58 Ian Lavery:** DECC is obviously totally in support of the roll-out of the smart meters, but there are other organisations that are equally opposed, like Which?, Orsis and many others. You say the implementation process has been too industry-led and not had enough focus on consumers. You have both said that the projected consumer benefits of roll-out may not be realised. Can you say how this risk could possibly be reduced to ensure that there is a good deal for consumers?

***Allen Creedy:*** Certainly at the moment, we are concerned about data. That was raised by the previous panel. As it stands at the moment, small businesses are not sure who will own their data, how they will gain access to their data and whether they will have to pay for those data. On the point you raise about the cost, we are most concerned that ultimately it will be our members and small businesses that pay for this roll-out, with energy prices already rising steadily. Smart meters have the potential to save our members and the UK economy an awful lot of money. However, the concern is that unless the smart meter roll-out is done efficiently and effectively and engages with members, so that it is for members' benefit, our members will end up paying more, not less.

**Q59 Ian Lavery:** The DECC figures suggest that by 2020, consumers could be saving, on average, about 2.2% of their bill—about £34 off a £1,496 bill—as a result of smart metering and better billing. How realistic do you think those figures are, and how much of the savings would you expect to result from consumer interaction with the in-home displays?

***Audrey Gallacher:*** It is quite difficult to look at international comparisons, because they have different

climates and housing stock and ways they live their lives. However, the energy saving figures that we have seen so far for domestic consumers seem okay, fairly achievable, but clearly that is only if we can engage customers. It will be about the whole experience of the roll-out and whether they have the tools and the ongoing and enduring support to sustain energy consumption reduction. That opens up some real possibilities for a real revolution in how people use their energy. Right now, it is a fairly passive purchase, and that could be improved. So I think there is scope, but only if we do it right.

That is on the domestic side. We are miles away on the non-domestic side. There is no requirement to provide any kind of real-time information. That is the big key for behaviour change—getting information as close to real-time as possible. I do not know where the savings for the non-domestic area are being derived or how they will be achieved with the current arrangements. As I say, there is no requirement for a home display or any kind of energy display. We have done some research and we know that suppliers are not offering them and of those that do some charge for them. There are other issues about charging to access data through the internet. So there are particular real concerns on non-domestic. It is potentially achievable on the domestic side, but probably only with quite a lot of hand-holding and a really effective engagement programme.

**Q60 Ian Lavery:** Do you think IHDs are an expensive gamble, then?

***Allen Creedy:*** For businesses, we do not even know what we are getting yet. IHDs are only mandated for the domestic sector. So for businesses, we do not know what the smart meter is going to look like or its functionality, and we do not know, from the business perspective, how we are going to engage with that. Neither smart meters nor in-home displays will actually save any energy at all. It is our members, it is the small businesses and the way that they respond to that information that is going to lead to savings. At the moment we have no idea at all from the energy companies or from the central delivery body, what training and what consumer engagement there is going to be. What we know from British Gas roll-out and other roll-outs is that they are saying it will take 45 minutes to install a smart meter. That is great, but how much time are they going to spend with our members helping them to interpret it, use it and reinforce the savings that are potentially there?

**Q61 Ian Lavery:** Do you think they are a gamble?

***Audrey Gallacher:*** I know what you are saying, in that you hear loads of anecdotal evidence that they end up in a drawer and are quite an expensive gadget to be wasted. Right now, we have said that we are supportive of IHDs, but that is provided that they actually deliver something for consumers. We know from research and what we have seen internationally that it acts as a good prompt for everybody in the house to think about their energy usage, but no doubt things will progress. There will be other methods available, whether it is through the internet, on telly or on smartphones. However, they are only really going to be helpful if they do what customers want. I think we are missing a big trick on them already.

Right now you can get information, or it is planned that you will have information, about your energy costs in pounds and pence, but that is only going to be an indicative cost. Research we have done says that about 93% of people would really value knowing through the IHD what their current spend was and what their obligation to the supplier was in terms of their bill. Right now, we are not going to have that completely accurately. Some of the trials done years ago back in the 1980s showed that that was the functionality that was most accessed by customers. We are not getting that accurate bill information on the IHD as a result of cost. However, it may well be that by not investing a wee bit more in the IHD, we might potentially be wasting quite a lot of money because we are not giving customers what they want from it.

**Q62 Ian Lavery:** Do you think the role of programmable thermostats may help consumers to reduce their energy use?

***Audrey Gallacher:*** Probably quite a lot more needs to be done to understand savings on gas, and clearly there is a big link there to thermostats. We know that they can save money. One of the things that we suggested previously was that during roll-out, especially for low-income and vulnerable customers, as part of an extra help scheme you could look at giving them advice on thermostats and heating controls, or even show how to use what they have in the house currently. I think there is definitely a role to be played, and that should definitely be explored in terms of cost-benefit and impact.

***Allen Creedy:*** We are concerned that our members and small businesses will be unable measures that they might want to take, because they are not being given the energy efficiency advice. Whether it is thermostats, insulation, fitting a boiler or voltage optimisation, who is going to provide them with that energy advice? Is it going to be independent, which is certainly what we would like—somebody like the Energy Savings Trust—or are we going to be relying on the very energy companies that are giving them that information and the results of their smart meter?

**Q63 Ian Lavery:** Finally, should suppliers be obliged to provide non-domestic customers with IHDs or another means of accessing their energy consumption data?

***Allen Creedy:*** I think they should be providing those. They should be providing them free. The data should be coming from an independent data communications company, not through the energy companies. For both the domestic and non-domestic sector, there needs to be centralised control for reasons of security, so that somebody—Government preferably, or an independent agency—is able to control those data all the way through to the IHDs for non-domestic suppliers.

**Q64 Sir Robert Smith:** I just want to firm up the fact that on the basic level, at the very minimum, the benefits should be that there will not be a team of

meter readers being paid to go and read meters, and there should be accurate bills and no more estimated bills. However, just to confirm, you are saying for that benefit to reach the consumers, then the wider elements of market reform and simpler tariffs need to be in place too so that the energy companies are forced to pass on the benefit to their consumers.

***Audrey Gallacher:*** There has to be a lot more scrutiny of costs to consumers and industry profits, and of some of the stuff that we have spoken about at previous evidence sessions around how we can ensure consumers are getting a good deal. There is probably other stuff where we could create incentives on industry to do things properly and make sufficient investment. Right now, given some of the delays that we see in the foundation stage for smart and the trialling of it, there is a big question over how much is about understanding the technical requirements for the meter and how much is about energy suppliers' back office systems and the readiness to integrate them both. So we have quite a long way to go. Potentially, doing things like creating some incentives around companies' ability to back-bill will protect consumers but could also focus the mind around getting good systems in place and appropriate investments.

**Q65 Albert Owen:** Mr Creedy, you said that you were not sure what exactly was happening. Does the Federation of Small Businesses have direct access to DECC to find out these issues? Have you been able to take stock of the roll-out of British Gas with your members so that you can feed into DECC likely problems that might arise or have arisen?

***Allen Creedy:*** We have made submissions over the last six months or so to DECC. We have had a series of meetings to articulate our concerns. Literally just last week, we were invited to Energy UK to start the debate about consumer engagement. So today is fairly opportune, because only last week we were invited to start articulating our views and identifying the desperate need for the energy companies and the central delivery body, when it becomes established in a couple of months' time, to start to understand businesses. The term we have used is the "behavioural economics" of businesses, whether it is a hotel in Scarborough, a metal bashing company in Swansea or a tourist venue in Cumbria. Each of those uses energy in a different way. We have carried out surveys of our members. We have 33 regions across the country, and they are taking the temperature of what our members' views are and our experience of British Gas and other roll-outs. I think we have a fairly good grasp of what is happening out there on the ground at the moment.

**Albert Owen:** Thank you.

**Q66 Dr Whitehead:** Do you, at Consumer Focus, have any particular concerns about data security and the potential for consumers' data to be captured or their accounts to be hijacked or interfered with in the way that we have heard already about this morning?

***Audrey Gallacher:*** I think it would be quite reckless and naive not to have some concerns about what is a whole new set of risks. The issue is what is being done to address them and whether that is sufficient. We have been quite pleased at DECC's response to some of the data and privacy issues that have been raised by ourselves and a wider group of privacy organisations.

I should be quite clear I am not a security expert by any means, but quite a lot has been done around putting things in place. Whether that is going to be sufficient obviously remains to be seen, and customer data need to be reviewed. We have been quite comfortable about some of the options that have been made available to consumers, such as the ability to opt out of data sharing and better information about how customer data are going to be used. The real challenge is whether or not those guidelines, how they will be interpreted by industry and whether they will be understandable to consumers.

We are trying to do some work just now with Energy UK on a privacy now data charter that ensures that there is a consistent approach and that consumers are getting a consistent message. We know that, just because of the sheer volume and depth of the data, you can potentially tell quite a lot about people's lifestyles. There are certainly a lot of risks associated with it. Up until now we have been fairly comfortable with the approach that DECC has taken but, as I say, it is about how that will be subsequently implemented and whether consumers know what options are available to them and what the implications are.

There are still some fundamental issues that remain to be established, though; things like whether Government or local authorities or other agencies can access the data and use it. So there are still questions that need to be answered. It is one of the areas where there has been significant focus by both DECC and industry, probably to the disbenefit of some of the softer consumer engagement issues that we have been quite frustrated about. However, that is clearly a really important area.

***Allen Creedy:*** We have greater concerns than Consumer Focus, because the energy companies are not mandated to use the Data and Communications Company. Therefore, as it stands at the moment, the roll-out is going forward and we have no knowledge at all about how RWE, EDF or whoever are going to retain the data and communicate it to our members. That has a whole series of implications for security, confidentiality and privacy. It leads to concerns about time data—if you switch your supplier, will they then give you the data? will you own the data, can you profile and can you look at your improving energy efficiency over a time regardless of the fact that you have switched energy suppliers? So we very much have concerns about how the data will be retained and distributed.

**Q67 Dr Whitehead:** We have heard information from the United States about the extent to which home area networks had not been switched on in the roll-out of smart meters, first because of concerns about their lack of security and secondly because of the limitations of the home area network in terms of what material could be sent through them as opposed to, say, gateway arrangements that could separately be uprated. Is that a concern you share, or do you think that is an excessively cautious approach?

***Allen Creedy:*** It is a concern we share, because there is the added complexity that many small businesses and large businesses have remote metering arrangements. So we could end up with a very complex mesh of different organisations, both private and public sector, trying to access the data. As it stands at the moment, the map of how this should take place—the journey for the management and installation, and the communication of energy data—seems to be very unclear despite DECC's best efforts. We know that it has been looking at it. The failure to engage with the business community and to understand its diversity, particularly micro-businesses, is showing in the failings that we are starting to point towards.

**Q68 Dr Whitehead:** How do you think, from a consumer point of view—this is particularly to Audrey Gallacher—you might respond to concerns about health issues and smart meters? How should DECC respond? How might you respond?

***Audrey Gallacher:*** At the moment, as we are not security experts or health experts, we have continually asked for reassurance on the safety of the equipment, the installation and the comms. I think there are a few things to ask. One is what kind of decisions are being made about the technology to mitigate any potential health concerns. We know that in some countries, for example, you can control whether the meter is transmitting. You can switch the home area network off at night, for example, in the Netherlands. We have not yet made the decision on the comms procurement. There is a debate about what we should choose and how often the communications are in place. There are some practical things that can happen that we can use to mitigate any concerns on health.

The other point is what you tell people and how people are reassured. We have already heard this morning about there is no evidence to suggest that there is a problem at the moment but further testing is required. I do not think it would be unreasonable for consumers to expect that that testing is carried out really quite quickly before we embark on a mass roll-out.

Then we need more information around what kind of stance will be taken take, what kind of information is put in the public domain, what it is reasonable to tell people and how their concerns will be addressed. Right now, there is not a lot. Some of the discussions that we have had around consumer engagement, for example, show the need for a balance in how quickly you go out and talk to people about things that are quite a while away. You have to gauge when the appropriate timing is. There is a worry that if we are not proactive in telling consumers about smart meters and the benefits and, indeed, the risks, we will leave a vacuum that is not necessarily going to be helpful. DECC and the Government need to have a fairly robust communications package and, as a consumer advocate, we have to take advantage of that. We have been pushing to get adequate testing and to get information from the appropriate authorities to satisfy ourselves, so that we can then satisfy consumers that everything is as safe as it can be.

**Q69 Dr Whitehead:** You have made the distinction between having a smart meter as a tool and having the assumption that a smart meter will automatically save money just by being there.

***Audrey Gallacher:*** Yes.

**Dr Whitehead:** There is a specific timetable now for the roll-out of those meters, so that they will just be there, but no timetable for how consumers might use smart meters as a tool. Do you have any thoughts on that disjunction and how consumers might be engaged in using smart meters as a tool?

***Audrey Gallacher:*** Clearly, you are absolutely right. A smart meter is not going to deliver any benefits without the appropriate level of behaviour change on the part of the consumer, and in order to do that they need to understand what the benefits are. So there has been some work done on an installation code of practice for mass roll-out. That will be on the level of energy efficiency advice that is provided and the wider customer experience. However, there is probably a lot more that can be done, particularly for low-income and vulnerable consumers who might not get the energy savings.

There is also a worry if we are going for a compressed period of time. If it is just about going in and getting the meters on the wall, adequate time is not spent engaging consumers and there is not an effective follow up procedure. We have asked for things like, "Can we have a freephone number?" We are not asking for the moon on a stick. We know from research on vulnerable consumers who have had smart meters that loads of them have questions about the smart meter but have never contacted the supplier. We should consider whether there should be proactive contact from the supplier post installation.

The way we look at it is that nobody is going to remember when roll-out commenced or whether it took five or six years. They are going to remember whether it worked. Let's not sacrifice what is, after all, a multi-billion-pound programme for the sake of meeting a date. Let's make sure it fulfils its objectives in terms of the consumers accessing the benefits of smart meters as well as industry.

***Allen Creedy:*** The comment we would make is that we would like to see a one-stop shop so that there is one point of contact for businesses that they can go to not only for resolving issues around smart meters but also to secure impartial energy efficiency advice, potentially linked to the Green Deal for future improvements of the smart grid. If that advice and that one-stop shop are impartial and un-associated with the energy companies, then I think they will have a lot more credibility in the business community.

***Audrey Gallacher:*** Do you mind if I just endorse that point? We have seen plans for the central delivery body having consumer engagement that is largely going to be industry-funded and run. It is really important that is not simply some kind of PR exercise that is paid for by consumers.

On the one-stop shop issue, we are in danger of creating yet another helpline associated with smart roll-out. We have it for Green Deal, and we have it for engaging in the market and complaints. This would be a really good opportunity, given the scale of behaviour

change that is required, to move to that one-stop shop. I think it would definitely help.

**Q70 Sir Robert Smith:** Going back to the installation, the recruitment of the installers is going to require a lot of training and technical skills, but from what you are saying, it is going to be crucial, too, that they are trained in how to make use of the meter and explain it to the householder. They are going to have to engage with the householder a lot more than just turning up, wiring up the new meter and going.

***Audrey Gallacher:*** Yes, and in NSAP, or whatever the standards that are being adopted for meter installers, there will be modules on the provision of energy efficiency advice, signposting the independent helpline advice and demonstration of the system. It is probably quite an important distinction that you do not just say, "There's you smart meter and this is how it works". You actually show people how it works and get them engaged with the IHD before you leave the house. I fully accept there will be a cost associated with that, but it is about the opportunity cost that is missed by not doing it. So it is about understanding additional investment, both at this stage and ongoing, because we need enduring behaviour changes, not just for the first couple of weeks post-install. A big omission in the whole thing is what happens when people inherit smart meters through a change of tenancy. Something like 14% of people move house every year, and there are currently no plans around how those consumers are engaged—certainly not in the formal stuff.

**Q71 Barry Gardiner:** The Institute of Engineering and Technology has talked about the importance of end-to-end system security. They say, "A new design element, the consumer access device, has recently been added to the draft system and the repercussions of this have not yet been fully worked through. The fact that a significant change to system architecture has been added at this late stage cannot fail to ring alarm bells." How important, in your view—both of you—is end-to-end system testing?

***Audrey Gallacher:*** It is going to be critical to whether the whole thing works and A talks to B, but, more importantly, to the security issue. Right now, we are not in a position to do any end-to-end testing, because we do not have the DCC and it is not going to be in place until the end of 2014 at the earliest, which again puts further questions on how ambitious we are on the roll-out target dates.

***Allen Creedy:*** It is unfortunate that we have yet to be asked by DECC, Ofgem or Energy UK our views on these issues. I am grateful to you for asking our views today.

**Q72 Barry Gardiner:** Very deftly done, if I may say so—give a swipe at them at the same time as offering me an answer to my question. It is lovely.

***Allen Creedy:*** End-to-end system is critical. What we know from British Gas, and they have been very open and very transparent in sharing a lot of their experiences so far, is that they have had a lot of problems. They are using third party installers. They are not trying to persuade the recipients of smart meters to change their behaviour. They are looking at it as more of a replacement of one meter with a slightly more up-to-date model.

As far as we are aware, there is no end-to-end system testing out there taking place in either the domestic sector or the non-domestic sector. Given the variety in the non-domestic sector, we think that this should be taking place urgently. But for that to take place, some of the uncertainties around data communication, data ownership and energy efficiency advice first have to be resolved. So these prerequisites—decisions that need to be taken by DECC and Ofgem—have to be taken pretty quickly if we are going to stick to the timetable that is out there at the moment.

**Q73 Barry Gardiner:** So when the IET says that the project has been "poorly conceived and overly rushed" and warns of, "potential consequences of cost escalation, poor functionality and rejection by customers", you guys would say that they are understating their case. Is that right?

***Allen Creedy:*** Certainly would not disagree with that.

**Q74 Barry Gardiner:** Tell us this then, because so far I have not heard from you that you are against the roll-out programme, per se What you have done is that you have highlighted key and critical problems with it. If you were doing this, what would you say was an appropriate time scale to start implementing the roll-out and to complete it in?

***Audrey Gallacher:*** It is important that there are trials. The scale of those trials is one question, because obviously the more meters that are out there that do not meet the technical spec and will not be adopted into the DCC, the greater will be the stranded assets and interoperability issues that we have heard about before. So although, there are trials there is a question about the scale of them.

Arguably, you would not start mass roll-out until you had done that end-to-end testing and you had things in place. Then the question is about what period of time you do that in. Do you ensure that consumers can achieve the benefits of it as an arbitrary date? I would not, in any way, want to see things float out, because we know that we already have companies that are moving. There will be costs associated with running a dual system, so it cannot be an open-ended thing, but we should consider whether it has to be in a four or five-year period.

We hear some of the figures coming out from companies—I heard a figure about one company that would be installing, during roll-out, one meter every five seconds, which is obviously inconceivable to imagine. Then there are probably additional risks and potentially costs associated with it; it is about whether consumers have a decent experience, whether they have a timed appointment or installers show up on spec because they have to get the work done, and how long they can spend in the home. I think there needs to be a much more pragmatic approach to the time scales, but certainly not an open ended thing.

**Q75 Barry Gardiner:** But I have asked you for specifics. I have asked you—

***Audrey Gallacher:*** I am sorry, I cannot say whether it should be five years or six years or seven years or longer, and there is also a question about what we are anticipating roll-out will look like. Is it 100% coverage? Are we ever going to get that? There are real dangers that some of the difficult ones are going to be left to last. I have already mentioned concerns about prepayment, but what about rural consumers, who are important when we are monitoring progress on roll-out? DECC has committed to doing that, so that we can see the distributional effects, and that is another thing that missing. I think the Public Accounts Committee got some guarantees from DECC that it would carry out a distributional impact assessment, and we still have not seen that, so we do not know what is happening for all customer types.

***Allen Creedy:*** I just have a comment, and I hope to give you a timetable. Trials do not involve small and micro-businesses at the moment, so we are starting to embark upon a roll-out without understanding the needs and potential and opportunities of small and micro- businesses, so we have great concerns in that sector. We do not have smart meters that are yet in production, we do not have common technology, we do not have an agreed SMETS 2, which is going to be rolled out, and we do not have an agreed timetable for the display units or whether we are going to be using the internet.

The point Audrey made about rural businesses is relevant, because many of our businesses are in remote areas where they do not have broadband yet. How are they going to be serviced with real-time information about their energy consumption? One meter every five seconds for the next six years is the projected roll-out. If we delay it any more and stick to the 2019 timetable, then it is going to be one meter every two or three seconds. I think we need six months', nine months' or 12 months' pause for us to get our technology agreed across the industry and across the domestic sector. We have to have a collaborative approach that takes account of the behavioural changes that we are looking to engender among businesses and domestic consumers, and then we can move forward collectively, because unless we are all going forward collectively with an agreed agenda, I do not think we will go forward. So I think we need a pause in the programme. If that means putting it back from 2019 to 2020 or 2021, that would be beneficial to the outcomes of the roll-out.

**Q76 Barry Gardiner:** Thank you, that is very helpful. You have spoken about your fears on security. Could you perhaps identify what you consider may be the cost implications of pressing ahead and not getting it right in the way that we have outlined?

***Audrey Gallacher:*** I think probably the main one is that you would ultimately have to go and replace the meters because they were not fit for purpose, so additional visits to the home would be required for updates or upgrades. We have to be satisfied with the functionality and the technical specification before we embark on this, because it is obviously quite a significant investment. As Allen says, there is then a period of time to then get the supply chain, manufacturing and all those things in place, which obviously are not there because we don't have the technical spec.

***Allen Creedy:*** I would mention the code of practice; the arrival of a person to disrupt your business; the lost business; and the downtime for power—as it stands at the moment, we do not know whether that is going to be in office hours, whether people are going to be prepared to come out at weekends or the evenings and whether we are going to have to pay extra for that. So that flexibility around the installation code of practice could have costs for UK business. Having a smart meter that just sits there, having cost me—my business, or another business—£150 or £200 but does not function doesn't help me to change my behaviour, and there is an opportunity cost. What is the potential loss to my business? Smart meters could save me 20%, 30% or 50% if linked to the Green Deal and energy efficiency advice. If we rush it, we will have not only the short-term immediate costs to business and to the public purse, but a lost opportunity for the future viability of our business and climate change impacts.

**Q77 Barry Gardiner:** Thank you. A final question: why do you believe the Government are rushing it? Is this just for political purposes?

***Allen Creedy:*** The FSB is not a political organisation. We can see the benefits of it being rolled out to our members and to UK business. I think the timetable seems to be the timetable that is on the table. Our view is that it is perhaps being rushed, for whatever reason, and we would perhaps like greater engagement with the business community so that it more appropriately meets our needs and our opportunities.

***Audrey Gallacher:*** I think probably the timescale, as Allen says, is the timescale that we have and that everybody is working towards, and I suppose it is important that you have some kind of target or things don't get done. However, as well as the issues that Allen has outlined, I suppose if we had a longer time, you could explore how this links with things like smart water metering and digital and broadband roll-outs, so there is a question about whether we can have a more co-ordinated approach across Government. We are really pushing for a more co-ordinated approach to the roll-out and suppliers, but are there additional benefits that we could derive as a country by exploring these other areas that are not apparent? I have some sympathy for why that is, because it is massively complex already without adding more complexity, but it may well be that if we had a longer period of time we would achieve those opportunities.

**Chair:** Thank you very much.

## Examination of Witnesses

*Witnesses:* **Sean Weir**, SmartReach Consortium, **Tony Taylor**, Energy Services and Technology Association, and **Hans Kristiansen**, Orsis (UK) Limited, gave evidence.

**Q78 Chair:** Good morning, and thank you very much for coming in. As you will have heard, we are very tight for time, so we have to drive this forward as quickly as possible. In the light of what we have heard, not just this morning but in our previous evidence sessions, it is clear that this is a huge and very complex programme. Do you think there is a way of minimising the risks of both cost overrun and time delays?

***Tony Taylor:*** Yes. I think as far as cost overrun is concerned, certainly my experience from earlier parts of the programme was that there was a big focus on the cost of the hardware and its functionality—"It would be ideal to have this functionality, but that will add to the hardware cost". However, these units will of course effectively be rented—financed, if you like—over a period of time, and those who are financing those assets will take a view on the risk that they will be churned off the wall. As we get less certainty on their functionality or longevity, they will price that into the rentals, which will put the ultimate cost up. The idea that we have to engineer the cost of the unit right down to what is specced, if you like, or to the Government's estimates, will not necessarily, prove to be the ideal for longevity and lower rentals, so for overall cost to the customer.

***Sean Weir:*** The programme that is going to be undertaken here is an aggressive and complex programme, without a doubt, and there has been quite a bit of debate about whether the time scales are right and so on. Some of the big costs in this programme are for the actual technology that we are going to deploy for the wide area network, the installation process that is going to be undertaken over five years to put new meters in every single home and the actual meter technology itself that is going into the home. To make sure that those costs are known and are secure costs, and that we understand what they are, it is imperative that the technology is first proven to work and that you know it is going to work in this country. I think it is imperative that the installation process that is undertaken is smooth, straightforward and can be done in one visit. I think that will eliminate a lot of additional costs throughout the whole of this programme for visits to the consumer and putting the consumer out. Of course, the actual technology in the home obviously needs to be fit for purpose and appropriately sized and scaled. We need to have the right technology there. It cannot be too expensive, frankly. I would look at the core technology and make sure it is proven and that you can install this very quickly and very simply across the country in one visit.

***Hans Kristiansen:*** I agree that the smart meter roll-out is essential, for all the right reasons. We are concerned about the risks, the costs, the complexity and the time scales. We believe that there is an unfair focus on the smart meter itself, and that the focus should be on smart metering and smart solutions. At the end of the day, it is up to us to change our behaviour as consumers so that we can get the benefits of the smart meter.

The programme as it stands today has been in development for many years and I believe that the current status of the hardware, the SMETS 2, seems to be overly complex for what it is intended to do. The SMETS 1A standard that has been out for a while and ratified by the EU as a bit of technology is perhaps sufficient for its intended purpose.

I think we should take a deep breath and ask—with the current understanding of the objective of the programme, which is to instigate behavioural changes so that the programme will pay for itself—can it be done in a slightly different way and still bring the savings? There have been many claims made about the costs of the programme and the perceived benefits, but we would like to go into much more detail about how much money we can save as a user and consumer.

I also think that with the in-home display—I am getting ahead of things here, perhaps—that the focus should be on the presentation of the data to the consumer, because we are not all equal. Some people require far more advanced information out of the smart metering system and some require simply a red and green light.

**Q79 Chair:** Is it not, as a practical matter if we are going to capture the full consumer benefits, essential that the data should be available on your phone rather than on the wall in your house?

***Tony Taylor:*** Very much so. I think that putting the customer at the centre of the profile data is critical to this. Nobody would argue with putting the supplier at the centre of the settlement data for billing and getting the billing right, but there has perhaps not been enough demand-side management and customer-side representation in the various working groups. Ultimately, that is where the benefits will come. I take what Allen said about one-stop shops, but they will actually come from innovation and from the competitive marketplace. If that competitive marketplace and those innovators can gain access to the data, with the customer's permission, that is the biggest advantage that this smart metering roll-out has. That would suddenly make data available that can be processed, and all sorts of things could be done with them that could be to the customer's benefit. There will be a lot of innovators out there wanting to engage with the market and come up with new solutions to help customers save energy, money and $CO_2$. That will happen if they can get access to the data, with the customer's permission, in a straightforward manner and not necessarily via the suppliers, because the suppliers are the centre of the data for settlements, and customers are the centre of the profile data.

***Sean Weir:*** I also think the solution that is being proposed at the moment enables that to happen, and there was a mention earlier in the meeting today about the consumer access device, which is an additional component to the solution. We need to provide a basic service or basic device in the home so that all consumers have some level of information that

enables them to understand their gas and electricity usage minute by minute, day by day. It is through that that they will start to change their behaviour. However, connecting other devices to that through your iPhone, your iPad or on to the TV screen with smart TVs and so on is entirely possible through this architecture, and there is no reason why that could not happen and that the innovation could not arrive in due course. However, you have to start somewhere with a basic platform, and that basic platform has to be rolled out as quickly as we can in a reliable way, then the industry will start to innovate and consumers will start to understand their data and change their behaviours and habits.

**Q80 Sir Robert Smith:** Would you see the data path being from the meter to the consumer for those more sophisticated applications, or from the central data collection, through the internet back to the consumer?
***Sean Weir:*** I think we need to be careful with the language of the internet and so on as far as smart metering is concerned. The technologies that we are proposing to put in place are not going to be public technologies. We, for example, are proposing a very private network communication infrastructure that is secure and is dedicated to this. I have one of those little displays in my home at the moment, and it tracks what my energy usage is for electricity in the home. You can download that to your PC if you want to, and you can see what your data and your energy usage are over time. So there is an opportunity there for me to see how things are going day by day, hour by hour, and I can see where the spikes are and what is happening if I want to. So providing the data from the meter to the home and just being within the home is entirely reasonable and entirely practical. Whether or not the data that are then transmitted all the way back to the data company, and then back to the supplier, are then made available to the consumer is another step to consider.

**Q81 Sir Robert Smith:** I am just thinking about the more sophisticated advice that might come along from agencies saying, "Looking at your profile, you clearly have a problem that could be solved by"—
***Tony Taylor:*** It is very targeted advice, and I think the answer to your question is both. I think innovation will bring solutions that will use the home area network and will download data that way, whether it is via a consumer access device, some widget and so on. There will be other innovators who will be SEC parties who will look to access the data from the DCC, because that will suit their service delivery model better than accessing it locally at the house. That is why it is important that the Smart Energy Code does not put up unnecessary barriers to tilt the playing field between them and other SEC parties, such as suppliers, who may even already have the right to the data. You question whether it should be opt-in rather than opt-out in the non-domestic market, but from that point of view, you would want it to be a level playing field for organisations that take the appropriate security measures and measure up to what the SEC has required, but there shouldn't be unnecessary barriers to playing in the market.

***Hans Kristiansen:*** The big-ticket item, the unique selling point, is demand profile, not just for ourselves to understand our consumption, but also used as data in a community scenario, with all the proper precautions. Using the data for forecasting might be a little bit of a stretch, because it is difficult to predict the wind patterns and make a comparison, but at the end of the day, these half-hourly—if we are going to do them half-hourly—demand profile data empower a lot of new ideas and innovation. For example, you can have a supplier look at your consumption data and give you a better tariff, because as it is today, the tariff data that come out from the smart meter are already mangled, so you need access to what we call the demand profile so that you can then make judgment based on the fundamental data, which show your demand profile.
When I want to understand it myself, I can see the peaks and troughs of my own consumption, but it will also lead into selecting the right time-of-use tariff, which is an ultimate goal of this. It can also be used for secondary metering purposes to integrate energy consumption and generation within the home. PV is a very popular thing these days, and we have the RHI, and our company is lobbying to get the Green Deal metering involved as well, so that I can have a coherent view on my generation and consumption as a consumer.

**Q82 Chair:** Do you have any concerns about the security? In the implementation programme, is that going to be an issue?
***Sean Weir:*** Security is going to be, without a doubt, one of the debating points and discussion points, and you have had it crop up in each of the sessions so far today. It is absolutely essential that the security here is dealt with end-to-end, between the meter itself at one end and the energy supplier right at the very end. There are a number of parties who are involved in this, not least of which, for example, is my organisation, Arqiva, which is proposing to provide the communications infrastructure that might sit there. What I would say is that the current proposals are to encrypt the data right the way from the very start all the way through to the very end, and they would never be opened up, interrogated or looked at. So over the wide area network, if you like, the messages would be encrypted and never opened at any stage, so if anyone was to interrupt them or gain access to them, they would be pretty useless to them during that phase. They would then land with the data company, which would have similar responsibilities, and ultimately go back to the energy companies, which have their own systems for securing their own data, which of course are proven today because they have those systems.
As long as that end-to-end security architecture is worked out all the way across and it is consistent and designed appropriately, then I believe we can manage security. If there are different security designs for each different stage, I think that will lead to gaps and weaknesses in the security architecture. However, DECC at the moment is taking quite a rigorous approach to defining what the security requirement is, and in fact in the entire programme, it has specifically

taken time to consider what is the right security solution, even to the extent that that may have delayed the procurement slightly. I think that is an appropriate decision for it to have taken, to ensure that the security is right.

***Hans Kristiansen:*** I would like to add that no system is ever 100% secure. There is always an opportunity, whether that is a bad apple within the organisation or outside, or whether it becomes a target for denial of service, which was mentioned earlier. I believe one of the colleagues earlier this morning was already developing enterprise software, and his organisation is well aware of the security within his domain.

With the central delivery body, the comms network provider and the meter developers and manufacturers, there are three different parties, so in my experience it is very difficult to nail down the guilty party when there is a breach of some sort. All measures must be taken to stop that from happening, but we are advocating more of a back office approach, where you focus your security on the public part of your architecture. There will be one back office, but 26 million meters out there. If there is, for one reason or another—to play devil's advocate—a security fault in a meter, you will need to upgrade all the meters, and not all meters will come from the same vendor. They might not even be from the same batch. So I think there should be more focus on accountability in security rather on than trying to say that it is secure from day one.

***Tony Taylor:*** From my perspective, I agree on all the issues about security, as long as it is not used as an excuse to make it difficult for the customer to get access to their own data.

***Hans Kristiansen:*** I believe the finance institutions—although they are not so popular—or at least HSBC now allow you to check your balance and your statements on your phone, so at least they have accepted it. I have not heard that they have security issues, but they have very good infrastructure in place to protect your data. I would like to add that we have to look at what data we are securing. For your electricity meter, the fundamental data are your load profile and the cost to you, which may be displayed on the home display, but your private user data is kept outside the meter itself. It should not be programmed into the meter. So we advocate a fairly dumb meter in terms of privacy and a fairly intelligent back office in terms of support.

**Q83 Dr Whitehead:** On the basis of the present comms strategy, how likely is it, do you think, that DECC is going to reach its target of 97.5% coverage?

***Sean Weir:*** I think that is a great question, and I can speak from my own experience. Our company's position on this at the moment is that we are going to probably exceed that target nationally. We are looking at 99%-plus as the proposed coverage for the UK—excuse me, the whole of GB; Northern Ireland is not included. I think that is a reasonable target for us to be setting as a country. Getting into the 99%-plus level means that almost all households across the country are going to get smart metering. No constituency or individual group or whatever will be disadvantaged—it is a fairly random selection—but at the same time there is an affordability question about going all the way to 100%. Putting in an infrastructure that absolutely does get to 100%, while it is technically possible, would be costly, but getting to 99% is reasonable. I mean, compare that to TV today, which is 98.5%, and mobile phone coverage is somewhat less than that, so we are getting right to the top end of what communications technologies can achieve.

**Q84 Dr Whitehead:** Do you think the potential for overall coverage is in any way connected with the potential complexity of the system compared with that adopted by a number of other countries, for example? Is there a trade-off between the two, and are there alternatives to the complexity that we have developed in the UK, which perhaps might be preferable from the point of view of coverage?

***Sean Weir:*** It is certainly true that the different technologies have different attributes in their ability to cover the country. One of those attributes is the frequency at which you are going to transmit over the airwaves, so if you are using a low frequency, then you will tend to penetrate through buildings much more easily and you will reach meters that quite often in this country differ from a number of other countries. They are quite often deep inside—they are in the basements, or they are in cupboards, or they are under the stairs and so on, so they are hard to reach. You can't just rely on getting to the outside of the house, you have to be able to get into the house with the communications. So we would say that you use low frequency spectrum to do that. That is one attribute.

The other attribute is the extent to which your technology is designed from the outset. Again, if you are going to build the infrastructure, you might as well build it now to optimise this particular country's topology and build it specifically for smart metering, and I think that is another advantage we have in this country. We might as well start off and design it and build it so that we can architect it for this country's topology and geography. Those are some of the things that are important.

There are ways of extending your coverage if your core technology does not achieve that, for example by putting aerials on the outside of a house. That might be one way of extending your coverage, so while the smart meter is deep inside, you could put an aerial on it and in that way you could then connect to the home.

**Q85 Dr Whitehead:** Is there a problem with interoperability as far as that is concerned? Bearing in mind that one's mobile phone quite often works in the living room but not in the cellar, and if you have a meter in the cellar you have to line it up via an aerial on the patch network with a meter just down the way, which may be installed by a different company and have different specs, is that a problem?

***Sean Weir:*** I don't think that is going to be a problem in this particular architecture, because I think the chosen suppliers for the communications infrastructure will be the single supplier in a particular region. What I would advocate is that we consider a single supplier for the entire country, and I don't think having three different suppliers of communications

infrastructure across the country makes an awful lot of sense. I think it drives an awful lot of risk into the programme, it probably adds cost to the programme and it probably drives some other levels of complexity into the programme. So having a single supplier of the core communications infrastructure would be the right approach, in my opinion—bearing in mind that I am one of the bidders for that infrastructure and I am clearly interested in supplying that infrastructure, but all the same, my point is still made with the best intentions.

**Q86 Dr Whitehead:** Mr Kristiansen, you have mentioned the idea of having perhaps slightly dumber meters installed in the home and then a much smarter system of communicating with those meters and taking it the next stage on. Do you think we are making a potentially big mistake in specifying home area networks within the specification of the meters, bearing in mind the limitations of those networks and the possibility of having gateways outside the smart meter in the way that you have described?

***Hans Kristiansen:*** With the coverage promised, obviously we see some evidence of that. It is much better than the current HAN coverage, which is only 70%, and I feel even that is a bit of an optimistic number. Choosing a lower frequency might help because it has better penetrating power for such installations. I just don't see the development of HAN itself—it seems to me that this love of ZigBee, if I may say so, was because it was selected as the best technology to go forward with as of today based on its merit. Then we decided to do some testing, and the feedback was that there was 70% coverage. I would not say, "I told you so" but it is at 2.4 GHz in a wi-fi band, whereas your network is obviously operating in an area where you have tested, and this will be able to communicate.

The challenge is that the most important part of the smart meters to get the data to the customer. In other words, he needs the data so that he can take decisions, so when I say a dumb meter, I mean that we can use sophisticated technology to get the data out of the meter, but we should not rely on a one-size-fits-all HAN to deliver the data to the customer. One good point is about flats, where the meters are in the basement or somewhere. There should be a way to collaborate so that we can feed the data backwards to the customer in any shape or form. I do not believe that one size fits all, generally speaking, because of the topology, but in terms of getting low-bit-rate, accurate data to the meter on demand profile, this technology seems to be the worst one. The choice of a high frequency ZigBee protocol to get the data to the IHD means that it will not necessarily display the level of information you need to make your own choices. That seems a bit unusual, to say the least.

***Tony Taylor:*** I think that there will always be the challenge of requiring a network—whether you call it a HAN or a local area network—to get the data from the gas side of things, because of its limited capacity to transmit. It can only be powered from a battery, so you have that limitation. However, on the HAN specification, certainly in the early days of the HAN working group when I was involved in it, a lot of the work was towards putting together a mock HAN Olympics, effectively, and inviting all comers and saying, "Look, these are the challenges we have to overcome, guys, blocks of flats and so on. Bring forward your wares, put them on trial, let's see just how much success you get." But for whatever reason, whether it was cost or time scale, that idea did not make it through to being achieved.

**Q87 Dr Whitehead:** So that has not happened at all?

***Tony Taylor:*** Not to my knowledge, no. I don't believe that there was any practical comparison testing.

***Sean Weir:*** I just want to be careful here. The HAN side of this is particularly important, which is the home area network. Once the wide area network communicates into the home it then translates across into the home area network, and at the moment, you are quite right, 2.4 GHz is the proposed frequency for that, which is not very good for transmitting through a lot of walls and so on. There is a proposal to use 868 MHz, which would be a better frequency altogether for using that, but that is not available at the moment and it will come in in due course. DECC is looking at how we might have to provide the capability to support both of those as part of this solution, such that—

**Q88 Dr Whitehead:** A bit late in the day, isn't it?

***Sean Weir:*** There is still some time to go before we have to deploy meters in the homes. There are a couple of years before we have to put our first meters in. The first job of work is to build the infrastructure across the country and make sure that is all available, then by the end of 2014 enable the industry to start deploying its meters in the field. By that time we will have the different frequencies available, but if we were able to use this lower frequency for the HAN it would improve the propagation levels and we would do better than the 70% that is currently achieved.

***Tony Taylor:*** The other long-term thought about HAN frequency and penetration is of course about water, which at the moment is obviously a different matter, but Ofwat representatives attended various working groups from time to time. They have the challenge that the water meter is often at the end of the property in a pit and so on, so if there were to be any way of linking or any communication that would suit water better, it would be one of those lower frequencies.

***Sean Weir:*** Interestingly, on that point, I must comment that we have a trial running at the moment with Thames Water where we are using the exact same smart metering infrastructure that would be used for gas and electricity to communicate also with water meters, and it is proving pretty successful with them as well. You are right, the reason we picked that is that they are in quite challenging environments, so they are three or four feet underground under a steel pit lid or whatever, and therefore if you can get to that, you can largely get to anything. We have that running at the moment and it is working well.

***Hans Kristiansen:*** As a company we use 433 MHz, so we felt comfortable at the time choosing that frequency based on a number of criteria. However, we are a commercial entity so we needed that something

that worked. We developed a range of products around this, so we do water metering, we do gas, any type of fluid you can consider, and in very strange places. It is not a technology that lends itself to providing, shall we say, web browsing, but it is a low bandwidth to get the reading out of there so you can make use of it to make the right choices for how you use energy. In our business space we provide the data to companies that choose us because they want to have access to them.

So herein also lies a bit of a challenge, because we can see that the innovation part is where you provide a set of data to them. We always get challenged on, "Why has my data peaked on a Friday?", for example. I don't do anything on Friday. You are talking about, let's say, a school and they have a swimming pool that backfills, for example. So you can see that once they see the energy pattern, they will start asking questions about, "How can I understand? How do I know whether this data is correct or not?" When we enter that consumer engagement phase, you and I will need to understand much better how we use the data. So we strongly feel that this is the beginning of something new, and obviously if there is no behavioural change, this programme has somewhat failed, but whether it succeeds or fails, we still need to pay for it.

**Q89 Dr Whitehead:** We have heard that in the United States a good proportion of the roll-outs so far have either disabled or not enabled the home area networks or the home area network capabilities within the smart meters that are installed, at least in part because of concerns about the security of what is in there. Has there been any robust programme of testing the security of the HAN protocols and arrangements as far as UK specification is concerned?

***Hans Kristiansen:*** May I answer that? No.

**Dr Whitehead:** No?

***Hans Kristiansen:*** The idea is that we roll out a secure network of some sort, and if you look at the wi-fi in your home, at some point some kid developed some software that could just sniff your network—I don't know if that makes any sense to you—and by brute force could crack your network. So then the Wi-Fi Alliance developed a new standard, because the first one obviously a bit short on security, and it has been continually developing new standards. So it goes in two ways: more secure standards and higher speeds, which are the very reason we use wi-fi. In such networks, security is paramount. When you put in the security on day on and it goes out into the wild, you don't know what resources the other guy has available to him to analyse the data. Maybe that is too much detail.

**Q90 Dr Whitehead:** So an upgradeable gateway might be a rather better idea than just putting something in that you can't uprate and fortify into a mixed specification in the first place. Is that the upshot of what you are suggesting?

***Hans Kristiansen:*** Yes. Yes and no. The concept of security through obscurity, if we can agree on a concept like that, is a little bit flawed, because it might not be the same guy who spilled the beans on how to get into the system who is trying to take advantage of this. However, at the bottom line, this is not a financial transaction in itself. It only displays the consumption information that you have, so you have to take a trade-off between security and what you are trying to secure. I think that is probably the best answer from my perspective.

**Q91 Sir Robert Smith:** One of the concerns in the States was that because of the meter connecting to your own internal house network, it would provide a gateway for people to do other things with your own internal software, so they could use the meter as a way of accessing your bank accounts on your laptop, because you were connecting the meter to the—

**Dr Whitehead:** The meter is a gateway to the primary network.

***Hans Kristiansen:*** Yes. Well, that is an innovative way of doing it. I am quite sure that when it is being rolled out we will come across individuals who will attempt it. It might be just an article or it might be a real attempt but, as I say, no system is inherently secure. It has to be proven to be such.

***Sean Weir:*** You have to bear in mind what happens once they get into their meter. The only way from the meter out of the house is through the single communications channel or infrastructure that we are providing. It does not go into some internet space that is readily available.

**Q92 Dr Whitehead:** It is the other way round—if you have a device in the meter that then connects to your larger home area network, accessing all sorts of other things through the meter, as opposed to the single encrypted piece of information that goes out, is presumably a different proposition. That is my understanding.

***Tony Taylor:*** I would suspect that it is probably easier to break into the home wi-fi network than it is to break in via the smart metering communications part of it.

**Q93 Dr Whitehead:** So that is not, in your view, a significantly different issue from the overall position of wi-fi in the home?

***Sean Weir:*** Just to explain a little bit of how our system might work if we were to use it, we would have a security operations centre, which would be providing surveillance of the entire network across all homes that we are connected to and would know every single device that was connected. So hacking into our system all the way to the meter and then into the home in that way is clearly possible, but you would be monitoring those events all the time, and that is again one of the requirements on us. On hacking in the other way, from within the home up the network, again we would know, and the encryption mechanisms and so on would stop that from happening. At the end of the day, though, you can only put in these mechanisms to the extent that you know what the threats are today. The threats will change over time, and you have to be able to adjust your system to cope with those evolving threats. You are right—the system will be able to download new firmware and software into the meter to refresh it and upgrade it if that is needed.

**Q94 Albert Owen:** Can I just go back to coverage? DECC itself has set a 97.5% target. The other 2.5% you said were some of the hard to reach areas with thick walls, but there will be geographical areas affected as well, and I would put it to you that some of those geographical areas do not have gas mains, have very poor broadband and it wouldn't be economical for some companies to go into those areas, because they do not benefit from dual fuel and so on. Are there identified areas of the country that are going to be hard to reach areas and will be part of that 2.5%? I was interested by what you said, Mr Weir, about the fact that you can get it up to 99%. With TV, it can be 100% if you go to satellite; it is just the analogue that was difficult. So are we saying that with this modern 21st-century technology there are going to be parts of the country that may be excluded because of their geography?
***Sean Weir:*** I suppose the short answer to that, Mr Owen, is not particularly. It depends how much infrastructure we are prepared to deploy, so if we have a tower that can radiate out and communicate to a community, but there is a house that is below a cliff because it is in a fishing village, and that happens to be in Cornwall, how do I get to that house that is down there? Again—

**Q95 Albert Owen:** I fully understand. There is London, but there is also Cornwall and north Wales. There are less people there, and there is going to be less money for the company, so it is unlikely that you are going to invest in those areas.
***Sean Weir:*** Our obligation is to cover to the 99%-plus that we are proposing.

**Q96 Albert Owen:** Sure, but there will be businesses in the periphery areas that are now thinking, "Am I going to get smart metering? Is this a huge advantage? I am not going to get it. I am going to be disadvantaged". Is that the case?
***Sean Weir:*** I don't think that is the case, no.

**Q97 Albert Owen:** So DECC can put pilot schemes in those hard-to-reach areas immediately and can overcome some of the problems, and we could get the 99%-plus.
***Sean Weir:*** Indeed, and we are currently running a pilot scheme of that nature in Glasgow and the rural areas outside Glasgow, in fact, Lochwinnoch. The reason that area was chosen when we teamed with ScottishPower on this is because it has very poor mobile coverage and you cannot get to it. We have installed 4,500 or so metres in that particular jurisdiction just to test the housing stock, which is good old Scottish deep walls and so on, and the rural nature of the countryside. We were able to connect to over 99% of the meters that have been installed and we were able to make that connection on the first visit that we achieved. So the install went in, it connected and it continued to work.

**Q98 Albert Owen:** So the rurality and the lack of other services would not inhibit the roll-out of smart metering, in your opinion.
***Sean Weir:*** It should not do, because the technology is available to do it. The question is, shall we put a little repeater device in a particular area to connect to a little hamlet? DECC does have a value for money trade-off to be achieved, which is about how much I spend getting to that last 1% or 0.5%. Is it economic for the country to go for that little bit extra?

**Q99 Albert Owen:** The GPO did it, 100% coverage, when it installed telephones to every house in the United Kingdom.
***Sean Weir:*** One of the reasons we can't use fixed lines is that not every house in the country has a telephone line.

**Q100 Albert Owen:** No, but the offer was there when they rolled out, and I know people in very exposed or isolated areas who got it. You believe that that can happen with—
***Sean Weir:*** That can happen.

**Q101 Sir Robert Smith:** Is that belief in your system or belief in general?
***Sean Weir:*** I am not privy to the other firms that are bidding or what their offer is. However, I think what DECC has done is set a high standard for us to achieve. It has made it clear that if you want to win this competition, you have to achieve the standard. It has set that range from 97.5% as a floor up to nearly 99.5% or so—"get yourself into that range and bid". I think all my competitors and myself are in that range and looking to do that. We have different approaches and technologies for achieving it, and that is where the trade-offs come in the process we are following.

**Q102 Ian Lavery:** I will quickly move on to consumer benefit or the potential lack of it. DECC has said that consumers are at the heart of the smart meter roll-out, but I think Mr Kristiansen's and Mr Taylor's organisations have said that the implementation process has been too industry-led and not had enough focus on the consumer. Would you like to say what your main concerns are in that regard, and where there should be greater focus on the consumer?
***Tony Taylor:*** When you look at the sheer number representation of the working groups and you take the industry parties compared with the consumer representative parties, there was a huge mismatch in the number that were representing the consumer or the demand side. Obviously that has an effect as the programme gets developed and moves forward. It permeates down into things like security, where it is more important to get the thing secure than it is to give customers reasonable access via the home area network, and there are more barriers to overcome and that kind of thing. That is the other thing with the smart energy code. We do not want to see barriers preventing customer-appointed agents from getting data to bring the customers the benefits of saving them money through demand-side management or energy efficiency. We have not seen that balance, shall we say. It has been very industry-biased in terms of the technology, the method of roll-out, achieving communication and all the things that are important but not balanced by the net benefits.

***Hans Kristiansen:*** I agree with you completely. The challenge is that this programme has yet to reach the consumers. There is some SMETS 1A to roll out in limited numbers. British Gas has rolled out smart metering for a long time. However, in terms of how the programme developed, it follows a process, and at this point we have reached the consumer engagement part of that process. Effectively, as a business, we do it the other way round. Our customers come to us because they know what they want, whereas in this project it is, "What you want is this smart meter, and it is the smartest meter that money can buy and this is your IHD". There is a whole slew of issues around how to communicate, suitability and so on, but one size fits all.

On which part of the industry benefits, there are some numbers in the impact assessment that are somewhat biased towards the supplier, but one must hope that those numbers will then be a benefit to the end user as well, with savings being passed on to the end users. Traditionally the industry might not have done that, but I think it should have a little bit more transparency. For example, when the consumption of energy and the cost of that energy are displayed on the in-home display, it should also perhaps include the standing charges and the distribution charges, as is done in other countries, so we need a bit more transparency within the industry there.

We also have the green tax. In this context, the Government are developing a smart meter. It is a fantastic bit of kit and it will work, don't get me wrong. SMETS 2 might be a bit of a stretch, but the current product will work very well. However, it is almost like it is getting rolled out with the permission of the Government through the suppliers and the suppliers will then fulfil the Government's policies. That is slightly wrong, because at the end of the day when the consumers say, "What is happening here?", who will they call? They will call the suppliers, who will then say, "Well, actually this is a Government-initiated programme".

There are a lot of complications around this, but ultimately we need to have behaviour changes. I would like to point out that the behaviour changes are subject to discussion. We would like to have some transparency on what you consider behaviour changes. If it is a programmable thermostat, as was mentioned earlier, that is an interesting aspect but I would like to see some evidence of that being the case. In our business we get inquiries, for example, for $CO_2$ and humidity. Under the Green Deal, for example, you can have solid wall insulation, loft insulation and double glazing, but it has side effects such as greater humidity that may cause health effects, which has not been covered earlier. We are very fond of the side effects of RF and mobile phones—that was quite a heated discussion—but I think we should focus more on what is good for us, and in that sense we are not all equal. Not all of us have a flat, and not all of us have a house, not all of us have a mansion and so on.

**Q103 Ian Lavery:** Is it fair to say that there is a huge danger that the energy suppliers and industry will be the main beneficiaries from this, and that perhaps the consumers will be left behind?

***Tony Taylor:*** I think so if there is not enough ability for the market to innovate and provide solutions. There are a couple of avenues here. In the non-domestic market AMR—automatic monitoring and targeting—has been a success. People have exercised a choice to say, "I would like my profile data handled by an independent" and so on. That opt-out of the DCC needs to still be there for the non-domestic market. Give the customer the choice of saying, "Actually I would like somebody else to handle my data" and the supplier should respect that. In the domestic market it is about behavioural change, and if we think that suppliers are best placed to innovate on behavioural change ideas I think we are kidding ourselves. There are probably an awful lot of companies out there who deal with search engines and information and data presentation and so on who are queuing up with potential ideas if they can get the data, with the customer's permission, to help change customer behaviour.

***Sean Weir:*** I am just going to add to this. There is an analogy that we could look to here. The last big change programme that happened across this country was to switch analogue TV to digital TV, and that happened over five years. It was pretty successful, and that programme also had inside it a consumer engagement focus. It was called Digital UK, and CDB is the one for smart metering. That organisation focused on engaging with charities and local communities. There were leaflets and information provided and there was help on hand to help each consumer understand how they were going to retune their TV, if necessary, to the new digital channels. The fact that they used all of those different bodies and allowed consumers to go to them and find out what they could be doing differently and how they could be doing things is an important lesson for this particular programme, and we could adopt some similar approaches here. I am sure the CDB, the central delivery body that is being proposed for smart metering, will look to that experience of the digital switchover and see whether lessons can be learned around how to engage consumers and how to get consumers to understand what they now have in front of them and make best use of it.

If we don't get that done, you are right, the consumer will not be achieving some of the benefits of lower energy—gas and electricity use—in the home. They will get a better bill, because it will not be estimated any more and they will achieve a benefit from that. Those who are on prepay meters will be able to update their credit over the airwaves, as it were, automatically as opposed to going round to the shop, so that is another benefit. Their ability to budget their energy use will be more effective, I think, with smart meters in place. They will be able to switch more easily between different suppliers, and with better information about their usage and so on they will be able to choose tariffs that are more attuned to them. I think that this all leads to more power being put into the hands of the consumer, if they are engaged appropriately, and taken away a little bit from the industry in terms of how the consumers manages their own energy use and whether they can take more control of it. The benefits are there to be had.

**Q104 Ian Lavery:** Listening to the different views this morning, there must be a huge question mark above the IHDs. Are they an expensive gamble?

***Tony Taylor:*** I have to agree, yes, purely from my own experience. I have one in the house. I am in the energy management industry and metering and data and all that kind of thing. I had one in the house. I looked at it, I paid attention to it, the batteries ran out and I have not seen it since.

***Sean Weir:*** My experience is quite contrary to that. I have one in the house and we sit down for tea at 6 pm and I can tell straight away whether the kids have left their lights on upstairs, because it is a little bit higher than it was the same time yesterday. I say to them, "What's going on?" and off they go and turn the lights off. That might sound a little bit—you know—but it is there and you can see day to day, hour to hour what is going on, whether you have left lights on or put the tumble dryer on. It spikes up and you realise, "Actually, it's a sunny day, maybe I shouldn't have put the tumble dryer on today". I think if people are educated and given a chance to understand what this information can do for them, they will have the choice as to whether they want to put the tumble dryer or dishwasher on or programme it for the middle of the night when electricity is a bit cheaper. I am sorry, my experience is contrary to yours but there you go.

**Q105 Ian Lavery:** Mr Kristiansen, do you have one of these?

***Hans Kristiansen:*** No, but I do have a smartphone. I believe that the IHD in its current shape costs X amount of money. The early estimate is that it would cost fifteen quid. If it is something you monitor the children with that is an excellent thing, but it does not help you change your supplier or do anything else. But to quote a very famous advertising phrase, "There's an app for that" and I believe that many companies will come up with applications that will enable you to understand your energy in a different way. Our frustration at this point in the programme is that it is the beginning of something, not the end, and the beginning is understanding that with the data available something will happen, but we—myself included—might not be the right generation to figure that out. The programme will be going on for 10 years, and after that period of time something else will happen, so I believe that this is just the beginning.

The IHD, whether it is in a drawer or used to monitor kids with, is a very simple device. It might be sufficient for some but I think if you have all the data you need better advice. So we see communities, ESCOs, third-party advisers helping you change your pattern. Time of use becomes even more important because customers react to price changes more than anything else to change your behaviour. If energy is going to be twice as expensive from 5 pm to 7 pm, you will not wash your laundry at 5 pm to 7 pm, which happens to be one of the peak periods. So I think we are beginning a very sophisticated age in terms of presentation.

***Sean Weir:*** I agree. You have to lay down the foundation now though. You have to put technology in that works. You have to get that, then all the innovation can be run off that and in due course that will arrive.

***Tony Taylor:*** If there are more developed IHDs that are more interactive—alarms that come up and so on—I think that would be a positive benefit. Undoubtedly the market could develop with devices that third parties might sell into homes that connect to the HAN and do the same thing or work on your mobile phone. As you say, "There's an app for that". What would be criminal is if suppliers developed more advanced IHDs, which is great, but then when you changed supplier that became a piece of junk and would not work with the new supplier. I am not sure that would be a good message to send out to consumers if every time they changed supplier they got another one through the post and had a collection of these things in the drawer.

***Hans Kristiansen:*** The current IHD has a life cycle of one year in terms of warranties from the supplier, and I think your consumption data will long outlive that IHD. There will always be a better, newer, faster, cheaper version of the IHD. Look at the other companies in our homes. We have Sky TV and BT, obviously, with their fixed lines, and you can now programme your Sky box from here if you want to watch a programme tonight. I think that type of coherence between your gadgets should also be extended to your TV system, should your temperature monitor and your humidity for you to get an understanding. You could talk to the people at Sky and present it on your TV, for example. There is nothing stopping you from doing that or from Sky offering that service, or the TiVo boxes or whatever you fancy.

**Q106 Sir Robert Smith:** When you were mentioning gas meters you pointed out they had to be battery operated because the gas would not power them. How often do they need an intervention to renew the battery? What is the battery life for that sort of role?

***Tony Taylor:*** I don't know what the latest thinking is. I would be surprised if they were targeting anything less than five years, because it tends to be an industry milestone to say it has to be functioning for at least five years without intervention of any sort. I know there have been problems with simple LCD gas meters display-wise, which were powered by very small batteries in the past, which cost suppliers because when the batteries failed the actual display went completely blank, so there was no reading at all. Of course with some of these being internal to properties, if you could not get access to change the batteries you could bill on estimates, but the customers could argue, "What are you billing me on? There is nothing on the meter". It causes all sorts of problems, so battery life is critical. The manufacturers would have much more up-to-date information about how long they are expected to last but anything less than five years—

**Q107 Sir Robert Smith:** There would have to be a programme of renewal then?

***Tony Taylor:*** Yes. Anything less than five years would be a train smash, I think.

**Chair:** Thank you very much indeed.

## Tuesday 14 May 2013

Members present:

Mr Tim Yeo (Chair)

Dan Byles
Barry Gardiner
Ian Lavery
John Robertson
Sir Robert Smith

### Examination of Witnesses

*Witnesses:* **Dr Sarah Darby**, Deputy Programme Leader, Lower Carbon Futures group, Environmental Change Institute, Oxford University, **Dr Gary Raw**, Visiting Professor and Professional Research Associate, UCL Energy Institute, **Professor Harriet Bulkeley**, Professor of Geography, Durham University, and **Dave Openshaw**, Senior Adviser, UK Power Networks, gave evidence.

**Q108 Chair:** Good morning. Thank you very much for coming in. We have about an hour, so don't each feel obliged to respond to each question, so that we have a reasonable chance of getting through in the time. Just by way of introduction, as this is the first time you have given evidence to this Committee—certainly during this Parliament—can each of you very briefly outline your own research background or your involvement with trials on energy consumption behaviour, particularly if those trials have involved smart meters at all?

***Dr Darby:*** I am Sarah Darby from the Environmental Change Institute at Oxford. In the late 1990s, I started doing research on the effectiveness of energy advice programmes. In the course of that, I got interested in how useful it was to be able to give energy users feedback on their consumption, as part of making that advice more effective and actually being able to see the effect of adopting certain measures, or changing behaviour in certain ways. I did a review of the research literature on giving feedback to consumers, wrote it up and then largely forgot about it for a few years. At that point people started asking me for this review, because of the growing interest in smart meters and the dawning of the idea that you could use smart meters to improve feedback to energy customers. For the past few years, I have been doing research on the development of smart grids and smart metering, in connection with improving the feedback to customers on their energy use. I was also part of the external evaluation team for the EDRP trials, and at the moment I am involved in the smart metering early assessment that is being carried out by DECC.

***Dr Raw:*** Good morning. Gary Raw. I am a psychologist by profession. I worked for many years at the Building Research Establishment, on various aspects of people in buildings, their behaviour, comfort and their use of buildings. Most recently I have been working as an independent consultant, but with bigger organisations—currently University College London—on energy, particularly householders' use of energy. I was largely responsible for the final analysis of the Energy Demand Research Project, EDRP, data and the write-up, and the extensive literature review that went alongside that. I have since been involved in some smaller follow-up projects for DECC. I am currently working on a large project on smart systems, more broadly, for the Energy Technologies Institute. I think that will do for me.

***Professor Bulkeley:*** Good morning. I am Harriet Bulkeley and I am at the Department of Geography at Durham University. My work concerns climate change, politics and policy more generally, and I work particularly on how cities around the world are responding to climate change. That work has taken me to thinking about issues of energy efficiency in the built environment and to the public's response to those kinds of issues, but I am also interested in the processes through which technologies get deployed and implemented.

At the moment, I am working in the UK on one of Ofgem's funded smart grid projects, the Customer Led Network Revolution, where I lead the social science research team at Durham working on that. CLNR, as we call it briefly, is led by Northern Power Grid with British Gas, EA Technology and Durham Energy Institute. We are conducting a trial of smart grids in the north of England. The social science component of that work to date has involved over 220 interviews with SMEs and domestic customers about their experience of smart meters in a smart grid, as well as a survey, which has gone to about 10,000 people. We have had about 700 domestic and about 180 SME responses. That work is very much in progress, and, unlike your other two participants on the panel, it has not yet been peer-reviewed. I would like to make sure that that is understood by the Committee, and the evidence that I give is very much preliminary findings from that work.

***Dave Openshaw:*** Dave Openshaw, Senior Adviser at UK Power Networks, which is the licensed distribution network operator serving the east and southeast of England and London. My particular focus is very much towards smart grids. We have done a number of pieces of research around smart grids and the benefits that might lead to, in terms of improved network efficiency and ultimately lower prices to consumers. In particular, we have done research with Imperial College on responsive demand, and—perhaps most relevant to this discussion—we are engaged with a similar project to CLNR, which is Low Carbon London. A unique feature of Low Carbon London is we are trialling a day-ahead dynamic time-of-use tariff, which we believe is quite original. It is not a fixed time band tariff. This is a dynamic time band tariff, whereby consumers are

notified a day in advance of the price and the time bands at which those prices will occur over the following 24 hours.

The reason we are keen on a dynamic day-ahead tariff is because we think this will reflect a future where we have high capacity wind generation, which of course is zero marginal cost but is intermittent. The availability of that generation, on a day by day or even within day basis, will have a significant impact on the real time price of producing electricity. Therefore, we think in future there would be real value if consumers are able to reflect the availability of wind generation in the way that they use electricity. Hopefully I will have a chance to say a little bit more about the preliminary results we have seen from that trial.

**Q109 Chair:** Thank you. Do you think the results from the EDRP are sufficiently reliable and transferable to give an idea of how the wider population are going to react to smart meters?

***Dr Raw:*** Shall I pick that up? I think they are, at broad scale. I would pose it slightly differently, that you need to understand in detail what came out of EDRP. If you only read the executive summary and expect that is exactly what will happen, I think you will be mistaken. You need to interpret it in terms of the detail of what was done, and I would put it not that they should be seen as representative, but they should be seen as guidance for how to make the roll-out more effective. I see EDRP more as a learning tool than a defining tool as to what is likely to happen.

***Dave Openshaw:*** It is worth reflecting that the EDRP trials did take place some time ago. There wasn't a great deal of use made of time-of-use tariffs, and I think we have learned a great deal since the results of those trials took place.

**Q110 Chair:** Was the evidence from EDRP fed heavily into what DECC's plans for the roll-out are, in particular in relation to the benefits that consumers might gain?

***Dr Raw:*** As far as I am aware they were, although clearly the impact assessment was very much in progress throughout that period. At what point they intersected I could not be certain, but certainly the kind of percentage savings that were achieved, or at least were achievable, backed up the sometimes more modest figures that DECC had included in their benefits calculation.

**Q111 Chair:** Have their assumptions about consumer benefits from the roll-out been realistic?

***Dr Raw:*** From that perspective, yes. Purely from the perspective of the possible energy savings that consumers can achieve, yes, I think they have been realistic. Again, I would say not in terms of, "This is what EDRP achieve. Therefore, this is what we expect, end of story," but rather to say, "This is what EDRP learned about how to maximise the benefit. Let's use that."

***Dr Darby:*** I think the findings from the EDRP have been very consistent with what we have learned from other parts of the world too, and that is worth saying. The savings that were made were actually quite modest, but, as Gary says, this should be seen in the light of a guide as to how to do this more effectively and the lessons that were being learned in the course of that trial. It was an enormous learning process for everyone who took part in it. I spoke to a senior person in Scottish and Southern quite late on in the trials. He said he had been in the industry for 30 years, and had worked on several major infrastructure projects, and carrying out this set of trials was by far the most difficult challenge they had had to do. There was a great deal of learning that went on by the utilities that conducted those trials, which they are carrying forward, and the findings they got, in effect, about how best to go about building a rather new relationship with your customers, have been borne out elsewhere as well.

***Dr Raw:*** I agree with that. There was a massive amount of practical learning as well, and, from the perspective of the energy companies, that was a very important part of their participation. Bearing in mind that when this started, and in the period over which it ran, they were still learning about: how to put a smart meter in; where it is difficult to do it; where you cannot do it at all, at the time; how you create the linkages between the smart meters and the other technologies that are involved; how you liaise with customers; and how it affects even the number of people you have to have in a call centre to handle the process. All of those practical lessons were of immense value. They are somewhat downplayed in the report because they not of so much research interest, but I think they are vastly important for the industry.

***Professor Bulkeley:*** I would add that I think the new trials that are happening at the moment are going further into depth to try to understand what the effects of the smart meters are, why it is that you get those kind of results, and how they combine with other things, such as time-of-use tariffs, which will add detail to our understanding of what a smart meter roll-out might look like.

***Dave Openshaw:*** I certainly think the context that we are facing now, with the electrification of heat and transport and large volumes of renewable—albeit, intermittent generation—means there are some very real opportunities for avoiding unnecessary investment in generation capacity and transmission and distribution capacity, if we can truly engage with consumers in making use of time-of-use tariffs and other mechanisms. The key word that came out of the EDRP pre-trials is "engagement", and continuous reinforcement of that engagement is absolutely crucial. That is certainly what we are finding with our trials at the moment.

**Q112 Sir Robert Smith:** The original EDRP trial suggested a consumer saving on electricity of 3%. Has that been replicated or improved on in more recent trials?

***Dr Darby:*** If you look internationally, there was quite a large scale review carried out in 2010 by the American Council for an Energy-Efficient Economy, where they found a range of savings from 4% to 12% for improved feedback, not always with smart metering but increasingly with smart metering. They looked at the longest-lasting of those studies—so

between one and three years—and they found those savings held up over time. In fact, in two of the nine longest-lasting studies, the savings actually increased a little over time. So you are getting a higher range of figures there.

The VaasaETT Global Energy Think-Tank did another big review of about 100 different trials of both of feedback and dynamic pricing. That was in 2011. They found, for the long-lasting trials, they were getting savings of about 5%.

***Dr Raw:*** I think that is right. The review that you referred to, the Ehrhardt-Martinez—

***Dr Darby:*** That is the ACEEE one, yes.

***Dr Raw:*** Yes, which I also included in my review. Yes, that sums it up nicely. The thing to be clear about from the EDRP evidence, you have heard a figure of 3%, and that is correct, but it is a very different 3% for electricity and for gas.

**Q109 Sir Robert Smith:** Yes, I was going to come on to that.

***Dr Raw:*** Most of those trials that Sarah has referred to have dealt with electricity and feedback on electricity. There is quite a lot of evidence, particularly in relation to in-home displays, real-time displays, which EDRP was entirely consistent with, and those savings were also more or less consistent over up to two years of the EDRP trials. It was dependent on the display, rather than the smart meter itself. For gas, as far as the evidence is available, it seems to be the smart meter was responsible and the display did not add a great deal. So one is dealing with quite different circumstances for the different fuels.

**Q113 Sir Robert Smith:** What was the experience with gas, then?

***Dr Raw:*** Much less experience. I don't know how much there has been. The Irish trials were published recently and had some similar gas savings, but they had a big mix of interventions and all had some impact. I think it is important to understand that those trials did not look at the impact of smart meters. Because everyone in the trial had a smart meter, they then looked at the impact of adding something to people who already had a smart meter.

**Q114 Sir Robert Smith:** How did the smart meter improve the gas—

***Dr Raw:*** It is a very good question and one that we have struggled to answer. We had some ideas, but nothing that could be proved from the evidence. It has to be something not to do with the meter as such but with the experience of getting the meter: the fact that you have a new encounter with your energy supplier; perhaps you're promised a bright, new, shiny equipment; exciting technology; possibly as basic as a friendly installer explaining something in the process of going through it; possibly some old meters being replaced, the ones where the dials go in different directions and are very difficult to read; for the first time you have a direct feed-out; you can see the rate at which the numbers are clicking over quite clearly. All these are possible. It could be all or some of them.

***Dr Darby:*** I would add to that that, with a smart meter and gas, you are getting an accurate bill every time. There is a rather different dynamic at work with gas and electricity. Most people have gas heating, so it is the difference between heating energy uses and non-heating. With electricity you are switching things on and off all the time. You can look at the display and you can see the numbers go up and down. For example, you can see immediately what the impact is of switching on your kettle. Of course with your heating you are interested in rather longer time periods, so you can get a bill—ideally you would get it every month or two months—and you can look back over that period and you can remember roughly what was happening. "Oh, it seems to be low, but then we were away for a week" or "It seems to be very high, and we had a bunch of people to stay". Of course, accurate billing for gas gives you an idea of seasonality more accurately and it operates over a long time period. So I think the introduction of accurate billing with the smart metering would also have been a factor.

**Q115 Sir Robert Smith:** Is there a breakdown of the type of consumers that respond most successfully to trials and others who perhaps find it quite a challenge to actually get any benefit?

***Dr Darby:*** Some customers do need more support than others in interpreting the new information they are given, certainly. There was a study done by NEA for DECC last year, which brings this out quite clearly, where they interviewed and did group discussions with people who for some reason are disadvantaged—they are on low incomes, they are vulnerable, they perhaps have mental health difficulties—and that certainly brought it out that, particularly for them, you would want some extra support explaining how to use their display and what a smart meter can do for them. When that was forthcoming they found people were very positive about it.

**Q116 Sir Robert Smith:** Did you have a comment?

***Professor Bulkeley:*** Yes, three points that I would like to make in response to the discussion that is taking place at the moment. The first is that, in terms of our evidence, we find the idea of a smart grid trial has provoked within people a sense of a civic relationship with the grid. They treat it not so much as a matter of a consumer relationship, but they are quite interested in their own role in keeping the lights on, in securing energy futures, and in the decarbonisation and climate change agenda. That may speak for why the introduction of a smart meter in the gas network had an effect, because it changes people's relationship to their energy system. I think that is quite an interesting emerging finding from our work.

The second issue is in terms of looking at how or why people respond to in-home displays. Particularly households, because our work on SMEs—which I can talk about later, if you are interested—is less developed than our household work. We find three different things that are going on in people's households. One is about budgeting. It is not so much about price reduction, but it is about managing a household budget over a week or over a month. People really enjoy being able to do that, that is

vulnerable customers as well as non-vulnerable customers but the budgeting issue is very important. I think we need to separate that from a sense of reducing overall price. However, they are related, people like to be in control of their finances as much as they like them to go down.

We see a second reason is around family management and oversight. I don't have teenage children but, for families who do, apparently smart meters are a very useful way of knowing what is happening in the family and managing some family tensions and dynamics. It is quite interesting. Then, for a sizeable minority, we also find the idea of gaming a smart meter quite an interesting motivator. People like to try to beat it and beat themselves at things, and that relates to a whole set of smart data that people use now. We have particularly looked at the equivalent in running, where people record their runs and try to beat their next time and so on, and we can see similar aspects happening with the smart in-home display.

That comes on to the idea about which customers respond most to these issues of in-home displays. One of the things that we would strongly recommend the panel to think about is that this appears not to be about customers and their attributes as such, as much as it is about different kinds of things that people do, which are more or less flexible and amenable to intervention. Perhaps unsurprisingly, we find that nobody really minds putting off their chores, or changing when they do chores, but things like cooking and family meal times are less moveable feasts. So, rather than looking at customer attributes, we are interested in the composition of what is going on in a household and how that relates to the in-home display. That might be more important for us to understand, in terms of where customer benefit can be felt for what kind of households.

***Dr Raw:*** I agree with that. It is very easy to look at the observable characteristics: the income, the education level, the number of people in the household. You can find effects of those. You tend to find higher savings in homes with higher incomes, with higher education levels. However, I think that obscures what is really important, which is the kind of needs that people are fulfilling in using energy, and those are complex, the flexibilities they have, the non-negotiable uses that they have, the particular ways in which they personally do it. Do they dry clothes over a radiator, in which case it is not just about heating? All these varying needs and behaviours need to be understood. Not that you necessarily understand every individual household, but you look at typical patterns and make sure that the interventions that accompany smart meter roll-out are suitable for that range of patterns of needs and behaviours. That is part of what I am working on at the moment. It won't be fully worked out for another year or so, but I think it is important to be thinking along those lines, beyond the simple characterisation and into the household dynamics.

One example of that that we did find in EDRP was, when it comes to the effect of time-of-use tariffs in shifting consumption from peak period to other times of day, households of one or two people seemed more able to do that. You can easily hypothesise why that would be. It is simply easier for them to manage their time. There are only one or two of them. They can make choices together. If there is only one shower, they can both use it off-peak. There isn't a queue of people and some of them having to use it on-peak. It is those details that are going to be important in understanding how to get the most benefit from the smart meter roll-out.

***Dave Openshaw:*** Certainly it is interesting to see the early observations from our trial. We have probably not yet fully explored just how flexible people can be if they have the right incentives, and the incentives are in the form of a price. Our tariff is a critical peak price tariff, so the peak price is very, very much higher than the normal or the low price. However, what we have seen is quite significant. Although it is early days, we have seen up to a 20% reduction in peak demand. You asked the question about energy saving, but of great importance, going forward, is the extent to which we can persuade people to move electricity away from peak demand, or, as I said earlier, to use electricity when wind generation is highly available and 20% shifts are very, very significant indeed.

Some of the interesting early anecdotal feedback we have had, which was a little unexpected—because we are expecting people with washing machines, dishwashers and tumble-dryers to be able to flex that demand for over a day if necessary—we had one family who have said, "In fact, we decide whether to cook using the electric cooker or the gas hob depending on what the price of electricity will be on a certain day," so we even have an element of arbitrage going on at domestic level.

***Professor Bulkeley:*** We would echo that too.

***Dave Openshaw:*** I think the potential is not yet fully explored. Again, I come back to the continual reinforcement. These consumers get a daily message and they get a monthly report showing how much electricity they have used at the different price periods. Compared with the control group, you can see there is a very, very distinct difference in behaviour, which I think is very interesting.

**Q110 Sir Robert Smith:** Thanks very much.

**Q117 Barry Gardiner:** You said that it was unclear as to why the gas smart meters had had the effect that they had. Could it simply be that somebody had come into their home for the first time and explained to them how to use their gas boiler, and how to turn it down and how to turn it up, and nobody had actually bothered to do that before, rather than anything to do with the smart meter at all?

***Dr Raw:*** That is perfectly possible. That is one of the series of possible explanations that we put. The problem is that the study itself does not provide evidence of that, because we don't know exactly what the encounters with the installer were like. In theory, the installer was to go in, fit the meter, show the householder how to use the display, and was not charged with helping them with their boiler. They were not boiler engineers; they were meter-installers. If the householder had asked, they might well have said, "Yeah, yeah, push that button and that button. That's fine." I would turn that around and say, "Since

that is a possibility, why not try to incorporate that positively into the smart meter roll-out?"

**Q118 Barry Gardiner:** Absolutely, and more than that, why not do a controlled experiment to see how much saving you would get by simply doing that and not installing a smart meter? We may be going to a lot of expense to install the smart meters to achieve what you could achieve by another means.
***Dr Raw:*** I think the smart meters will have other benefits but, yes, the trial will be the interesting one.
***Dr Darby:*** There certainly is a big issue about the extent to which people understand their heating controls and can operate them.

**Q111 Barry Gardiner:** Absolutely.

**Q119 John Robertson:** How useful are in-home displays to help consumers reduce their energy consumption?
***Dr Darby:*** Pretty useful. There is a first order effect, which is that, for a lot of people, this particularly gives them an awareness of their electricity consumption that they did not have before and it gives them a tool that they can experiment with. They can switch things on and off and see what effect it has. It gives them a feeling of control that they have not had before, so we typically see savings from that. That is the first order effect.
In the longer term, it helps build up an energy literacy, so that they start to be more open to suggestions of the kind coming from people like London Power Networks about belonging to this whole thing, the grid, being active in it and being able to shift their consumption in such a way as to help the grid to function better. Just to go to the experimental evidence that we have, when people have a display they will typically react better to time-of-use pricing and they will produce better peak savings, so you get that second order effect as well.

**Q120 John Robertson:** What about design, does that come into it as well? Are some better than others?
***Dr Darby:*** Yes.

**Q121 John Robertson:** How does a consumer get to know which ones are the best?
***Dr Darby:*** Trial and error, I suppose.

**Q122 John Robertson:** You are our experts. Do you not give that advice?
***Dr Raw:*** You ask a good question, because the consumer is probably not in a very good position to understand, "Should I buy this meter or that meter?" At one level there will be minimum standards for the displays that are to be provided alongside smart meters, so they will have to meet that standard. Once the roll-out starts in earnest, I would be surprised if the suppliers themselves didn't compete by trying to explain what their display did that other people's didn't. Though there is a risk even in that, because I think what people benefit from most is really simple, direct information presented in a very visual fashion.

**Q123 John Robertson:** So we are not tied into who gives the best advertising is who gets the sales?
***Dr Raw:*** That could be potentially counter-productive, but I guess that is true of the way the market operates in general and not just in this specific instance. The important thing is to understand that the evidence shows that when you give people the choice, the complicated device, ultimately it is settled on a few small pieces of information. They are looking at the cost ticking over or the kilowatts ticking over, but all that helps them with the kind of process that Sarah has described. Once they are engaged with that, the kind of display it is becomes less important, and the way in which it has been initially explained to them is more important. When I say "explained to them" I mean two things. One is how to use it: the operation of it, which buttons to push; the other is how to use the information that you get out of it, which I think is probably more important.

**Q124 John Robertson:** That was part of my next question but, having said that, I find that if somebody gets a new item and they don't really understand how to use it, it just gets pushed to one side.
***Professor Bulkeley:*** Yes. We have spent almost 500 hours now speaking to people about in-home displays and smart meters, which is probably more than anybody could quite bear. What we found is roughly two-thirds of the people that we have spoken to are very enthusiastic about their in-home displays, about one-third of them are less enthusiastic, and about 3% actively disconnect them, so very few actively move away from them.
The in-home displays we are looking at is a traffic light system—red, amber and green—and people find that intuitive. People don't even ask for it to be explained. People understand that if it is red, something is not quite right, if it is green it is fine, and they like that.

**Q112 John Robertson:** That is probably like what my grandson gets at school, depending on his behaviour.
***Professor Bulkeley:*** Yes, exactly. Red, yellow and green, they understand it and they get on with it very well.

**Q125 John Robertson:** Can I ask you a question? It is something I wanted to ask earlier, but I felt rude so I moved on. Your investigations really only apply to people who know what they are doing. It doesn't apply to people who are poor, who don't understand and who need the additional help. You are really only dealing with a certain amount of the community, are you not?
***Dave Openshaw:*** That is not quite true.

**Q113 John Robertson:** Convince me on that.
***Professor Bulkeley:*** I will convince you. You go first and we will go that way this time.
***Dave Openshaw:*** I am sure it is true of Northern Power Grid's trial as well, but certainly for the trial we are conducting with EDF Energy, who are managing this dynamic day-ahead tariff, we have deliberately chosen a cross-section of Acorn groups,

so we are getting a socio-economic balance in terms of the consumers who are participating. There are something like just over 1,100 consumers participating with, as I say, a balance across different socioeconomic groupings. It is not exclusive to any particular type of consumer. Although it is too early to draw firm conclusions, it is certainly true that we are getting different reactions from different socioeconomic groups. I come back to the point about clarity of display. One of the things that EDF Energy do is each month every consumer gets a clear visual report showing how much electricity they have used at high price, low price and mid price periods and how that is reflected in their overall electricity charges.

**Q126 John Robertson:** Do you think a person I am talking about would have a great deal of understanding, or is there difficulty in understanding?
***Professor Bulkeley:*** I will have a go at convincing you instead.
**John Robertson:** Okay, your turn.
***Professor Bulkeley:*** My turn. I think it is important for us all to understand that people are not ignorant about their energy use. In fact, the people who struggle the most to pay their energy bills are the people who understand energy the best in many ways. Groups of—

**Q127 John Robertson:** Yes, but these are the people who turned it off.
***Professor Bulkeley:*** Yes, they do turn it off but they try to manage it. There is a group that we have worked with in Middlesbrough, called Thrive, a fantastic group of women trying to help their community understand energy use. For those households, energy is absolutely paramount. It is one of the first things they think about. It is what they try to manage their household economy by. So far, our experience is that where messages are straightforward—and I am not going to comment on whether that is the right approach—for those households that can be a very useful way of communicating with them and helping them manage their budget, but it equally means that we need to understand that all households have an understanding of their energy. We all know whether it is too warm or where the sun comes in a window. Those of us who use a clothes dryer to dry their clothes, like I do, will move it around the house. We find lots of people telling us, "If it is a sunny day I will hang the washing outside." People have a good understanding of energy in those terms. They might not have a good understanding of price. They might not have a good understanding of bills, which do affect them, but they have energy knowledge and we should be trying to use that and come from their perspective.

**Q128 John Robertson:** The one thing that I have found, particularly with people who have the least amount of money, is they all have one of these things.
***Professor Bulkeley:*** They do.

**Q114 John Robertson:** They have a smartphone because they cannot afford to have a landline and various things. They understand these items, so where can we link that into the system? Is that possible? Is it something that we are going down that road? I believe that would be a good end.
***Professor Bulkeley:*** Yes, absolutely.
***Dr Raw:*** It is current; you can do it already.

**Q129 John Robertson:** Are you looking at that?
***Dave Openshaw:*** We are doing it as part of this trial. One of the options that consumers have is to have a text message each day, as well as the message to their in-home display.

**Q130 John Robertson:** The feedback from people? Good, bad?
***Dave Openshaw:*** Yes, very positive indeed, as I say.
***Professor Bulkeley:*** Probably an under-utilised function at the moment.
***Dave Openshaw:*** You make an interesting link there, and, while some people express concerns about complication of time-of-use tariffs, people understand with a mobile phone you will have different rates depending on what time of day you use it.

**Q131 John Robertson:** That is the point I am trying to make. They understand this. Whereas something that goes into the house, if they don't understand it immediately, it has a habit of getting shoved into the background.
***Professor Bulkeley:*** That is where you come back to the idea of the in-home display, because everybody we have talked to about it, if we say, "Can you show us your smart meter?" they show us their in-home display. They don't show us the bit that has gone into a cupboard somewhere.

**Q132 John Robertson:** Something I felt very strong about is that the IHDs should be fitted right at the start when we are rolling out the smart meters. Do you agree?
***Professor Bulkeley:*** Yes.
***Dr Raw:*** Yes, absolutely.

**Q133 John Robertson:** Why do you think that is the case?
***Dr Raw:*** The point about people's understanding is important. In EDRP, what we found is that the SSE trial was the largest of the four, and they spread their sample across different MOSAIC groups, different socio-demographic groups, and the intervention did not depend on which group people were in. In the E.ON trials, they broadly split their sample into people who were more likely to be fuel-poor, less likely to be fuel-poor. It is the people who are more likely to be fuel-poor who, if anything, gave the more positive response.
That makes sense when you look at understanding being important. Everyone has a different level of understanding—their starting point, what kind of equipment they understand. You don't have to know Ohm's law to make this work. It operates on a different level. It is not just about understanding what to do and having the equipment; it is also about having the motivation. Sometimes people who perhaps don't have a lot of money have a lot of motivation to save, so those two things going together

are important, alongside the resources to make the change, the time, the space, the money. It may be, if you are a pensioner spending a lot of time at home on limited income, you have the motive and you have the time. Even if you start off with not much understanding, with or without someone's help, in fact, you will get there. I think it is a question of what comes first. Are you motivated to make a change; therefore, you seek to understand, or do you understand and then it is easy to make the change?

**Q134 John Robertson:** Do you think these meters should be optional or mandatory when they are fitting?
***Professor Bulkeley:*** The IHD?
***Dr Raw:*** I think it is very difficult to tell people they have to have one, but I think they should—

**Q135 John Robertson:** If they are going to have a meter anyway, should they not have the top of the range?
***Dr Raw:*** They should definitely be offered one.

**Q136 Sir Robert Smith:** If they have moved on in technology terms, do they need to put one in every house when the installation is going on, because people will be moving houses, so that there is always an IHD there, or does the first adopter decide, "I don't need an IHD because I am happy with an internet report?"
***Dr Raw:*** It is a concern that you give the first consumer to receive the meter a display. That is good. The next person to come into that dwelling may not receive that display. They could probably go out and buy one, or they might decide, "I will bring mine with me, along with the light bulbs from the house I had before, because I am not sure I am going to have one when I get there." The dynamics of that will not be entirely positive. As you say, at least if we get one into every home, one should remain in every home. People may have to replace them from time to time. They seem to be quite robust, but you cannot count on them lasting for ever. Yes, certainly get one into every home if possible.
***Dave Openshaw:*** I think what will happen over time is that we will see an evolution. The smart metering equipment technical specification already makes provision for consumer access devices, so I think what we will see is more sophisticated means of interacting with the smart meter. It may be that the in-home display is ultimately replaced by something more sophisticated, and ultimately smart appliances that are actually doing that communication on behalf of the customer so the consumer has less need to interact physically, because we will see an increase in smart appliances that are reacting to price change signals on his behalf. It will be an interesting evolution, and it may be that the simple in-home display becomes obsolete in the long term.
***Dr Raw:*** That evolution would not just be about energy display, but integrating that with other smart services, such as security, would be the obvious way to go.

**Q137 John Robertson:** Are you working on that for smartphones? Were you working on it? If not, why not?
***Dr Raw:*** I think that would be for the app developers.
***Professor Bulkeley:*** I don't think you want us to, actually.
***Dr Raw:*** You don't want me designing an app. I almost know what one is.

**Q138 Chair:** To maximise the benefits from all this, it will be necessary to enable people to respond to time-of-use pricing, changes in the weather, occupancy of buildings and so on from their smartphone.
***Dr Raw:*** It seems a logical statement, yes.

**Q116 Chair:** Given that is the way we do everything else now.
***Professor Bulkeley:*** It would be necessary for some people, but it won't suit everybody to interact with their in-home displays and their home systems in that way, but there will be a large majority of people who will enjoy doing that.

**Q139 Chair:** The proportion is very rapidly increasing. I think those elderly people who have grandchildren at home will say, "Look, you can actually do all that stuff now."
***Professor Bulkeley:*** I am not necessarily thinking of those elderly people. It is just some people—

**Q117 Chair:** Well, speaking as an elderly person myself.
***Professor Bulkeley:*** Some elderly people are much more proficient at those things than some young people. It is just a question of how you—

**Q118 Chair:** That is perfectly true but, from my observation of my contemporaries, a lot of them do have a lot of help particularly from their grandchildren in mastering these things.
***Professor Bulkeley:*** They are missing out the middle generation, I guess.

**Q119 Chair:** If you are over 40 you can forget it.

**Q140 Dan Byles:** I want to explore a bit more of this whole demand response and demand shifting. The Irish customer behaviour trials found that time-of-use tariffs and demand size stimuli could reduce overall electricity usage by 2.5% and peak usage by 8.8%. Are those the sorts of figures that we have seen from the UK trials? Would you say they are—
***Dave Openshaw:*** We are certainly seeing a bigger shift than that, albeit we are three or four months into a one-year trial. I am glad you have raised that point because it is important going forward, in particular, that we focus on what is happening to peak demand. You can imagine a future, with electrification of heat and transport, where people are coming home from work in their electric vehicles, plugging in the vehicle as soon as they get home to make sure it is charged the following day. They will arrange the heating controls so the heat pumps are kicking in around that time. Bearing in mind that peak demand occurs now

between 5 o'clock and 6 o'clock on a winter weekday evening, the danger is that, while we might see a 20% increase in electricity consumption, because of heat and transport electrification, we could see a much bigger increment in peak demand, which would be very, very costly in terms of the amount of generation peaking plant we need to build, the amount of transmission network capacity.

A real focus going forward, which is why we think time-of-use tariffs or critical peak price tariffs are going to be important, is to make sure we do shift demand. Even if we don't reduce electricity consumption, but we shift it away from the peak periods, that will have a huge impact on the national cost of energy, and therefore will have a huge benefit on the national economy, make our exports cheaper and will put more disposable income into people's pockets.

**Q141 Dan Byles:** Is there a danger that if everybody has a smart meter and a smart system that is helping them shift to the off-peak, that off-peak ceases to become off-peak? If everyone takes the shortcut, the shortcut is no longer a shortcut.

***Professor Bulkeley:*** Yes. We would say in our trials so far, we have found a small post-8.30pm peak. A small one, not as much as the evening peak. In our trial, so far we have only looked at the summer data. Again it is provisional, but we see roughly the same kind of 9% to 10% shift in the peak. It will be interesting once we have had the data run through the winter to see whether we achieve that as well.

We have the energy data that tells us one thing and then our work, actually talking to people, which tells us why they are doing it. It is that we are mainly finding that it is some of the most energy-intensive practices of washing, drying and laundry that are most flexible, and also some kinds of cooking. We could get into the details of that. I am not sure you wish to. There are a lot of households who have shift work, who have multiple families in the same house, who are not all eating at traditional meal times. They seem to have quite a lot of flexibility within them. There are also people who do batch cooking and heating it up, all these different kinds of households who have found time-of-use and in-home displays help them manage all of that quite effectively.

The things that seem to be stickier are showering times, which are often associated with other rhythms and routines of the day, going out to work and coming back from work and school; heating, of course, where there is electricity heating and cooking, although we find a decline in electricity use for main weekday cooking As we have talked about before, there is a reasonable amount of flexibility in households and it is about how you tap into that.

This raises the question about, when we are communicating with people about smart meters, what are the messages that we are trying to give them? Is it about demand reduction? Is it about the savings that they can create as an individual, or are there broader messages about their engagement with the grid as a whole, the overall cost of supplying energy, and about shifting from one time of use to another time of use? Those two things can go together, but getting the message, the communication, support and engagement for people, clear on those two different things is going to be important.

**Q142 Dan Byles:** In terms of the different interventions and incentives, and we have discussed a number of them—time-of-use tariffs, in house displays, smart appliances, smart devices, the smart meters themselves—is there a danger that your trial is going to struggle to identify which ones are producing the incentive, for example, to demand shift?

***Dr Raw:*** That certainly was an issue with the Irish trials, the way that everything is mixed up and everyone had a whole bunch of things happening. It is quite difficult to split it out. To the extent that we could, we split it out in EDRP. Some of the trials are very simple: "We're doing one thing; let's see what happens." Others were mixtures and you had to do some quite sophisticated statistics.

**Q143 Dan Byles:** Have you managed to draw any conclusions, from what you have seen so far, as to which are the more effective incentives?

***Dr Raw:*** Could you explain what you mean by incentives?

**Q120 Dan Byles:** Perhaps "incentives" is the wrong term. Which tools are best at leading to demand shifting, for example?

***Dr Raw:*** To shift demand, clearly a time-of-use tariff is pretty much the only thing that is being studied. We have critical peak pricing work coming through, which I think will be very interesting to have a look at. It has been done more in relation to air conditioning in hotter regions but not so much in relation to the UK, so that will be very interesting to see what is coming out of that.

The time-of-use tariff itself seems to do some shifting, and the amount of shifting it is very difficult to pin that down to exactly what is the tariff like. The Irish trials used four different tariffs with increasing extreme difference between the peak and the off-peak, with the daytime in the middle. You can just about see a trend that the bigger the extreme, the bigger the peak time saving. It is not statistically significant, even though they relaxed their criterion for statistical significance in that trial.

What is important seems to be the trigger that makes people think, "Aha, it is more expensive right now. Perhaps I could do that some other time," or to be more careful at that time. Because it is both things. People will switch off the light, "It's peak time, so why has someone left that light on?" They are not going to then switch the light on sometime during the day to compensate, so you get a total saving. Whereas for other things they are shifting. The Irish trials again show the shift tends to be a delay. They say, "No, don't do it now. Do it later." With more practice they will probably have more anticipation, "It's the middle of the day, so I'll stick it on now—I won't wait until the evening," or "I'll use a timer to do it while I'm out."

**Q144 Dan Byles:** Am I right that the Irish trials found no evidence of a tipping point in terms of—

***Dr Raw:*** That is the way they put it, yes.
***Professor Bulkeley:*** I would suggest that it is perhaps a little bit of a red herring to think about the financial difference between the time-of-use and the non-time-of-use tariffs. As Dr Raw has just pointed out, in a sense it is more about a changing awareness of the nature of electricity, where it comes from and what is happening to the grid as a whole, rather than the price itself. We find people saying, "If it saves me 5p, well, that's okay," but one of the things is that they found they can do it. They found that their dishwasher has a timing switch that they did not realise it had. A lot of people talk about how clever their wives are at all of this—I thought it was worth pointing out—how clever their wives are at cooking and how clever their wives are at washing, and so on.

**Q121 Dan Byles:** The original smart meters.
***Professor Bulkeley:*** Yes, they are the original smart meters. The army of the UK's wives in the north of England have been going about their business in very different ways, and it is that sense of motivation rather than necessarily only the price.

**Q145 Dan Byles:** Joking apart, has anyone looked at whether there is a gender difference in this? Have they looked at male-only households and seen whether there is any?
***Professor Bulkeley:*** We haven't looked at it explicitly, but I would say, yes.

**Q146 Dan Byles:** It might be that different genders respond better to different prods. Men like shiny things.
***Professor Bulkeley:*** Yes. Say we have talked to roughly 200 households, I would say in 80% of them it is women who are seen to be doing the work of responding to the smart meter in one way or another—

**Q122 Dan Byles:** That is an interesting dynamic.
***Professor Bulkeley:***—in terms of shifting their chores, shifting their cooking, but that is because that is the way domestic labour still is predominantly achieved.
***Dr Raw:*** Yes. I would say it is not gender as such. It is the split of the household roles.
***Professor Bulkeley:*** It isn't, it is the way their household is, but perhaps other studies will find it different.
***Dave Openshaw:*** An untapped opportunity is around explaining the carbon benefits as well. Whether they are sceptics or otherwise, most people recognise that there is a carbon agenda, a greenhouse gas agenda out there. I think the extent to which they can help reduce carbon emissions by their behaviour is a useful area of focus as well. A lot of people are putting photovoltaic panels on the roof of their houses. For example, if you could link that to charging their electric vehicles during the day there is a real synergy there, a real opportunity there. Certainly, if those messages can be explained as well, why the generation mix going forward will be what it is and how we can fully exploit that low-carbon energy resource in future I think would be helpful.

**Q147 Dan Byles:** How much opportunity do you think there is for automation? We heard from the Oklahoma trial that programmable thermostats played a significant role in helping consumers reduce electricity demand at peak times. Effectively, it takes the decision away from the individual themselves.
***Dave Openshaw:*** There is no doubt in my mind that smart appliances are the future, because it takes the physical need to interact with the appliances away from the consumer, provided they trust that appliance. What is important, though, is we recognise that this is a consumer choice, buying an appliance that will interact with a smart meter. There has been a certain amount of scaremongering around Big Brother taking control of your domestic appliances. That is not where we are coming from at all. It is very much about consumers being able to purchase—potentially, for a very low incremental cost—a device that will interact with a time-of-use signal and take that need to physically interact away from them. I think there is a huge, huge future there for automation. Electric vehicle charging is an obvious case in point going forward.

**Q148 Dan Byles:** Other than *The Mail on Sunday*, are you aware of any real people who are concerned about Big Brother in all this? Has there been any push-back in any of these trials from people who have been concerned that this is in any way sinister?
***Professor Bulkeley:*** Again, from our study of the people that we have talked to, no household or business has raised a question about privacy concerns. I think that it is important to put that into the context of the trial, which has a variety of partners, one of which is a university, and it is regarded as about creating new forms of knowledge. We have had some concerns expressed by a sizeable minority—certainly not by the majority—that this will be used as a means of increasing profits for the energy companies. What is important is what this is being used for. It is not necessarily a question of privacy, per se, but what matters is: why is this data being collected? Who is going to benefit from it, and what is going to happen to it in the future?

**Q149 Dan Byles:** Finally and quite briefly, how useful do you think the international studies are in applying to a UK context? You have referred to air conditioning, for example. Obviously some of these are not necessarily—
***Dr Raw:*** You have to be quite careful what they are studying and where they are studying it. If they are studying air conditioning in Oklahoma, there are some quite big differences in both context and the technology. If they are studying smart meters in Ireland, you can see there are some cultural and physical and climate similarities that—

**Q123 Dan Byles:** A degree of common sense, perhaps.
***Dr Raw:*** Exactly.
***Dave Openshaw:*** Also, I would say you need to be careful what the generation mix is as well. We have not a unique but a specific type of generation mix going forward, which will involve very high volumes

of wind capacity, as well as potentially a strong nuclear base for base load. That could be quite a different situation in other parts of the world, where there is perhaps more hydro storage, more solar photovoltaic capability and so on, so you have to be a little bit careful about drawing comparisons that they are looking at a similar energy portfolio.

***Dr Darby:*** I do think there is definitely a role for automating some functions in time, but I would want to add the big caveat that people should always be making a really well-informed choice of that automation, otherwise it is going to feel Big Brother-ish.

I ran some focus groups last summer pitching different types of electricity tariff to people and getting their reactions. When it reaches the point at which you pay a tariff and your supplier or network operator will be able to switch off your water heater at certain times, that kind of thing, there was certainly a bit of nervousness about that. You would feel that people would want to have gone along a certain learning pathway to understand why this would be a good thing for them and for the network, and be fully convinced of that before they did that.

***Dr Raw:*** Yes, I think that is right. There is an intermediate step between where we are now and that kind of automated control. What we alluded to earlier is having appliance-specific feedback, so people are able to see and learn more clearly which are the big users, and therefore are more likely to see the benefit, say, of having a button on their washing machine that they push and it won't come on until it is the minimum tariff for the day.

**Q150 Barry Gardiner:** You have slightly shifted your ground in the last five minutes, haven't you? First of all, when Dan said about issues of privacy, you said, "No, no, no," and then you said, "Actually, there may be something if people feel that it is more to the benefit of the company, rather than them." When you look at what Consumer Focus have said, they have said that, even though there have been few public concerns voiced about smart meter data or even health, the potential for these to become issues that jeopardise consumer engagement and result in detriment should not be underestimated.

***Professor Bulkeley:*** Yes, absolutely. I would say that that is about how we engage people, and also what we think the data is for and who is going to benefit from it. Effectively, it is the question of ownership and the question of use, and to what use is it being put, by whom and for what purposes? It is not at all that people don't have concerns. That is not what I meant to say. I did mean to say that people haven't raised concerns in this trial, and I think they haven't done that because of the use to which the data is being put. Do you see what—

**Q151 Barry Gardiner:** Let me give you another scenario that may affect people's response. If they are engaging with their smart meter, taking active steps to bring their consumption down, but at the same time the price per unit of their fuel is going up and they see no material difference to their energy bill—although, of course, you and I both know that their bill would have been higher had they been carrying on as usual—how likely is that to affect their engagement with the programme?

***Dr Raw:*** You can make it a more difficult sell, clearly, if all you can say to people is, "If you take all this effort, your bill will not go up as much as it otherwise would have done." It is not quite as strong as saying, "Your bill will go down." You can probably work out some pictures that show it all in relative terms that make it more convincing, but there is still the basic issue that bills are going to go up, everybody's bill is going to go up, "If you do this, your bill won't go up as much as it would have done." It is a more complicated thing to sell. If people are able to see for themselves that they are using less energy and they are able to focus more on the energy consumption, the number of kilowatts that they have used, then it will make more sense. However, I agree, it is one of the more difficult things to try to get across to people.

***Dave Openshaw:*** Certainly one of the things that consumers will be able to do, if they have 13 months of data available to them, is that they can then use that data to ask suppliers, "What would I have saved with your tariffs, or your tariffs, or your tariffs?" There are real opportunities there for that comparison to be made.

***Professor Bulkeley:*** I want to add two brief things. I realise that time is ticking on. I think the first is that people will not necessarily do it because it is an effort anyway. People will use these things because they fit into their everyday life and they will be gaining other things from it, as I mentioned before: budgeting, looking after their family in particular ways, and this kind of idea of gaming. Those are all other motivations that are not about reducing costs. Cost matters, but there are other household benefits.

The second thing that our evidence shows, and where we need to improve our communication, is this sense that people are willing to be part of it. They are willing to be part of the grid. They are willing to be part of an idea of securing Britain's future energy system.

**Q152 Barry Gardiner:** This was a self-selected group, wasn't it?

***Professor Bulkeley:*** This is a sample from—

**Q124 Barry Gardiner:** This is the group that responded and said, "Oh yes, I am willing to be part of your trial." It is not the people who said, "No, why on earth would I want to be interested in doing something as stupid as that?"

***Professor Bulkeley:*** That is true, and I will take that on board. However, it is a sample taken from a group of 15,000 people. It is not like 300 or something early, early adopters. It is a reasonably big trial from which we have chosen this. I also think that when we are talking about the value to consumers, people live in very different geographical contexts. The value to consumers who are living on the end of a ropey grid that often suffers blackouts, and they think, "Actually, we would like to be part of a community that can manage this grid better and that can ensure that we don't have blackouts," so the value is different.

**Q153 Barry Gardiner:** I think it is a good point and you made that one before about engagement, which I think is absolutely right. Let me press you a little bit on the issue of privacy and security, because there are people who have very real concerns that the data that is accumulated on them is not only going to be able to be used by the companies for their own marketing purposes, but, if it is tapped into, could provide criminals with new pathways to get at them and give them information about periods during which the house was habitually empty, which leads to greater exposure to crime. What did you do on the trials to address that, and how important do you think it is to try to address that in a wider roll-out, when it happens?
***Dave Openshaw:*** If I can start, and speaking from a network operator perspective, certainly on the trial we have engaged with a privacy impact assessment to start with. We engaged with an expert on privacy impact assessment to make sure that what we were doing was not only compliant with the Data Protection Act but was also fit for purpose, in terms of the data that we were taking. The purpose of network operators in taking the data is not to look at individual consumption. It is to aggregate that consumption so that we understand what is happening from a network perspective, so immediately you have taken—

**Q154 Barry Gardiner:** Do you seriously think that there won't be any way in which a company can use this data for commercial purposes?
***Dave Openshaw:*** What is going to be absolutely critical, and the only way that network operators will have access to half-hourly data going forward, is if they can demonstrate to DECC or Ofgem—depending on what time they present their plans—that those aggregation and data privacy provisions are absolutely concrete and robust. The industry is looking very hard right now, for example, the Energy Networks Association is engaging in a study to understand exactly what provisions need to be put in place to make sure that that data is absolutely secure and cannot be accessed or misused in the way that you describe.

**Q155 Barry Gardiner:** That is the substantive argument. Now let's take it forward into the argument about how do you communicate that substantive position to people on the roll-out, so that their fears are allayed and they are willing to engage. How have you done that?
***Dave Openshaw:*** Certainly as part of the trial we do that, but I think the question relates more to the mass roll-out.

**Q156 Barry Gardiner:** No, what do you do?
***Professor Bulkeley:*** What do we do?

**Q125 Barry Gardiner:** I am saying, when you go into somebody's home to install the smart meter, what discussion do you have? How do you train your operatives to have a discussion about privacy and security?
***Professor Bulkeley:*** Anybody who is taking part in the active side of our trial, whoever is engaging with them has a whole protocol of things that they talk about: what the data will be used for, what the purpose of the intervention is, what will happen at the end of the trial. It is all the ethical procedure that you would go through to achieve someone's informed consent to participate. The other part of our trial is an opt-out, so for the vast majority of customers—it is probably the same on yours—it is an opt-out letter that goes out to them to say, "Would you be willing for your data to be shared as part of a trial for a limited time period?" Those are the two mechanisms that are used, and of course we could let you see copies of that documentation if you wished to see it.

**Q157 Barry Gardiner:** What refusal rate did you have on grounds of privacy?
***Professor Bulkeley:*** About 2% on opt-out.
***Dr Raw:*** About two years ago I was reading through all of the huge piles of papers on the EDRP trials, and it was like this. I still feel quite tired from reading it. I cannot recall anything substantive in there about data security or concerns raised by the participants about data security. For most, if not all people, it seemed at that time to be a non-issue. That is not to say it will remain a non-issue or it will be a non-issue for everybody, but, as you say, apart from the substantive perspective on the controls that are put in place, I would simply point to—

**Q158 Barry Gardiner:** You have not come across Stop Smart Meters! (UK), then?
***Dr Raw:*** Of course, yes, that is why it will probably increase. On the other side, my mobile service provider knows who I am talking to and when I am talking to them. They probably know where I am, if they care to look. My supermarket loyalty card is telling people what I am buying over a long period, my typical patterns of behaviour and which shops I go to. For someone to know when I cook my dinner seems to me relatively trivial.

**Q126 Barry Gardiner:** I am not so sure about that.
***Professor Bulkeley:*** Perhaps the lack of response about these data protection issues is because people have a good deal of trust in that side of things at the moment. The question is: what would happen if that trust was violated, if something was to go wrong with it? My sense is that it is an important issue and we need to ensure that that trust is maintained, but in some senses people are reasonably satisfied with the current arrangements about that.

**Q159 Barry Gardiner:** Who is best placed to provide all that reassurance and information to the public? Who has the undivided trust of the British public? You are going to tell me it is the Big Six energy companies?
***Professor Bulkeley:*** It is David Attenborough.

**Q127 Barry Gardiner:** You are going to tell me it is the politicians? You come along there as independent researchers, and of course you are academics, and everybody says, "Oh, well, if you have a white coat on, we'll do whatever you tell us." We know that from the Milgram experiments. Who is going to be best

placed—it is a serious question—because the messenger often determines whether the message is going to get through?

***Dr Raw:*** You are right, the messenger is important but I think it needs to come from multiple sources. It needs to come from everyone involved. It needs to be trusted public figures who have been brought in, who are entirely independent. David Attenborough would be an option. Alex Ferguson is looking for a job. It needs to be Ofgem. It needs to be the industry itself, and I think—

**Q160 Barry Gardiner:** That would leave one side of Manchester without smart meters.

***Dr Raw:*** The other side without a manager. I think that trust needs to be built up in layers, because you need trust in the motive of what people are seeking to do, trust in the credibility of their plan, how they are going to do it, and trust in their competence to deliver. That is why I say I think it needs to come from multiple messengers, all who are trusted in those different categories of trust.

***Professor Bulkeley:*** Quite a bit of the smart meter roll-out at the moment through the trials is taking place with the participation of third parties, so you have social landlords, you have housing associations, you have local authorities, and you have fuel poverty action groups. You have a whole range of third parties, from the civil society sector on the whole or who are locally based, in one way or another, participating in these trials and in the development of other kinds of low-carbon technologies. We cannot underestimate the role that those organisations have had in establishing trust.

**Q128 Barry Gardiner:** Thanks very much.

**Q161 Ian Lavery:** Just on the costs and the benefits or potential benefits to the consumer, I think you mentioned before, Dr Raw, about the potential savings. DECC estimate by 2020, with smart metering, and better than that, the average consumer will save somewhere in the region of £34 per annum. That is on the average bill of £1,496. Is this really the case? Do you agree that that is the case? Do you think that people will be saving money? Do you think there is real benefit that comes from that?

***Dr Raw:*** It is certainly feasible. I am not an economist and I have not studied in detail every aspect of that impact assessment and the economic case for it. The factors that they have taken into account, the way that they have done their calculations all seem credible. I don't feel I am in a position to second-guess or say that they should be a little bit higher or a little bit lower, but overall it seems the right sort of order.

***Dave Openshaw:*** They have made reasonable use of optimism bias in their calculations. I think the methodology is robust. It can be described as an IT project, and that always carries risk of cost overrun. Certainly, the Energy Networks Association, for example—and I know Energy UK on behalf of suppliers—have engaged closely to make sure that those projected savings look robust. We have had a lot of input, in terms of the network efficiency benefits that will come from smart meters as well. So I think there is no case at the moment for saying that those assessments are overly optimistic, but they do need to be kept under review as the programme rolls out.

***Dr Raw:*** Again, my point would be not that we challenge are they right or wrong, but rather: how do we make them better? How do we get more out of it than currently expected?

**Q162 Ian Lavery:** Do you think that, with the roll-out of smart meters, inevitably consumers will have to pay more than what they will get back in the long run? Basically, they are paying for the burden of a smart meter without receiving any potential benefits in the long run.

***Dr Raw:*** Inevitable that they will pay more? No, I don't think so.

***Professor Bulkeley:*** There is also a wide set of benefits, which we have come back to a few times in the evidence that we have given today. The benefits of having a working electricity grid, and the benefits in terms of broader ideas of energy security and in terms of climate change. Those are the benefits on which it is quite difficult to put a cost. Therefore, they are usually not taken into account in those calculations. If we were to ask people, "Do you want an electricity grid that works or not?" then their answer would probably be yes. If the question is, "Is there another route to achieve that other than smart meters?" I am not a power engineer; I rely on the power engineers to tell me that they think that it is necessary for managing the network.

**Q163 Ian Lavery:** Then, if you ask them if they are prepared to pay for the smart meter, they are going to say, "What will I get in return?" That is the question. Will the consumers be paying for the roll-out of smart meters without getting enough benefits in return? That is basically it.

***Dave Openshaw:*** Obviously, it really depends on the extent to which they engage with the information and make use of the information. I cannot overemphasise the point that Harriet makes about the overall cost of providing electricity, going forward, including generation, transmission and distribution. If we get the sort of engagement we really need, then we will be able to roll out affordable low-carbon transition, so we will have secure, affordable low-carbon electricity going forward. It really does depend on the extent to which consumers engage. If the behaviour doesn't change, then clearly the benefits are not going to be so high. If they engage in the way that we hope they will, through time-of-use tariffs and so on, then the benefits are potentially enormous in terms of saved cost of electricity.

***Dr Raw:*** It is a good point, in the sense that the amount that consumers benefit is partly in their own hands, how they make use of the technology that is there. It sounds a little harsh perhaps. However, the more we can help them to benefit through the process of the roll-out—not just the fact of the roll-out—the better it will be, and the more likely that there will be a larger positive balance in their favour.

**Q164 Sir Robert Smith:** Do we need to restore the confidence in the working of the energy market?

Obviously, if the market is working, if you do something that makes it more efficient to provide energy, then the consumers should see the benefit.

***Dr Raw:*** You would certainly hope so, yes.

**Chair:** Thank you very much for your time. It was a very useful and interesting session for us, and we will take careful note of what you have said.

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## Examination of Witnesses

*Witnesses:* **Dr Martyn Thomas CBE**, Chairman, IT Policy Panel, Institution of Engineering and Technology, and **Alex Henney**, EEE Limited, gave evidence.

**Q165 Chair:** Good morning. Thank you both for coming in. As with the previous panel, perhaps if you can begin by outlining your backgrounds and the expertise that you have on the issue of smart meters?

***Dr Thomas:*** Happily, yes. I am Martyn Thomas and I am a software engineer. I have over 40 years' experience in the software industry, working on large real-time, security-critical and safety-critical systems. I chair the IT Policy Panel for the Institution of Engineering and Technology. At the beginning of the smart meter programme, the IET brought together its policy panels on energy, communications and IT to make sure that, in interacting with DECC, we were able to provide a multi-disciplinary view of the impact of smart metering and, more widely, of the smart grid. From the beginning of that programme, I have been providing the IT input to that combined group.

I would also like to say that I am also a non-executive director of the Serious Organised Crime Agency, which of course has focused my attention fairly sharply on the opportunities for crime, which were raised earlier, and on security. However, today I am speaking as Martyn Thomas, the chair of the IT Policy Panel for the IET, and I am not representing the views of SOCA here.

***Alex Henney:*** Good morning. My name is Alex Henney. In the early 1980s, I was the customer representative on the board of London Electricity. I got to meet Bob Peddie, who was chairman of Seeboard, and he was the joint patentee of the world's first smart meter. We tried to commercialise it but it was too early. Also, in 1987, I was the first person to propose a competitive restructuring of the electric industry in England and Wales, through a report that the Centre for Policy Studies published, and I was involved with Cecil Parkinson and officials in the early days of the restructuring.

Subsequently, I have worked from the Nordic market to New Zealand, via North America and places in Europe. I did a study of electric smart metering and I would emphasise I know nothing about gas, other than one puts it in gas turbines and cooks my food with it, so I focus entirely on electricity. I did a study of electric smart metering in 14 countries, which took in total—together with the review—about a man year. I was very impressed by the big Italian company Enel, which in the year 2000 designed its own smart meter, pilot tested it and, by 2008, it had rolled out 32 million of them at a cost of £65 a pop all in, including IT systems. I was also impressed by Iberdrola in Spain that pioneered open source power line carrier system and meters.

I wrote a book called *The British Electric Industry 1990–2010: The Rise and Demise of Competition* and it included a chapter titled "Smart Metering Provided Unsmartly". I tracked through the numerous papers, White, Green and any other colour that you can think of, which Her Majesty's Government and various other bodies have produced. It struck me that it was complicated. It was based on suppliers and every other country with a mandated roll-out bases that roll-out on the DNOs. It was expensive. Quite clearly, DECC did not understand the power line carrier, which is cheaper than wireless. On that you can see the Irish regulator's comments, and I also provided the Committee with the comments of the person heading the roll-out in Iberdrola. When, under pressure, DECC looked at a DNO roll-out they got the sums wrong for two reasons: first, they did not use PLC; and second, they did not reduce the cost of capital for the meters.

In December 2011 I met Professor Ross Anderson, who is Professor of Security Engineering at Cambridge, and he was concerned that the IT project would be yet another Government screw up. We put together a paper, and last year we met Charles Hendry in February: Ross Anderson did the IT bit, I did the economics.

I noted that the net present value of the benefit proposed for a smart meter roll-out increased from minus 4 billion, when it was undertaken in 2007 by Mott MacDonald, to plus 4.9 billion when it was undertaken by the Civil Service. If that does not ring a bell then you can believe pigs can fly. It was quite clearly manipulated, and Ms Vicky Pryce told Professor Ross Anderson that it had been politically manipulated so that politicians could run around and say, "Oh, we're going to save 5 billion." I did point out in my submission that the British Government's assessment of smart metering was far more optimistic than any of the other 14—no, sorry, there were not 14 assessments. I think there were 10 assessments undertaken in other countries. So, if I can be blunt, it is a fantasy. It was manipulated by reducing the optimism bias, and I am sure my good colleague here will agree that 10% for an unspecified IT system is absurd, and also for the physical implementation that the Chief Executive of EDF Energy said was a high risk project. Furthermore, there was no attempt—as the Germans are doing—to discriminate between the benefit of customers who take a lot of electricity and customers who take a little. It doesn't require much grey matter to work out that, in theory, those who take a lot are going to benefit more than those who take a little.

I regard the in-home display unit as a waste of money—

**Q166 Chair:** I think we have established your credentials, and we are going to return to some of these subjects during questions. So, rather than expressing views about the value for money of the in-home display, perhaps we might explore that during the questions we are going to ask.

***Alex Henney:*** Can I mention that, as a result of this paper, we asked the Cabinet Office Major Projects Review Group to undertake an assessment and the initial noises were quite favourable. As one of the members put it, "We looked at DECC's evidence base and it was flimsy". Subsequently, I have attempted to get a copy under FOI and it has been a charade of specious Whitehall waffle. So we are now at the position where there are two IT companies on the list for the DCC, G4S of Olympic fame and Capita—see *Private Eye*—neither of which have experience of systems involving the sort of regulation that we have developed to a refined complexity. So my view is we should stop it before we waste more money.

**Q167 Chair:** Well, that is pretty clear. We have had witnesses who have suggested that pressing ahead with the mass roll-out is pretty risky while there are still some technical and systems issues unresolved. In your view, what are the technical issues that still need to be addressed?

***Dr Thomas:*** The roll-out of smart meters is a complex programme, and I would like to start by saying that the smart grid is the real prize—as you were hearing earlier this morning—and we need smart metering to support the smart grid. This is a national scale programme and it is important to look at that larger prize in determining the timescales, the cost benefit and so on. That hasn't been done yet. We don't even have a proper architectural design for the smart grid yet to enable that to be done thoroughly. Even so, it is important to view this not just as the roll-out of a smart metering programme, with the current specification, but in terms of its enabling capability for the smart grid.

Of course the dangers of rolling out, before we have a full specification, are significant and I hope the delay that has been announced recently will be used to make sure that the specification is firmed up before there is a mass roll-out. Clearly, it is not optimal to have a lot of meters already installed, which turn out to be incompatible in some way with the specifications when they are produced in their final form.

One of the things that the IET has pressed on consistently is that the roll-out timescales do need to be based on the engineering realities, rather than determined by judgments made by politicians or by senior civil servants for political reasons. So it is important that engineering judgment is used to inform the roll-out timescales. If we don't do that we will inevitably get it wrong. We will get cost and time overruns and we will make mistakes that have to be fixed later.

We are concerned that currently the requirements are expressed very informally. They are natural language specifications with some diagrams. That means that they can only be checked for consistency and for completeness by human review. From all other complex systems we know that that means that they will contain inconsistencies, ambiguities and contradictions that will turn out to be significant problems in the programme later. We would press very strongly that the time that we have now, before the mass roll-out starts, is used in part to formalise and properly analyse the specifications for the meters, for the overall architecture, for the security properties and to prove that those things are consistent. We know how to do that and it is not expensive. There is time in the programme to do that and that is something that we would strongly recommend. So there are technical issues to be resolved but I think we have time to resolve them.

**Q168 Barry Gardiner:** Of course DECC has recently put back the start date of the mass roll-out by a year, to avoid bashing into people's homes with these things just before a general election. Although, of course, the reason that they gave was that the Data Communications Company, DCC, had to be up and running with the systems tested. What is your assessment of when the SMETS 2 specifications will be agreed?

***Dr Thomas:*** It is not clear yet when that agreement will occur. There is still quite a lot of work to be done and there are a lot of stakeholders involved. The UK has a uniquely complex market structure and has chosen to roll-out smart electricity and smart gas meters and, therefore, the complexity of this programme is greater than in other countries. Getting these specifications agreed and then analysed, to be shown to be self-consistent and have the required properties, will take time.

**Q169 Barry Gardiner:** How smart is it to announce that you will be beginning your roll-out at a particular point in time, without having any capacity to know when you will have those specifications agreed?

***Dr Thomas:*** As Sherlock Holmes remarked to Dr Watson, "It is a capital mistake to theorise before one has data." It is important to drive the timescales from the engineering, not to try to constrain the engineering to fit in with predetermined timescales.

**Q170 Barry Gardiner:** Thank you. How long do you think the end-to-end testing is likely to take?

***Dr Thomas:*** The first thing I would like to say is that testing can only ever show the presence of faults and never show the absence. So, if what you are looking for is high confidence that the key properties of the system—like some of the security properties—are genuinely there, and you are looking for high assurance of that, you cannot get it through testing. That is well understood in the safety critical and security industries. It is well understood theoretically in the universities and has been for 40 years. Testing is not the way to get high assurance, either of functionality or security or safety or any other key property. You have to do that by analysis, and that requires using mathematically formal specifications and the associated tools to analyse them. As I said, we know how to do that, it is not particularly expensive. Indeed, everywhere it has been used it has reduced the final cost of systems. We would strongly advocate that these tools are employed where

appropriate in this programme. It will reduce the testing times, incidentally.

**Q171 Barry Gardiner:** If you were trying to work out how long it might take?
***Dr Thomas:*** It depends very much on what level of assurance you want, and that is not specified. The degree of confidence—

**Q172 Barry Gardiner:** I presume that they want a high enough level of assurance, so that householders are welcoming in sufficient number to make the programme deemed a success.
***Dr Thomas:*** That degree of assurance has probably been developed through the trials that have been carried out. You could repeat those with the real systems and it would not take very long to do that level of testing. The issues that concern me are whether in fact there are vulnerabilities that could be exploited, or combinations of circumstances that might cause a significant failure, which would only appear later on and which would then cause a need for substantial rework. If you needed to be sure that all of those had been eliminated, then you have to do much more than the level of testing that has been carried out in the trials, and indeed, as I say, testing will not get you there on its own.

**Q173 Barry Gardiner:** Let me be clear that I understand what you are saying. You are predicating that, without that level of analysis and corroboratory testing, there is a risk of a major unforeseen failure, which undoubtedly would undermine public confidence in the system and, hence, reduce the Government's overall goal, which you alluded to earlier, which is the network goal rather than the smart meter goal?
***Dr Thomas:*** Yes, there is that risk. Of course, it is not possible to quantify that risk.

**Q174 Barry Gardiner:** Thank you. Is there also a risk that customers who receive smart meters during the early roll-out will be left with lower functionality, than those who receive the SMETS 2 compliant meters during the latter phase of the roll-out?
***Dr Thomas:*** That depends very much on how the transition is handled, when you have rolled out a number of meters that are not SMETS compliant and you need to cope with the transition process of making those SMETS compliant. Otherwise, yes, clearly there is that risk.

**Q175 Barry Gardiner:** Given that the Government have now announced these dates of autumn 2015, after the general election, to start roll-out, completion by the end of 2020—no doubt a glowing success just before the following general election—what is your view of these new dates?
***Dr Thomas:*** They are better than the old dates, in that they do give us an additional year to make sure that the specifications are sound and to fit things in better to the engineering realities However, since we don't have the full specifications, we don't know the details of the bids that have been put in by the DCC and other communication suppliers, we don't know what their proposals for assurance will be, we don't know what compromises will come out of the negotiations over those contracts, therefore we don't know the full engineering reality of the roll-out of that process. On that basis, setting timescales now is simply a mistake. At the very least we need to be flexible, once those things are known, and to be willing to adjust them again if necessary.

**Q176 Barry Gardiner:** I am glad you amended that position because isn't it unrealistic to ask the Government to have no timescale at all? I am sure this Committee would be saying, "So the Government has an aspiration but it has no timescale for delivery." We would be criticising them for that, if they did not seem to have a clear and logical framework in which to conduct the analysis and the testing.
***Dr Thomas:*** I agree completely, and that is not what I am saying. I am simply saying they should declare that these timescales are provisional.

**Q177 Barry Gardiner:** The essential point of what you are saying about the importance of the engineering driving list, and the analysis and the subsequent corroborative testing then coming into play, is that all timescales should be defeasible?
***Dr Thomas:*** Yes, timescales need to be driven by the engineering realities. A typical IT project of this complexity overruns its declared timescales by approximately 100% and its costs by about the same. You need to recognise those realities.

**Q178 Barry Gardiner:** If one stopped at smart metering, given what you have said about cost overruns and functionality of smart metering in itself, do you think it is a cost-effective exercise if it were to stop there?
***Dr Thomas:*** The important role of the meters is to enable the smarter grid, and a lot of work has gone into SMETS 2 to provide the functionality for the smarter grid. It is not yet absolutely clear—cannot be absolutely clear—that that functionality is sufficient, because we don't know exactly what the smarter grid will require. For example, there may be a need for more real time data with lower latency for some of the management aspects. We simply don't have the architecture to know that yet. If this programme were only to be providing in house displays and remote access for billing, I very much doubt that it would be a cost effective way of achieving those goals. You can already buy in house displays and clip them on to your supply wires, and the remote billing issues are probably not of sufficient benefit to the consumer to merit the cost of the whole smart metering programme but the smarter grid really matters.

**Q179 Barry Gardiner:** Do you think that the Government would be wise to backpedal on what you see as the ultimate goal of smart networks, because that is likely to put consumers off? I don't know if you heard the earlier panel who said that willingness to engage was very much a function of whether they thought they or the companies were going to be benefiting here, so the Government would be wise to backpedal on the whole idea of the smart network now

and simply to focus on what you say is the less cost effective part of the scheme, simply in order to get it in place. Orwell told us that we have to love our oppressor, didn't he?

***Dr Thomas:*** I certainly don't think that they should backpedal at all on the goal of implementing the smarter network. If they choose, for presentational reasons, to emphasise different aspects of the motivation for this programme then that is a political decision and not an engineering one.

**Q180 Sir Robert Smith:** In your opening remarks, Mr Henney, you made quite clear your concerns about the cost benefits analysis, and you said you had a meeting with Charles Hendry. Have any of your meetings or discussions with the Department assuaged any of your concerns?

***Alex Henney:*** No. When I was putting together the figures afterwards for a paper that I published called *Smart Metering—A case study of Whitehall Incompetence and Profligacy*, I discussed with the economist, whose name appears on the impact assessment, what I was trying to do. Namely, I made clear I know nothing about gas, I was focusing on electric only, so I wanted our costs for electric only metering so that I could compare them with the costs from other countries, which I had. I was told that was a useless exercise, and I said, "Why? The other countries are doing it much more cheaply," and he said, "Oh, that doesn't matter, the benefit is so great that the cost is irrelevant." Now, that is not the way I have been brought up in the private sector.

**Q181 Sir Robert Smith:** When you said they should abandon the whole smart metering project, did you—

***Alex Henney:*** The way it is being done now. I have nothing against smart metering. In my view, it should either be done as a DNO roll-out or alternatively, as in New Zealand, people should be given the option to go and buy their own meter. If they want a smart meter, if they want an in-home display, go out and buy one in the shop, get it hooked in to a PLC system and away we go. This is called a market, I think, which is not something that DECC are very keen on.

**Q182 Sir Robert Smith:** Would you share that view, Mr Thomas?

***Dr Thomas:*** No, I wouldn't, unless all you are interested in is the provision of the in house display information. If you want to go beyond that and to have: first, the management information needed for the smarter grid; and second, the demand-side management, through being able to take remote control of smarter devices and domestic equipment through the smart meter, then clearly you need very tight specifications on the end-to-end security of that system and on the functionality of that system. You are not going to be able to get that simply by getting people to go out and buy something labelled a "smart meter" from Maplins and hook it up to some power line communications. The architecture needs to be planned in much greater detail than that, as we have seen from the thousands of pages of specifications that have already come out, and the man years of effort that have been put in by GCHQ and CESG on ensuring that that architecture has the kind of security characteristics that you need for something that is part of the critical national infrastructure.

***Alex Henney:*** Could I respond? I focused on the smart metering issue. As far as I am concerned, there is another debate that one can have about so-called smart grids. Last year I spent a fair amount of time running around Europe doing a study on smart grids. However, I would emphasise that that, in my view, is another story, and what is a smart grid in Orkney Islands is not the same thing as what is a smart grid in Eifel in Germany, in the national park, and is not the same thing as a smart grid in London.

**Q183 Sir Robert Smith:** You reckon that the power line carrier communication would be a much cheaper—

***Alex Henney:*** The Irish analysis was that the capital cost of the power line carrier was half that of the wireless. The note that I received on 3 May from Bilbao said, "With regard to OPEX, PLC smart meter costs are two orders of magnitude lower than wireless smart meters, and—"

**Q184 Sir Robert Smith:** Isn't that the same functionality in terms of—

***Alex Henney:*** Sure. Sure. Assuming that the network is a suitable configuration for PLC. It is not always. One suggestion that Ross Anderson and I did make to Mr Hendry was that someone from DECC go and visit Bilbao, Iberdrola. Instead of going to visit Bilbao, they went to visit Iberdrola's subsidiary, Central Maine Power, and Central Maine Power: first, did not use power line carrier; and second, half their costs were covered by the stimulus programme, so they did not really care about the costs because the other half were regulated and their costs in total matched DECC's costs. So DECC did not take the offer of the opportunity of going to see a very successful roll-out. To be clear, what I would advocate is a simple roll-out by the DNOs. It took Enel eight years to roll-out 38 million; it is taking us eight years of faffing around to begin to start.

**Q185 Sir Robert Smith:** If you are doing a roll-out by DNOs is that not slightly different from your idea of individuals just going and buying—

***Alex Henney:*** That is the alternative. Two approaches: if you want to mandate a mass roll-out then get the DNOs to do it. Otherwise ask yourself, "Why shouldn't we let the market provide?" Because not everyone will want them. I personally don't want one. My consumption is only about 5,000 kilowatt hours per annum. I have better things to do.

**Q186 Sir Robert Smith:** Better things to do in terms of?

***Alex Henney:*** My time; with my time.

**Q187 Sir Robert Smith:** Yes. Would you not appreciate getting accurate bills from your supplier?

***Alex Henney:*** They true themselves up once in a while when they come and read the meter and I am not fussed. I don't greatly mind having estimated bills.

**Q188 Sir Robert Smith:** Have you put any thoughts into whether a DNO roll-out would be more effective than a supplier roll-out?
***Dr Thomas:*** I believe the decision was taken because the suppliers were seen to have the customer relationships, and that was the key relationship that would be needed in order to get the acceptability and to make it work. If it would help the Committee to have a note on the issues surrounding PLC communications, then I am sure the IET would be very happy to provide that.
***Alex Henney:*** Could I perhaps correct here? The reason it went to the suppliers is because, in 1997 or thereabouts, Ofgem or OFFER, as it then was, devised the idea of the supplier hub, which is a fiction because, unlike bananas being trucked to my local greengrocer, the wires are separate and integral with the delivery of electricity. You cannot have electricity without the wires. Having set this story up, together with competitive mass market metering, because—aren't markets great, they are wonderful, innovative and all the rest of these storylines, which you can get if you go back and read the relevant documents—having set that system up it just rolled on, instead of someone saying in the late—

**Q189 Sir Robert Smith:** The meters currently belong to the suppliers, don't they?
***Alex Henney:*** Yes. The suppliers are supposed to supply the meters. That is the theory of the supplier hub, and I think it is a most ill-advised approach for the mass market. It makes a lot of sense for big industry, and for Tesco and all the rest of them. One of the characteristics of the British Civil Service is we love uniformity, both across the country and across all types of customers. Let them all have the same.

**Q190 Ian Lavery:** I think I have a fair idea of the answers to the questions I wish to put, but I will put them anyway. How convincing do you find that the evidence that the in-home displays, IHDs, are integral to helping customers benefit from smart meters?
***Alex Henney:*** Not at all. If you stop and pause and you ask yourself honestly, "What proportion of the well-educated British populace cannot read, let alone count?" That is not a trivial number. "What proportion are, like me, pretty ancient and not tech savvy and are not going to get interested in this?" Then "What proportion, like me, who have thrown away one in-home display because when I tried to fix it, it didn't work?" and a friend of mine who said, "I got this from British Gas and I threw it away." So you have to ask yourself, first, "What proportion is going to use it; and second, why can't they use their smartphones or their computers?"
***Dr Thomas:*** The IET would defer to the evidence that you had from your first panel this morning, the people who have actually carried out the trials and analysed them in detail.

**Q191 Ian Lavery:** Do you think the IHDs add lots of cost to the roll-out of the smart meter?
***Alex Henney:*** They add about £25 a pop. Multiply that by 30 million and that is £600 million. If half are thrown away then that is £300 million. However, as I said earlier, I have never seen any evidence that DECC has any concern about any money being wasted on this or other projects. Other projects are not on the table for today.

**Q192 Ian Lavery:** You mentioned before and you probably heard the earlier panel as well discussing the possibility of using smartphones, web portals or other feedback mechanisms. Could you elaborate very briefly on that?
***Alex Henney:*** I have a smartphone and you have a smartphone. If an app were available, then I might look at it occasionally. Again, when I have nothing better to do. I have a computer and I might look at that occasionally. Coming back to my basic point, my consumption is not that much and I am not going to turn the television on and off because of the price of electricity. I don't mind if there is a direct system that controls my washing machine and my clothes machines. I am not going to turn my lights on and off because the price of electricity is high or low or whatever, and I am not going to do my cooking to suit some non-existent gas price.
***Dr Thomas:*** The benefits of time shifting will undoubtedly come from smart devices, not from human intervention, simply because they can react so much faster to clip the peaks off demand. That is why the national grid has made the approach that it has, asking for the ability to turn off people's freezers briefly, that has so excited the *Sunday Mail*. In order to be able to get the real benefits of shifting demand to times when the wind happens to be blowing, when there are peak demands arising elsewhere and you need to be able to get away from those peaks and so on, we do need automation in place. That is the principal reason why the smarter grid is so important. Otherwise, we are going to have to do so much work to strengthen the distribution networks. We are going to end up digging up half of Britain, which may be good for unemployment but it is certainly not going to be good for the consumers or for the countryside.

**Q193 Sir Robert Smith:** If we could deliver the smarter grid part and those benefits, would that tip the equation in the cost benefit analysis?
***Dr Thomas:*** Who are you asking?

**Q129 Sir Robert Smith:** Both of you.
***Dr Thomas:*** The smarter grid will be delivered because it is much too important not to deliver it. One way or another we will find a way to deliver the smarter grid, I have no doubt. The Government cannot meet its climate change targets without it; it cannot meet its international commitments on carbon reduction without it. Ultimately, we won't be able to keep the lights on without a smarter grid, because the cost of achieving those things other ways would be so much higher. So enabling the smarter grid is key and it will happen. I have no doubt about that. The smart metering programme is a key enabling step in doing that. If it were to be delayed for other reasons that would be a shame, but that will happen in due course in order to facilitate the smarter grid, beyond doubt.
***Alex Henney:*** Could I put in a note of reservation? The meaning of a word is an explanation of what it

is, how it is used, and when one talks about "smart grid" one needs to step back and say, "What does it really mean?" It means different things in different contexts. Orkney has a smart grid. That smart grid is there because there is a lot of wind, there are two cables that connect it to the mainland and people want to build more wind. There are two ways of achieving that. One is building another cable and I think they are about £30 million a pop. The other is to improve the sophistication of control of the existing network. I think that cost was about £300,000. That was the route adopted. That is nothing to do with meters. That is all to do with the medium voltage system. Likewise in Italy, where there is a lot of photovoltaic put in at an enormous rate, there is a problem with back feeding through medium voltage transformers. Again, it is absolutely nothing to do with residential customers. So I think you should look on a so-called smart grid as the application of modern technology to solve particular problems. First, we need to define the problems and then we can talk about what has become a marketing concept.

**Q194 Ian Lavery:** I think we should get back to the IHDs. That was the initial question and then we moved on to the grid again. Can I just finish my line of questioning on the IHDs, and I will be very brief? Is there any reason why the IHDs cannot be used in conjunction with the likes of the internet, with the likes of an app on an iPhone? Could they be used in conjunction?
***Alex Henney:*** Why do you want two?

**Q130 Ian Lavery:** Choice.
***Alex Henney:*** Go buy one.

**Q195 Ian Lavery:** So they could be used in conjunction?
***Alex Henney:*** I have no problem with people going into a shop and buying an IHD. I have a lot of problem with £600 million worth of socialised costs, of which a significant proportion will get wasted.
***Dr Thomas:*** The current specification essentially enables that. The information is available on the home area network, in order that the IHD can get access to it, and the market will undoubtedly generate all kinds of other devices that are driven off the information that can be provided over the home area network.
***Alex Henney:*** The New Zealand Institute of Economic Research concluded that an in house display was not economic and noted, "IHDs are subject to damage or loss by consumers. We assume they require replacement every five years."

**Q196 Ian Lavery:** I am not sure, are you opposed to IHDs? Sorry. The last question. Mr Henney, you suggest that it would be cheaper and more effective to let customers use their laptops and use smartphones rather than IHDs. If IHDs were not mandatory, how would consumers, without internet access or smart devices or apps, or whatever we have discussed this morning, be assured of access to the consumption data?
***Alex Henney:*** If you want, you can start to provide IHDs to everyone over 65 or everyone on welfare. What I am saying is the mass roll-out of these things is likely to be a waste of time. There may be some who should, on social welfare grounds, have them provided but that does not justify dishing out 30 million.
**Ian Lavery:** I think we have your point. Thanks.

**Q197 Dan Byles:** I want to talk a little bit about the Data and Communications Company, the central communication hub and this issue. It has been suggested to the Committee that the communications model being adopted by the UK is overly complex compared with what has been done in some other countries. I am curious to know what your thoughts are on that.
***Dr Thomas:*** It certainly is complex; there is no doubt about that. The complexity is there for reasons of functionality because of the nature of the range of stakeholders that exist in the UK market, the way that it is currently structured. In looking at that architecture, I haven't seen any redundant complexity although there is substantial complexity there.

**Q198 Dan Byles:** We heard from Professor Ross Anderson, Professor of Security Engineering at University of Cambridge—and I think from you—that Britain is the only country mandating a centralised communication system feeding a centralised database.
***Dr Thomas:*** Yes, Ross hasn't been keeping up to date with the evolving specifications, as he will readily acknowledge. I have had this conversation with him very recently. When he wrote his seminal paper, *Who controls the off switch?* it was at a time when it was believed that the DCC would be holding a central database of all the data that came in, all the half hourly readings from the meters. That is not the current proposal. The current specification maintains the half hourly data in the meters distributed around the country in individual people's homes. Only aggregated information is sent in response to requests for, for example, billing data. So there is no central database.

**Q199 Dan Byles:** Mr Henney, would you agree with that?
***Alex Henney:*** I am agin the central system because I think it should have been done by the DNOs, of whom there are 14.

**Q200 Dan Byles:** Given where we are now with the way the—
***Alex Henney:*** I would stop and get the DNOs to do it. One can see a vast mess coming down the tracks. Is that why it has been delayed until after the election? I don't know.

**Q201 Dan Byles:** In terms of the home area networks, do you have any data security concerns about having home area networks integrated into the smart meter?
***Dr Thomas:*** The way in which the security architecture has been designed is to use end-to-end encryption to control the security aspects. There are some complexities that arise because of the inclusion of gas meters that, because they don't have power

supplies, have to be driven off batteries. The batteries obviously have limited capacity, and that reduces the amount of processing power that you can put into the gas meters because it uses too much power from the batteries. That then reduces the amount of heavyweight encryption—public key encryption—that you could in fact implement in the gas meters. Therefore the SMETS 2 specification has a mirror for the gas meter data in the electricity meter, so a gas proxy that contains that information, which is then held in a place that can handle the higher computation intensive security that is needed in order to provide the end-to-end security.

There is a less strong but nevertheless adequate level of security for communication across the HAN, using the ZigBee specification and the security enhancements that have been made to that. We don't have major concerns with the security around the HAN, other than the general fear that because the way in which the specifications will be written, and the nature of the way in which they are implemented, it is not going to be possible to provide very high confidence that they have been implemented in a secure way. So there may be security vulnerabilities that will show up later, which won't have been detected during the testing process. That is back to my original point that we need to use mathematically rigorous methods to specify and, ideally, to design the software that is used to implement these specifications.

**Q202 Dan Byles:** Mr Henney, do you have a view on that?

***Alex Henney:*** No, I don't.

**Q203 Dan Byles:** A final question, which is about DECC's communication strategy and how confident you are that they are on course to achieve 97.5% coverage that they decided they require.

***Dr Thomas:*** The analyses that have been done by the communications providers seem to suggest that they can get that level of coverage for the communication systems. I understand that that data is available; perhaps it has already been given in evidence to the Committee. We have some concerns about other aspects of coverage. There is a wide range of users. It is not clear that it is going to be easy to get access to all premises. It is not clear that the location of meters in all premises is going to make it easy to install the equipment appropriately, and get the right level of communication with access to the meters where they need to be. Given those range of risks, a 2.5% failure rate feels optimistic. However, we simply don't have the detailed data that would be required to be able to assess what a reasonable assessment of that risk would be.

**Q204 Dan Byles:** Mr Henney, any thoughts on that?

***Alex Henney:*** No.

**Dan Byles:** Thank you, Chairman.

**Chair:** Thank you. Thank you very much for coming in. It has been very helpful and interesting.

## Tuesday 14 May 2013

Members present:

Mr Tim Yeo (Chair)

| | |
|---|---|
| Ian Lavery | Sir Robert Smith |
| John Robertson | Dr Alan Whitehead |

### Examination of Witnesses

*Witnesses:* **Paul Spence**, Director of Strategy and Corporate Affairs, EDF, **Dr Neil Pennington**, Programme Director, Smart, RWE npower, **Andrew Ward**, Operations Director, ScottishPower, and **Tony House**, Smart Programme Director, SSE, gave evidence.

**Q205 Chair:** Good afternoon. Thank you very much for coming in. There is a fair amount of interest in this inquiry and I am grateful to you for giving evidence. We have about an hour for this session, so do not feel obliged to answer every question unless you really want to. That is not to discourage you, but I want to keep proceedings moving along at a reasonable pace. I will begin with a question that I think each of you may want to answer, which is how many smart meters, both gas and electricity, have you installed to date and what smart metering trials have your companies been involved in? We will just work our way across, maybe starting with EDF.

***Paul Spence:*** Thank you very much. We have installed somewhere over 10,500 meters as a part of four trials that we have run. The most significant of those is the Low Carbon London trial focused on the London area. We have chosen to emphasise very much making sure we have the infrastructure in place and the teams ready for the mass roll-out as and when that comes, but, as I say, we have done 10,500 meters.

***Dr Pennington:*** From an npower perspective, in around 2008 we carried out a 5,000-meter trial, which was all geared at understanding customer behaviour as opposed to the technology. We looked at monthly billing, a prepayment trial, simple time-of-use tariff, a web enablement and a microgen trial. We concluded those trials about a year and a half ago. On finishing those trials, we retired the technology because that technology was never going to be an enduring meter or enduring communications technology. We got a lot of insight around customer preferences for those particular products and we have been focusing our effort on investing in the platform and procuring and establishing relationships to begin installing some SMETS 1 meters at the turn of this year.

***Andrew Ward:*** From a ScottishPower perspective, we have installed 35,000 smart meters. In 2010 we installed 30,000 meters, predominantly to help us understand the complexities of installing smart meters in a variety of properties. Last year we installed 5,000 meters, predominantly to help us understand the communications challenges.

***Tony House:*** From an SSE perspective, we were a very active participant in the EDRP trials in which we installed about 6,000 smart meters. Since that point we have undertaken a number of smaller trials, maybe 1,000 meters at a time, and we have recently put together a platform that will enable us to put meters out from a foundation perspective, meters that we would deem to be SMETS 1 compliant. Currently we have about 500 meters on that platform. Our focus has been very much on developing the back office infrastructure to support smart metering. We have invested about £50 million to achieve that so far. During the course of this year we would look to make a similar investment in deployment of meters in the foundation programme moving forward, but keeping volumes relatively low.

**Q206 Chair:** Is there a risk that some customers who get smart meters during the early roll-out may have a smart meter that is not as good as the SMETS 2 compliant meters that others get later on?

***Tony House:*** From an SSE perspective, we would tend to agree with that. We think that the full and final specification should be the SMETS 2 meter, which ensures interchangeability, full security—all of those key requisites that we think need to be in place for a successful and beneficial experience for the customer through smart metering. It is for those reasons that we are trying to keep deployment volumes to a minimum to enable us to get the learning through foundation, before we get ourselves ready for pushing volumes to the much higher degree that we are going to need to do—8,000 or 9,000 a day when we get into the mass roll-out.

***Andrew Ward:*** I think ultimately the answer is yes. 35,000 meters will effectively have to be removed from customer premises because they are not compliant with the final SMETS 2 specification. Our approach to date has been to understand how we deploy smart meters, the challenges in the UK—there are significant challenges—and to wait for that final infrastructure, the nuts and bolts, for the UK, to be installed and then we can deploy fully once that is established and is working.

***Dr Pennington:*** We are in the same position at npower. We have invested a significant amount of money in putting our platform in place, and at the end of the year we will start to install very small volumes of SMETS 1 meters. We are absolutely concentrating on giving people the right customer experience and getting it right for our customers. We think that means focusing on SMETS 2 meters in the long term such that they are assured, they are compliant and we have interchangeability and there are no barriers to switching.

***Paul Spence:*** Our view is very similar to that of our competitors. Our focus is on doing things once and doing things right. Installing early meters is about learning what it takes to get those meters installed, to

make them work and to help consumers benefit from having those meters in place. We have done that learning, but ultimately non-compliant meters will have to be replaced so we do not want too many of them out there that then need replacing at extra cost for consumers.

**Q207 Chair:** What do you say to people who suggest that the roll-out is too industry led and not focused on the consumer?

***Paul Spence:*** We have been boringly consistent in our view that this needs to make sense from a consumer standpoint. The heart of the smart metering programme is something that is about helping consumers engage in their energy use, understand the profile of their use and act to reduce the amount of energy that they use. That is at the heart of the business case. We need a programme that is consumer focused, that looks at how they want to engage in the roll-out process. Clearly though, the industry has to play its part in doing that. We are talking about an enormous programme for the country as a whole. The scale of the metering roll-out, the timetable for it and the technical complexity of the programme is enormous, and it needs companies like ours to engage in that programme with the Government and with people representing consumers.

***Dr Pennington:*** I think that is right. Ultimately, this is about giving consumers choice and customers choice and helping them change their behaviour and their relationship with energy, but in the early stages of this programme it is about establishing the platform that enables it and reduces costs and complexity. As an industry we have to collaborate and work with the Government in order to establish that platform, with the ultimate goal and ultimate design of this massive change programme that is all focused on that customer experience. For companies like ourselves, the relationship with retailers and our customers and trust is extremely important, so we are very concerned about not undermining that at any stage in this roll-out.

***Andrew Ward:*** From the ScottishPower perspective we view it as we have one opportunity to get this right. That is why we have adopted a view that we want to make sure the infrastructure in the UK is established and we want to focus very heavily on the consumer engagement. We know how important it is that, from an early stage, we engage with consumers right the way through the deployment process and after they have actually had the meter installed. That is what we are spending our time focusing on right now. We are actively engaging a group of our own customers now, understanding what they would like to see as part of the deployment process. That is helping inform what we will design as a deployment process.

***Tony House:*** I think we would also look to take the opportunity through partnerships as much as we possibly can. We have been actively involved in partnerships such as Ecoisland on the Isle of Wight, a community-driven environmental programme that seems to be delivering some good benefit. It is a good way of getting acceptance for smart metering and putting it into place in a wider eco-environment. We have done examples of that and also working with networks partners from a low carbon networks perspective for the projects that they are undertaking such as the Thames Valley Vision project.

**Q208 Chair:** One of the consequences of competition and switching and so on is that you might have six houses next to each other with six different suppliers. It is not difficult to envisage the sort of irritation and confusion it may cause if they are all having their smart meters installed at different times. Will you be able to co-ordinate the roll-out among yourselves so you get street by street rather than individual by individual?

***Tony House:*** There are some areas where we most definitely need to do that very early on, multi-tenanted buildings, blocks of flats for example, where we will require an infrastructure to be able to communicate from the meters to the in-home displays. It is very important that we come up with common solutions, otherwise you have six or more suppliers trying to create a solution within one building. That is an example of an early opportunity where the need for collaborative working is very much identified. I think from that there could be other spin-off benefits as well.

However, we need to recognise and trade that against our opportunity to be able to grow our workforce on a regional basis, to be able to have GB coverage as quickly as we possibly can, to be able to respond to the need and requests from early adopters of smart metering. They will be the advocates of smart metering as we go forward, so we need to make sure that we can encourage them along the way.

***Paul Spence:*** We have looked very carefully at the economic case for smart metering. It is very clear that one of the biggest costs is the cost of the installation, and finding ways to do that in as co-ordinated a fashion as possible that, first of all, allows for targeted communication with consumers in a particular area and then allows for logical installation, not just multi-tenanted buildings but in particular areas, is something that offers an opportunity for cost savings. One of the things we are advocating is that with the change in the timing of the programme it gives time for DECC and the industry to look at the other opportunities to create more co-ordination, to deliver more value and a better customer experience earlier.

**Q209 Sir Robert Smith:** Are there any barriers to effective co-operation from licensing conditions in trying to keep competition going between the companies?

***Paul Spence:*** Clearly, we have to be conscious all the time about the fact that there is a competition restriction. We are competitors with each other. We have to be careful about the information that we give and the information that we share in any process. However, we believe it is still possible to increase the collaboration, the co-working, in the roll-out of this programme.

***Dr Pennington:*** We are already pretty well set up in terms of our working relationships within the programme. We have meetings centrally. We work very closely with DECC and with each other to discuss the issues as they arise. The challenge is that

once we get into the mass roll-out at the end of 2015 and we are into the volume installations that we are doing, there has to be an opportunity to increase that collaboration. From my perspective, when I look at my colleagues in the industry and we are discussing the issues and working hard at jointly solving some of the design and build issues that we are facing, I think the foundations are pretty good there to be able to have those conversations.

***Andrew Ward:*** From a ScottishPower perspective we do not see the driver behind effective installation as something that is of a competitive nature. It is to ensure that the customer receives a good installation, they understand the installation, and it is done at the lowest possible cost. That is a fundamental driver of why we want to co-operate as an industry.

**Q210 John Robertson:** That was really interesting. We look forward to seeing this competition you are talking about. We have not seen much of it over the years, so carry on. It will be very interesting to see how much it is going to help the consumer. I would be interested in the cost of the installation, the equipment and so on and how much is offset by the fact that you will reduce your workforce of meter readers and things like that. Are you going to take that into consideration for your costs and will you lay out exactly what the savings will be in the future?

***Andrew Ward:*** As part of the planning process, we have already analysed what the potential benefits will be under the original case from DECC. We will be submitting on a quarterly basis to DECC all of the cost and benefit information on a very granular level of detail, so they will be able to see that themselves in terms of where the benefits are coming from, which I would hope from a cost-saving perspective in terms of ScottishPower will then in turn be passed on to the customer.

**Q211 John Robertson:** I hope you will send us a copy of these documents. Let me move on a bit to talk about key enablers. Mr Spence, you have said that these key enablers are important and they need to be in place before the mass roll-out begins. What kind of key enablers are we talking about?

***Paul Spence:*** One of the things that we have done as an industry is identified 11 key enablers. I would be very happy to write and give you detail, but in essence—

**John Robertson:** Just tell us the important ones.

***Paul Spence:*** In essence, this is about making sure that we know that we are installing the right meter, so a meter that is to the right specification; that that meter is to an engaged consumer, so we have an appointment and somebody there, in a building that we can communicate with and where the communication is possible around that building between the meter and the display; that the meter then is able to communicate properly with our systems via the DCC so that there is a central point to co-ordinate all the industry information flows that need to happen; and for all of that to happen in a way that then allows consumers to get the information that they need to make the changes they need and for us to have a workforce that is able to deliver the roll-out, answer the queries, offer the products and take the benefits of smart metering, and that is all on both gas and electricity networks.

**Q212 John Robertson:** I would consider the most important one, of course, to be the communication to the customer and not necessarily your company, because I am sure the first thing that you will get will be the meter reading and you will know exactly how much money these customers will have to pay. The communication to the customer seems to me to be more important. Do you not see that as being the most important thing? To me personally, if I do not get the information, then what the devil would I want a smart meter for?

***Paul Spence:*** Absolutely. I think it is essential that you are given information about your consumption in a way that you can understand that information on a device that you want to use for the information to be presented to you. It may be you want it on paper, on a display, on your smartphone, or on your computer. The range of devices that people use to access information is enormous.

**Q213 John Robertson:** You obviously sat in on this morning's evidence session. Are you going to give me an app for my mobile?

***Paul Spence:*** I am sure somebody will give you an app for your mobile if you want one.

**Q214 John Robertson:** What about the rest of you? You might be getting a chance to get a customer here.

***Dr Pennington:*** It is absolutely about what is appropriate for the particular segment. Some customers who do not have access to the internet or do not use apps will work with the IHD and others will want apps and will be demanding them. The world changes so quickly that we have to encourage and respond to that.

***Andrew Ward:*** I think it is key that when we are installing the meters we give a customer a choice. They can choose to take an IHD; they can choose to have information displayed in any way they desire. Our job is to facilitate that as best we can.

**Q215 John Robertson:** What are the risks involved? What risks do you think are important that need to be looked at and overcome?

***Tony House:*** I think there is a significant risk of going too soon, and we welcome the extension that we have for the foundation and to the roll-out periods to enable a lot of those risks to be mitigated through landing a stable DCC solution, and particularly a compliant smart meter that we know will be interchangeable. We do not believe that is the case just at the moment and we have concerns about the increasing volumes of meters that are out there that will need to be revisited because they are not compliant to today's specification, let alone SMETS 2, which we believe is ultimately the right specification to move forward to.

**Q216 John Robertson:** Should we really be going to second generation meters where we have in-house displays minimum?

***Tony House:*** Our view would be yes, absolutely. We should go with the SMETS 2 meter as the compliant meter and that is the only meter that gets rolled out in volume because you can have certainty around interchangeability, supported with an in-home display or something that is deemed more appropriate to a particular customer. That could be an iPhone app or a tablet app. We think the IHD has its place for some customers, but probably a reducing number of the total population of customers now, given the greater prevalence of smartphones and tablets. We would be very supportive of developing apps that will support and give greater functionality to the customer and make it a more exciting experience for them.

***Dr Pennington:*** That underpins the other major risk, which is not just a technology risk but is that risk that you identified, which is around consumer engagement at all parts of this, so for each group of customer but at each stage of the roll-out. It is very important. We have all signed up to and will be driven by a licence condition that when we turn up to install the equipment, we are not selling, so there is no sale at that visit, but we are educating and explaining and taking time to explain how the meter and the IHD or the app actually work. Then there is the ongoing engagement with them to help them use this stuff and change their behaviour. The risk is that if we go in too much volume with unproven technology, consumer engagement is undermined and that is not going to help anyone. I think that is the other risk.

***Paul Spence:*** Just to shift the view from the consumer, the other thing I would like to highlight is that this is an industrial programme. We are talking about the installation of about 50 million meters in homes with infrastructure of varying quality that the people who do that installation are going to be working with. We have to make sure that that is a safe experience for the installer and for the customers and that we have the arrangements in place to make sure that where there are cases that are not safe, the right action is taken to deal with those. It is a real industrial programme and it needs that attention as well.

**Q217 John Robertson:** How do you respond to the British Gas suggestion that, "valid, but resolvable, concerns about some elements of the roll-out, including interoperability, security and technical specifications" have been used as "a reason to postpone embracing the roll-out"?

***Tony House:*** I would like to take that one if I may.

**John Robertson:** You have been practising.

***Tony House:*** We are in a position where we can roll out meters in volume. We have a platform, but we recognise that it has some interim components within it just at the moment. We therefore think it is inappropriate to put those meters out because it will not provide the customer with a positive experience. It will be suboptimal if the meters that we put out are deemed to be non-compliant and we have to go back in short order and replace those meters, which means customers having to be at home yet again, having to have their supplies interrupted again to allow that meter to be exchanged. We very much think that we should create the platform, engineer the right solution rather than market it, and then use the opportunity to deploy the meters, mindful and knowledgeable that we have the ultimate solution for them. We can use that installation process as an extension of our customer services to them rather than an opportunity to up-sell or to acquire customers. It is more about extending the customer service that we already provide.

**Q218 John Robertson:** Would it be fair to say that basically you guys are just not ready for it today but at some time in the future you will be? Is a year delay enough?

***Tony House:*** From our perspective, that is not the case. We can put out meters in volume but we choose not to because we do not think that we have got to the point where we have the infrastructure in place to assure that those meters will stay on the wall for an enduring period.

**Q219 John Robertson:** So why would the Government put it back a year? A year does not sound an awful lot, does it?

***Dr Pennington:*** I think the key here is that the period before the DCC is in place, i.e. mass roll-out, from an npower perspective we see as a kind of testing period to prove that our meters, data transfer systems and customer service—the whole customer experience—actually works on a one-to-one basis. We are also very mindful that in doing that early we will be using the SMETS 1 meter, not the final SMETS 2 meter. If you tick a box and say, "Are we able to prove that the pathway works in a limited volume?" then yes, and that is what we will do before the start of mass roll-out. The other conditions then I think from a customer viewpoint are: can I switch easily? Do I have interoperable equipment? Do I have faith that this equipment is going to be interchangeable if we transfer between different suppliers? I think that is when you get the delay, and the welcome delay, which is to make sure that the next generation of meters, the basic generation, are interoperable and that customers do have a good experience of this.

**Q220 John Robertson:** Call me an old cynic, but it strikes me as if you know already there are going to be some problems and that the idea is to take the problems until after the general election to make sure it does not affect the outcome and that this is absolutely nothing to do with putting it back a year. Chances are it might even be longer. You really do not know, do you?

***Andrew Ward:*** The risks are real. I will give you a live example of ScottishPower's experience. Of the initial 30,000 meters that we deployed in 2010, we have had to replace 5,000 of the SIM cards that are in those meters. The understanding we had when we installed the meters was that the SIM cards would be sufficient to last the life of the meter, so that has gone wrong. We have had to interrupt the lives of 5,000 customers and reinstall those meters.

I will give you an example from part of our global group in America. They have now installed over 600,000 meters and I believe the common misconception is that software upgrades on the meters can be done electronically from a distance—you don't

need to attend the property. As part of that deployment they rolled out, at the point of 200,000 meters they had to replace 5,000 meters because they could not update the communications over the wire. They had to again attend that property, a physical visit. It is a real example of what could potentially happen in the UK. That is why there is a desire from a ScottishPower point of view to test thoroughly what is actually in there before we mass deploy in the UK.

***Paul Spence:*** As we think about it, it is all about making sure that we give the consumer the best experience and also the best value, and that is about getting it right.

**John Robertson:** The best experience for the consumer would be to give a cheaper rate of electricity, but somehow I do not think we are going to get that. However, let me know when you get the app on board and I will decide who I am going to go and work with.

**Q221 Sir Robert Smith:** Just returning to the cost benefits, how robust do you think DECC's calculation of £6.7 billion is for the net benefit?

***Paul Spence:*** The benefit case is made up of three big chunks. There are the benefits for consumers from better use of energy, lower use of energy, so there is that component. The second component is the savings that we as companies and the industry can make. The third component is the costs of the programme. Where it is about the costs and the cost management, EDF Energy believe that we would have some differences on particular line items but in general we think the case is about right.

The most difficult piece is about achieving the savings—achieving the consumer benefit in terms of the energy efficiency and the savings on gas and electricity. There are some trials that have shown some of that, but we are still at the early stage of our own trials to validate that and to see how you get the right consumer engagement and the right behavioural change sustained over time to deliver those benefits.

**Q222 Sir Robert Smith:** Do you think the £12 billion side of the equation is broadly in the ballpark?

***Paul Spence:*** Yes.

**Q223 Sir Robert Smith:** This morning we were hearing evidence that it would escalate madly because it is a big IT project.

***Tony House:*** The continuous review of the impact assessment is clearly very important. The fact that the DECC programme has progressed to a point of procurement now, approaching procurement for DCC, starts to de-risk some of the cost elements associated with that. I think the continuous review of the impact assessment is really important, as is making sure that we absorb and factor in the learnings through the extended foundation period before we really commit to high volumes of meter deployment. We have the opportunity to revisit the impact assessment on a number of occasions.

**Q224 Sir Robert Smith:** The other benefit you said was that meter reading costs and inaccurate billing will go. How can consumers in the current sort of climate have the confidence that they are going to get the full benefit of that reduced cost base for your operations?

***Paul Spence:*** I heard the views of the panel before but—

**Sir Robert Smith:** It is a question, not a view.

***Paul Spence:*** I am getting my retaliation in early on part of the response. The reality we see is we are in a competitive industry. We face a number of costs that are increasing and we work hard to keep our tariffs as low as we possibly can. It will be that pressure that will be the guarantee and the force that causes us to pass on the benefits that we see in terms of lower costs to our consumers. It is that that will be part of trying to win new consumers. My company is a company that wants to grow and to do that by having competitive tariffs. If we can make a cost saving and pass that on to consumers, that helps us in our competitive position.

***Dr Pennington:*** There are a number of controls on this. In the new Smart Energy Code we will have an obligation to report our costs and benefits of roll-out to Ofgem on a regular basis, so they will see those. I suppose the area of uncertainty is the big benefit case around changing consumer behaviour. I think that we are not in control of what individual consumers and customers choose to do with the information that they get, but it is absolutely a fundamental driver for us to make sure that platform is in, and then we are working with them and engaging with them over the period of roll-out and beyond to help them realise that net benefit, which should see a balancing effect. There is a regulatory licence condition to report on costs and benefits.

**Q225 Sir Robert Smith:** You are actually reporting figures?

***Dr Pennington:*** Yes.

**Q226 Sir Robert Smith:** The consumer benefit, the actual behavioural benefit, is a big chunk of that £6.7 billion, or not six because you will be taking 12. It is 5.3, I suppose.

***Paul Spence:*** Viewed without that element of the benefit, this programme looks like more cost for less benefit as viewed from the supplier's perspective at the moment.

**Q227 Sir Robert Smith:** Back to an earlier question—and probably it is too late to unravel—would there have been efficiencies by having the meters back again with the distribution companies, so that there was one meter at the end of the wire that sat there metering away?

***Paul Spence:*** My company is known for having argued the position that it would be better to have had this as part of the regulated network. That would have allowed a street-by-street approach and that would have allowed a potentially lower cost of capital for the amount of capital that is being deployed. I think the question for us today is how much of those benefits it is possible to deliver and achieve, given the structure that we are faced with where we are given the obligation at the moment to roll out those meters.

***Dr Pennington:*** Before the smart programme started, there was that consultation process within the industry, which was, "What do you think is the most favourable and efficient roll-out model?" The choice was to go with the fully competitive model and, as my colleague Paul said, we are there and our challenge is to really make that work and we are committed to doing that.

I guess what I would say is that ultimately if the benefit case is all driven by fundamentally changing consumer behaviour, then a competitive market with new entrants coming in offering all sorts of apps and all sorts of advice to help people really manage their energy is probably where you want to be when the platform has been established. I think we are fully behind now where we are in driving and working in that market structure.

***Andrew Ward:*** The decision was taken some time ago to make it a supplier-led roll-out. From a supplier's perspective, we have experience in interacting with our customers on a daily basis in a number of areas. Some of us have our own metering businesses as well, so we have experience in deploying meters. Putting the two together, I feel that ScottishPower are capable of deploying this.

***Tony House:*** I think the success for the smart metering programme overall is around consumer acceptance of smart metering. The supplier owns that relationship with the customer and we will do our utmost to make sure that that is a very positive experience. We can see this is a great opportunity to extend our experience into our customers. We have a once in a lifetime opportunity to have a face-to-face touch-point with each consumer and be able to use that opportunity to best effect and to really sell the benefits of smart metering.

**Q228 Ian Lavery:** We have discussed the IHDs already, but very little information has come to hand with regard to the cost of the IHDs. How much is the IHDs adding to the cost of the roll-out programme for the smart meters?

***Dr Pennington:*** The IHD is a really interesting question within npower because it is how much do you pay for a basic IHD and that functionality versus where you go with apps for different market segments. I believe the impact assessment said it was somewhere around £23 to £25 an IHD, and I know that that is broadly where the target is for the early basic specification of a mandated IHD. However, then how much you invest in terms of apps and various other things is a matter of marketing strategy, I guess.

**Q229 Ian Lavery:** Do you think they are worth it?

***Tony House:*** I think for an increasing segment of the population functionality and the benefits are better delivered through something other than an IHD—an app or a web portal where the consumer can log online and then can view their smart metering consumption and do comparisons from the energy that they have used today compared to the same day last week, last month, last year. Those are the kind of things that will drive much more engaging behaviour around smart metering.

**Q230 Ian Lavery:** Are you serious in thinking that there are alternatives to the IHD such as the web portals and the smartphones and the apps?

***Tony House:*** We have web portals today to support all of our smart meter customers. If you take one of our smart meters, you have a web portal that you can log on to and you can see that detail on a granular basis. We are developing applications to go on smartphones and tablets to enhance that experience further as well.

***Andrew Ward:*** In our original 30,000 deployment, we offered a website for our customers to go and view their consumption historically and even at that point piloted incentives for customers to reduce their consumption through that web portal again.

***Dr Pennington:*** We are all doing that, but again it all depends on the segment. There are some segments of our country, our community, that do not have online access, so you need a balanced way of giving people information and ability to make a choice that is appropriate to their particular set of circumstances.

**Q231 Ian Lavery:** How would you make sure that the most vulnerable in society would not be jeopardised by using the feedback mechanisms, for example those people who do not have access to the web?

***Tony House:*** We think the IHD has its place and for customers such as that absolutely that would be something we would make available. However, we need to recognise that different segments have different expectations, so our suggestion is that we should be able to offer a multitude of different touch-points rather than just be focused on the IHD.

**Q232 Ian Lavery:** Do you think the potential feedback mechanisms are as effective as the potential IHDs in respect of helping consumers to reduce consumption?

***Paul Spence:*** One of the things that app trials and pilots have taught us is that we need to work especially hard to help segments of the consumers who are disengaged, either because they are vulnerable or because they do not want to engage, to understand smart meters, to understand what it means for them, to understand whatever device they might use and what it might make possible for them and what it might require of them by way of behavioural change if they want to see the benefits of smart metering. We already know that we have to work particularly hard to make sure that we communicate right with different segments and it is not a one size fits all. That is one of the benefits that we have already seen from the trials at the moment, but how that works and how that is going to continue to work—I suspect when the smart metering programme started very few of this Committee would have been using iPads and smartphones. Today that is the norm. We are already talking about a programme that is going to run until 2020. Over the period between now and 2020 it is very difficult for us to sit here today and say with confidence exactly what the changes will be and what is the best technological choice to allow consumers to engage with this thing called a smart meter.

**Q233 Ian Lavery:** Do you think these IHDs should be installed to all domestic customers, and indeed all business customers? Should there be a difference?
***Andrew Ward:*** From a domestic point of view, I think it has to be a choice at the point of installation for a consumer. Do they wish to use an IHD or would they wish to use technology that exists in their home such as a tablet or a smartphone? I think in terms of small business customers, again looking at the interaction we have with small business customers at the moment, they deal more on the web by the nature of what they do. They deal more online. They are far more interactive and typically they will be more open to that technology as part of their business process. Therefore, I see more use again, but it is a choice for the business customers through more alternative means.
***Dr Pennington:*** We are actually mandated to offer an IHD to the domestic consumer as part of the roll-out.

**Q234 Sir Robert Smith:** To offer, but if they refuse, if they do not want it?
***Dr Pennington:*** Sure.
***Tony House:*** They have a 12-month period to choose whether or not they wish to take it.

**Q235 Sir Robert Smith:** If they move and someone else moves in, does the IHD stay with the meter or move with the—
***Andrew Ward:*** It should stay with the meter.
***Dr Pennington:*** It stays with the meter.

**Q236 Sir Robert Smith:** What if they have opted out and someone else moves in who needs one?
***Andrew Ward:*** We need to deploy an IHD.
***Dr Pennington:*** That is a change of tenancy process and we will deploy an IHD or offer them an IHD. As Paul said, over time, predicting what 2017 and 2018 and 2019 will be like, the proportion of people that would rather have some other form of engagement will change.

**Q237 Ian Lavery:** On the form of engagement—we have mentioned the feedback mechanisms of the mobile phones, the smartphones, the tablets, the web—do you think using those as an alternative to using the IHDs, basically a blanket installation, would be cheaper?
***Paul Spence:*** We have not done the analysis of the cost to know if that would be cheaper. Instinctively as somebody who has a smart meter at home—I know I am not a completely typical customer—I would much prefer to have the information provided on the thing I use, which is my iPad, rather than on a separate display. I know I prefer it and I suspect it would be cheaper not to give me a piece of kit that I do not use very often, which is the IHD.
***Andrew Ward:*** We see more and more of our customers communicating through social media, through websites, and we have a growing online presence in terms of ScottishPower customers. It is just evolving more and more.

**Q238 Dr Whitehead:** The roll-out clearly is going to be very important in terms of necessary consumer engagement. What are you looking to do in terms of your own customers as far as consumer engagement is concerned and on a wider front?
***Tony House:*** The opportunity through foundation, as well as being able to trial and test technical solutions, also gives us the ability to understand how we best engage with the customer. We are investing significantly in making it easy to book an appointment. In the same way that you might order your shopping online from a supermarket, we are developing systems whereby a consumer can log on and select when they would like to take their smart meter at some point in the future. We will then optimise to make sure we get somebody on site on the day. However, we need to develop that and learn through that process as we go through foundation and also how we engage with the customer on the day of the installation. What is the best way that we can educate the customer in how to use the smart meter? Those are the things that we would do independently. In addition to that, the Central Delivery Body is in the process of being established under the guidance of Energy UK. That will be up and running from July of this year and that body, with a degree of independence, will be strongly promoting the positive aspects of smart metering to get a wider acceptance from the consumer base at large. I think the appetite is to create a pull for smart metering rather than suppliers having to push.
***Andrew Ward:*** To add to what Mr House has said, from a ScottishPower perspective there are two key things that we are doing right now. The first is we are conducting a number of visits to premises, because part of the challenge that we highlighted earlier is the physical installation in the customer's premises. We need to understand what that challenge actually means across a variety of properties across the UK. We are trying to understand that now so we can engage customers proactively to explain to them the challenges that we face when installing a meter.
Secondly, we are engaging some of our customers now to understand what they want from a deployment perspective. Already we see information coming back that they want to have two weeks to a month's notice in advance of us coming to install a meter. They have preferred days, they have preferred times, so we are starting to build that up now, we are starting to deploy that, starting to build that into our deployment model.
***Dr Pennington:*** From an npower perspective, we are on roughly the same lines. What I would add to what Tony said about the Central Delivery Body is that that vehicle has a strong remit to reach out to a number of third parties like Age UK and the various trusted bodies and channels that can engage much more widely with different communities and different areas of our country to be able to give that heartbeat, drumbeat about smart metering, a little bit like the Digital UK experience. They are very much going to create a lot of partnerships out there in terms of that wider GB engagement.
***Paul Spence:*** Like our competitors, what we are doing is investing in making sure we have the systems to allow our customers to call or to go online and book the appointments, investing in making sure we have the trained installers who know how to give the

information, how to do the installation but also how to deliver the support and training that the customers need during that process. Dealing with that in the different types of locale, the different types of building that we are going to face, is all part of what we are doing to try to make sure that it is as good an experience as possible. Then we need to work individually and collectively to make sure it is an experience the customers want to have, which is the piece about the Central Delivery Body and our own efforts to communicate what smart meters are. I think we all know that at the moment public awareness of smart metering is very, very low. My team gave me the analogy that this is like thinking about the roll-out of Sky being done twice as fast, and at the moment Sky only has about 10 million customers. We are talking about getting everybody in the country signed up, so getting all the infrastructure in place, the sign-up in place for something, and it is not intuitively as obvious that you want smart meters in your house.

**Q239 Dr Whitehead:** You mentioned the digital TV switchover and the Central Delivery Body could potentially have a similar sort of role—maybe not with the annoying little metallic robot—to the digital TV roll-out. On the one hand, that is the general case-making body and reassurance and pull-through body. I assume that is the sort of process you are looking to develop. Is that right?

***Dr Pennington:*** Yes, the Central Delivery Body giving the context and myth busting and creating the context in which consumers can understand what smart metering is all about, doing it through a number of partnerships as well. We talked extensively to the Digital UK team and they had the outreach relationships as well. Then there are individual companies to target our particular messages and engagement with our consumers on a number of different levels, everything from before we turn up at the door to do the installation and provide the customer experience and the education to make that the right experience for the customer, all the way through to helping them, once the kit is in, to engage with that and change their behaviour and realise those benefits that were talked about on the wider GB business case.

**Q240 Dr Whitehead:** In addition to that general body, would you have individual trained additional mentors and visitors over and above the actual installation process in order to assist with in-house displays and what have you?

***Dr Pennington:*** Sure.

**Q241 Dr Whitehead:** Is that right? How would they be trained? What would the process be?

***Andrew Ward:*** There is a variety of training that our staff will go through. One of the main challenges the individuals on the doorstep will find is that there is a different engagement strategy completely. Right now in the UK we will install meters but without the need to convey to the customer how an in-home display might work, how the meters will bind together, how the process of a smart meter will mean differences to their own lifestyle. Individuals in our office-based environment will support that process in terms of the initial engagement to make the appointment, the initial engagement to explain how the meter will work. We are educating our own staff right now. We went through this process to support our initial pilots to make sure that any queries that came back in—so we have learnt from that. We continually learn from what we have done already to refine and make it as efficient as possible.

***Tony House:*** Our estimate is that we are going to need something like 1,700 staff on the road to be able to deploy meters in volume. We are investing heavily in upskilling and recruiting to achieve that capability, both from an operative installing the meters but also providing the consumer education piece. We have established a smart training centre in Wales where we are able to offer that training to our staff and new recruits now, and we are looking to roll that out regionally across the country to create youth opportunity as we move forward.

**Q242 Dr Whitehead:** Some of those people who you will approach will obviously be coming back to you and raising concerns about privacy or health or a combination of them. To what extent do you have experience of that so far and how might this system that you are describing deal with it or accommodate it or perhaps place it into an exceptions category that you deal with by means of an opt-out or other processes?

***Andrew Ward:*** I think if I maybe draw from our global company and give you a real experience. In deploying the 600,000 meters in America, they had a number of objections from a health perspective—not so much a privacy perspective—and with the support of the local government they engaged third party experts. The third party experts were able to confirm that there were no health risks to the smart meter being installed. As a result of that, it was a third party expert who then communicated that process. From the point of view of the UK, the Central Delivery Body would, therefore, be a vehicle that would help to communicate that message back to the consumers.

***Paul Spence:*** It is very clear that the vast majority of the trials so far have been trials that have been run with volunteers. We have not yet had the equivalent of one of the things we had advocated, which is a programme where essentially we try for real the full scale of all the suppliers, the Government, the Central Delivery Body, all trying to sign up customers in a particular area and how we can find ways to reach the concerned and the unwilling. Our experience when we have tried a geographically focused trial—pick the area, Low Carbon London—it is more difficult than we expected to reach consumers in the first place. There are a lot of those consumers, when we do reach them, who are just genuinely not interested in wanting a smart meter. Even when they do, convenience for the appointment means that we do not fulfil or their building means we can't fulfil. All of those are things that we need to learn as we go through and to do it we would suggest will take some real scale co-ordinated trialling.

**Q243 Dr Whitehead:** However, there will be, I guess, a number of customers who will simply want to opt out at the end of the process for various reasons.
***Paul Spence:*** Absolutely.
**Dr Whitehead:** What sort of protocols might you be developing for the knowledge that those people will simply want to opt out? For example, are you envisaging that if they opted out they would be charged for opting out, or would they just opt out and receive the service that they would have got had they not had a smart meter in the first place?
***Tony House:*** We have a mandated obligation to demonstrate that we have taken all reasonable steps to encourage customers to take smart meters. We are keen to have that determined so that we all know where the bar is, effectively. Once we know that, we can then start to address those concerns and try to work through and maybe adjust the approach through the initiatives that we might have ourselves, and particularly through the Central Delivery Body, to try to break down some of the barriers that hopefully the minority might push forward.
***Andrew Ward:*** I think I would hope anyway that through good examples we can share across the UK consumers will actually see the benefits of smart. The example I gave earlier of the American deployment for our company, we had an 8% opt-out, so we had 8% at that point in time. Through sharing a lot of the experiences, we managed to decrease that opt-out a point, but ultimately, because it was a roll-out that they deemed needed 100%, they introduced a charge that was as a result of still having to read the meter, still having to recover the cost of potentially the bills, the amended bills, the whole process that we are trying to introduce for efficiencies in the UK and savings for the UK consumers. As a result of that—and that was supported by the US regulator—they managed to reduce the opt-out to below 1.5%.

**Q244 Dr Whitehead:** Are you saying that that would be your preferred route, to use best efforts to get the totals up and then charge those people who did not under any circumstances want a smart meter to cover the costs of somebody going round and reading the dumb meter further?
***Andrew Ward:*** It is one of many options but I think we are not anywhere near that point yet. We need to develop and produce a good communication strategy and just wait and see how that develops.

**Q245 Dr Whitehead:** Is it the general view that you think this will not be a significant problem and therefore you have not thought about it yet, or it will be a reasonably significant problem and therefore you may need to have strategies in place to either charge or to further encourage or to run parallel systems? It seems a little unclear.
***Paul Spence:*** The first piece about getting clarity about what the level of expectation is as a first step I think is something we absolutely share. We are not clear what reasonable means yet with a definition that we can be confident will allow us to say that we know the bar is there and then here is how large the group is that we are potentially looking at. Once we are in a position to do that, I think we are then in the position to work with DECC and look at the options for what to do with that proportion of the public who really do not want these meters.

**Q246 Dr Whitehead:** So you have not thought about it yet really? For good reasons, I understand but—
***Dr Pennington:*** As an industry, those mechanisms have not been defined. We have a target to achieve 100%. We are organising to try to achieve 100%. We would like good understanding of what all reasonable endeavours means, because if you have a refuser you have called 14, 15 times that is not a great customer experience. Going to an extreme, that is not a great customer experience. I think it is only as we progress through the roll-out that we will start to understand what that looks like and then have a conversation with the regulators about what we need to do about it.

**Q247 Dr Whitehead:** You have a separate issue, have you not, between what you might call urban refuseniks and possible rural unreachables? Are you confident that the DECC suggestion that there should be 97.5% coverage on present comms arrangements can really be achieved?
***Tony House:*** That is clearly a concern for SSE particularly, given that we have a significant customer base in the northern reaches of Scotland, which is a likely area where communications might be difficult. We are reliant on the DCC to be able to provide a service and recognise that those bidding for service provision for communications have primary, secondary and maybe even tertiary solutions to drive the level of coverage that we would need to see. It comes back to key enablers that we have talked about previously. One of the very important key enablers is to ensure that we have that wide area network coverage in line with our roll-out projections, otherwise we will have to be selective as to where we go and that leads to a poor customer experience. Alternatively, it may be that we arrive at premises and we have to walk away because we do not have comms. Again, that is not driving a good customer experience. For those reasons, we see that as a strong key enabler.

**Q248 Dr Whitehead:** Have you between you experienced any problems that you might think are worse than they might otherwise be? For example, on the distinction between a theoretical coverage and an actual coverage relating to where meters are in cellars or what particular barriers there are, not necessarily just in rural areas, to actually getting that level of coverage in real life situations as opposed to those theoretical protocols.
***Andrew Ward:*** The trial we completed last year on the communications was very positive. We saw coverage in the region of about 98%, which was excellent. We were very pleased with that. However, in the deployment of our 35,000 meters we have seen communication challenges down to the property type, so we know we are going to have challenges around high-rise flats for their meters. We know we have challenges in communication in our experience of houses that were built in the 1800s or thereabouts with extremely thick solid walls. We have some challenges

with new builds because new build has insulation with foil on the exterior and that impacts on the signal from the meters. It is just some properties. We also have challenges with some properties where you genuinely can't quite understand why there is, for example, not a telecommunications signal. That is there and part of the survey we are trying to do at the moment is to try to understand what the barriers are. At the moment, I do not know yet what the comms solution is across the UK. Once we know that, we can be far more informed about where the potential gaps are.

***Tony House:*** I think it recognises the fact that any meters that we are deploying at the moment are necessarily on a suboptimal comms solution because the DCC is not in place. We are trying to utilise a platform that is not primarily focused at smart metering. When the DCC is established, then we will be in a different perspective and we will have something that is designed and fit for purpose.

**Q249 Sir Robert Smith:** I obviously empathise that from West Aberdeenshire and Kincardine with the solid walls in the rural area, with mountains, it is going to be quite a challenge. This morning we had a witness who argued that the Spanish experience of power-line carryovers would have been a cheaper and more effective solution if the Government had taken it. Is that something you have thought about?

***Andrew Ward:*** Yes. From the comms perspective we have engaged DECC as a potential solutions power-line carrier and we have offered that as a solution.

**Q250 Sir Robert Smith:** As a universal comms or just—

***Andrew Ward:*** I think for the UK there is a question, which is will one type of communication be sufficient for the entire UK? I genuinely believe it will not because of the challenges of meters in basements and the different types of properties. I think we will have to deploy a variety of communications. Power-line carrier could potentially be one of those.

**Q251 Dr Whitehead:** Would you say between you that perhaps you are very politely saying that you think the 97.5% coverage is probably very optimistic?

***Tony House:*** I think it comes back to the point that there is probably not going to be one straightforward solution for this. Many of the comms service providers will have to have a primary, a secondary and maybe a tertiary solution. The power-line carrier point is quite interesting in the way that we have determined that we are going to roll out smart meters here, given that it is a supplier-led roll-out. Power-line carrier is necessarily a change to the networks infrastructure to provide that solution. You then potentially have a dependency on that infrastructure build from the networks businesses to provide the solution that the suppliers then need to be able to communicate with their meters.

**Q252 John Robertson:** As somebody who worked for BT for 31 years and understands the communications problems that have happened, if you are going to have this sort of communications through power cables who are you going to get to run it? There is a universal obligation here. Does that mean we are going to put that obligation on you to ensure that you get to every part of the country to deliver your electricity? There are some areas that you can't get to or you have difficulty getting to due to cost, where other companies in years gone by have just had to bite the bullet. Should we make that the same for you?

***Dr Pennington:*** One of the lynchpins of the DECC programme is the procurement of the DCC and the specification of the WAN coverage that we need. We have talked about second order, third order solutions within that to get to both building types and hard to reach properties. That is being run by the Government. We put our requirements in there and everything that we are getting back is telling us that they are going to deliver on their promise about the kind of coverage that we are after from a WAN communications perspective. There are a number of different technologies in there, everything from long-range radio to GPRS in the mix. They are running quite a comprehensive procurement there.

**Q253 John Robertson:** I do not have a rural problem of course, being in an inner city, but I do have the multi-storey concrete blocks, old housing problems. The communication companies have had that problem for a long time and had to overcome it.

***Tony House:*** I think DECC have recognised that we are ultimately users of the communication systems that will be provided by a separate licensee. We are not communications experts as suppliers, neither are the network operators, neither are any of the authorised users of the DCC ultimately. To place that responsibility with those that are the experts is the right thing to do to create that platform that we can then be users of, rather than us trying to design and develop something that is not our area of specialism.

**Q254 John Robertson:** What you are doing is putting the onus on the Government to solve this problem for you?

***Tony House:*** I would say what we are looking to do is to get the right organisations together through a competitive procurement process to deliver a solution that is designed and fit for purpose to meet the needs of smart metering for multiple users.

**Q255 Dr Whitehead:** However, you will have responsibilities about data access and quality of data access once the roll-out is complete.

***Tony House:*** Absolutely.

**Dr Whitehead:** Are you confident that all consumers will have equal access to energy use data?

***Tony House:*** The data sits on the meter. There is 13 months' worth of consumption data on the meter that can be downloaded at any time moving forward. While continuous communications to the meter would clearly be preferable, if there are periods when that communication is down for a period of hours, or potentially days at some point maybe, that data will not disappear. It will still be there and can be presented back to the consumer at their request.

**Dr Pennington:** So the consumer is the final owner of the data.

**Q256 Dr Whitehead:** A final thought. There have been some suggestions that the design of the home area network as being integral to the smart meter itself may have some security implications in terms not of the extent of data out but the extent of acting as a portal for data in, bearing in mind that that will be linked with all other elements of what increasingly will be comms-driven internal activities as far as homes are concerned. Some suggestions, particularly from the United States, are that a better solution would be to have that home area network not enabled or not in the smart meter and having the processes that that would have undertaken being done effectively via router and the internet. Is that a thought that you have looked at or experienced or are you confident that the way that the design is now evolving will not be subject to any of those problems?

***Dr Pennington:*** In terms of the mandated infrastructure—the home area network, smart gas meter, electricity meter, comms box, that whole pathway—that level of closed-loop security is designed into that network. How a consumer chooses to then use their data, perhaps through an internet connection to another third party, is their choice. In terms of the use of data for regulated purposes, we have security designed into that whole network. The issue around providing access to your own data as an individual consumer to other third parties will be a choice, I guess, for a consumer to decide how they are going to use their data, but we have security designed into ours.

**Q257 Dr Whitehead:** That is down to the consumer, although that is something that will be an integral part of what will be increasingly integrated home area networks for all sorts of things over and above the question of reading your real-time energy supply and providing information to energy companies. There will be all sorts of computer functions, home-controlled functions, possibly remote vehicle functions, all sorts of things that will be integrated with that system. Is that a concern that you may have?

***Tony House:*** I think we can secure the HAN through end-to-end encryption. From a security of the data perspective, that challenge has been addressed and is being recognised in the subsequent meter specifications. Having a live and real-time HAN does ultimately, moving forward, offer some great opportunity for all of us as consumers. There is a desire to introduce something called a consumer access device, which will create an interface between the data that is flowing within the metering HAN and be able to present that out into other broadband applications. Coming back to the point about how you can make the smart metering experience really much more exciting and interactive with other home management systems, security systems, healthcare systems, all of those kind of things, it will enable us as consumers to be able to stream that data in its raw state but then present it into other applications that can develop that data and turn it into other things that will become much more meaningful in a fully interactive home environment.

***Dr Pennington:*** That is about consumer choice of using that pathway.

**Chair:** Thank you all very much. That is helpful and interesting for us.

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## Examination of Witnesses

*Witnesses:* **Stuart Rolland**, Managing Director, Smart Metering, British Gas, **Don Leiper**, Director of New Business, E.ON, and **Darren Braham**, First Utility, gave evidence.

**Q258 Chair:** Good afternoon and thank you very much for coming in. You probably heard the previous evidence. We are going to cover pretty much the same sort of ground, if we can. You now have the quality of the Committee rather than the quantity here. I will start by asking, as I did the previous witnesses, how many gas and electricity smart meters you have installed so far and what smart metering trials you have been involved in?

***Stuart Rolland:*** In terms of British Gas, we have installed nearly 1 million meters between both business and residential customers. In residential customers, the number is about 624,000 as at the end of April, and slightly more electricity than gas in that mix as we have done some electricity-only installations. In terms of trials, a large part of our effort has been to get up and running the first SMETS-compliant meter technology. We were successful in doing that during last year, so we are now rolling out SMETS-capable meters. We have now hit about the 50,000 mark in that regard. Those trials have been quite difficult. It has taken probably a couple of years to get there, but we have now got to the point where we are getting very high levels of meter read-through and, very importantly, we are achieving 100% success rate in over-the-air upgrades, which is the essential part of the technology to achieve change of tariffs, change of mode switch, that sort of thing. That is probably the most significant aspect of our trials.

We have also trialled specific customer groups such as prepayment customers to understand what their propensity is to use time-of-use tariffs. We have trialled in social housing environments working with housing associations to determine if there is a difference with social housing tenants. We have also been part of a very significant trial in the northeast of England, the Customer-Led Network Revolution, which is testing effectively the potential for smart grid technology in the future; that is hand in hand with Ofgem. A very interesting part of that trial is to understand whether you can shift consumer behaviour in terms of when they use energy out of the peak period. We have had very good early results indicating that you can shift about 14% of the peak usage, which is very significant actually in terms of the overall objectives of smart metering.

***Darren Braham:*** We have rolled out about 30,000 advanced meters, principally dual fuel. There is a

small proportion of electricity only. That includes about 5,000 SME customers, so that represents about just under 20% of our overall customer base. Being a smaller independent supplier, our focus has been to roll out smart metering from the start. We are currently trialling a new technology, so SMETS 1 meters. We have installed about 1,000 electricity only, and so far that is going very well. We have had good success in terms of communicating to those meters, bringing the data back into the back office so that we can pass on the information to our customers. Our next step is to trial the SMETS 1 gas solution, which we are doing over the next month or so.

***Don Leiper:*** From E.ON's perspective we have rolled out 210,000 meters now, of which 66,000 are gas and the balance are electricity. In trials, our focus is on making sure that we have the roll-out process as smooth as possible for the installation process with our customers and how we interact with them—I am sure we will get on to that in more detail through the course of the afternoon—and for ensuring the back office processes to support the meters, to build them and so on, are as smooth as they can be.

**Q259 Chair**: Will any of the meters installed by British Gas have to be replaced because they are non-compliant?

***Stuart Rolland:*** The meters that we are currently installing—and there are 50,000 of them already installed—are SMETS 1 capable and will be part of the enduring phase, and therefore there is no question of them coming off the wall. We are now on our fourth meter version and so there are older types of meter on the wall, including what we call the phase 2B of which there are probably 500,000. They are actually smart meters inasmuch as they provide remote meter reading, they have an IHD, they give the customer all the benefits that the customer is looking for in terms of smart metering but technically they are not SMETS compliant. Technically they should be replaced before the end of 2020. In reality they are performing a very good service for customers today.

**Q260 Chair**: More generally, will customers who had smart meters installed early on have meters that are less smart than the SMETS 2 compliant meters that come later?

***Darren Braham:*** No, I do not think that is the case. I know it goes against some of the messages you heard in the earlier session, but fundamentally this is about delivering the benefits to the customer, so whether it is an advanced meter or a SMETS 1 meter, particularly SMETS 1, that is a specification that has been agreed by the industry. There is no reason why it should not remain there in situ; it delivers the benefits to the customer. This is about providing the information from the asset—at the end of the day it is a communication device—and it is how you communicate it back to the customer so they can realise the benefits. As Stuart was saying, customers we have on advanced meters get the same information, they receive pretty much all the benefits they would receive from a SMETS 1 or potentially a SMETS 2 meter.

***Don Leiper:*** I would add a couple of points to that. In our trials with Age UK, we asked the customers who we rolled out meters to what they perceived the most important benefits to be, and they were accurate bills and not having a meter reader coming to the property. Both of those benefits will persist under any scenario until the very tail end of the roll-out when they need to be replaced and they will just be replaced by a SMETS meter. In addition to that, I think the idea that SMETS 2 is the be all and end all and will be the final version of life is probably not accurate. Earlier we referred to the idea of iPads and iPhones and so on not being around a few years ago. I think SMETS 2 will develop into SMETS 3, SMETS 4, possibly SMETS 5, before the end of the five year roll-out. It would not surprise me at all. That is certainly the experience in other countries as they evolve. Yes, there are some features and functional differences but I do not think they are significant. Certainly we will be able to, pre the DCC, communicate to each other about meter readings and inform each other; that is a requirement of us come next year, and so those two critical items will be persistent through the process.

**Q261 Sir Robert Smith:** I think you have just answered my question. If you have an early smart meter that is not SMETS and you want to switch suppliers, can you just keep the meter?

***Don Leiper:*** You can keep the meter and from next year we will have to communicate with each other to inform each other of the meter reading. There may be some features which are not completely functionally interoperable, but nevertheless the basic features will be okay.

**Q262 Chair**: How do you respond to criticisms about the roll-out being too industry-led?

***Don Leiper:*** Do you want me to take that one? I think this is a good example of where the industry does not necessarily always agree with each other, from one of the comments the gentleman was making earlier. We would have been happy for this not to have been put further back in time, although we do accept that the DCC needs to be in place properly, without which we will get into long-term difficulties, I think. We do not necessarily always agree about this and from our perspective it is really important that this is about customer benefits at the end of the day, so that is why we are doing some early roll-outs because customers like this. Customers appreciate us, they trust us more, they have a much better customer care score with us if they have smart meters than if they have not. They get the benefits early, so from our perspective it is important that we continue to get those benefits to customers as early as we possibly can. From our perspective, therefore, it is not just about industry, it is about customer and industry.

***Darren Braham:*** I think from our perspective, although it is an industry-led programme, as long as we have flexibility to offer smart services to our customers it achieves the objective, which is delivering what the customer wants and enables them to reduce their consumption. The fact that it is an industry programme should not hold up a supplier's

approach to rolling out smart, and I do not believe it does at this stage.

***Stuart Rolland:*** Just to build on the point of it being a customer-centred roll-out, that was one of the very important reasons why we went for a supplier-led roll-out. Because the supplier has a relationship with the customer, as was said earlier, all of us have a strong interest in really impressing that customer with the installation process and making it a very value-added experience, to get the industry away from just being a commodity supplier to being a more value-added supplier of energy services, effectively. We have had incredibly positive feedback from customers who have had smart meters. We have customer satisfaction ratings that are about 40% higher from smart meter customers than from standard meter customers. Our retention rates are much higher, so they stay with us longer because they like the service, and our complaints level from smart meter owning customers are about 40% less. The contact that they make with us as a company is significantly less as well, so it is a much more hassle-free energy experience.

Certainly from British Gas's point of view we have made the customer really very much at the heart of this, which is one reason we brought our installation force in-house. Rather than having 10 contracting forces as previously, we now have a unified British Gas installation force of about 1,200 engineers. We do not call them "engineers", we call them "smart energy experts", and the reason for that is so that they can really give quality advice to customers at the time of installation. We are now developing additional services and products, which are smart enabled, to really retain the customer's interest and engagement in smart metering beyond the installation stage. We have just rolled out the first smart energy report, which is a web-based document that they can access and it gives them tremendous granularity and insight into where they are using energy in the home and how they can save. The customer is really at the heart of everything in this roll-out for us.

**Q263 Chair**: Will you be able to co-ordinate your activities, given that you can all have your meters installed in adjacent properties or indeed in fact in some cases in the same property, I dare say, if there is more than one occupant? Is that going to be something where co-ordination is effective?

***Stuart Rolland:*** We have always suggested that co-ordination would be a very difficult approach and we certainly have an understanding that even within our own company it can be difficult to get to the same house at the same time. So if you have gas supplied by one company and electricity supplied by another, the idea of getting two companies to turn up on the same day to make a meter exchange is really not feasible. There are many other reasons why a co-ordinated approach was not advisable, not least of which is the fact that a lot of the assets out there are quite young. The idea of taking a young meter off the wall rather than a meter that is at the end of its life is really not very sensible in terms of achieving the most economic roll-out. It would have added a lot of cost to the programme in terms of stranding costs of younger standard meters and that would have ultimately been a cost to the consumer. Also you are unable, in a street-by-street roll-out, to answer the requests of your customers most interested in smart metering to get them a smart meter when they want it.

For all those reasons we did not feel that that co-ordinated approach was feasible. As I think was remarked earlier, co-ordination around dealing with tall building solutions would be welcome and probably a more efficient approach for that specific customer base.

***Darren Braham:*** Certainly from our perspective we would be against a street-by-street approach, which was one of the methods debated early on in the programme, simply from the perspective that it takes away the control of rolling out from the supplier. As a fairly new entrant wanting to offer these smart services to our customers, that would have been a significant detriment to competition. We approached it slightly differently, so we did not feel it was the right approach.

The other thing to mention is that you gain a lot of benefits by achieving reasonable density. If an engineer can install half a dozen meters in a day, they do not have to be properties next to each other. As long as they are able to have sufficient density in a local area, that should bring down the cost significantly, so I do not think there is necessarily a significant cost disadvantage of not going street by street as well.

Again, echoing what other people have said, when it comes to apartment blocks you definitely need a more co-ordinated approach. It is almost a kind of bespoke approach and that will be a challenge for the industry definitely.

***Don Leiper:*** It sounds very attractive to do what you have described in terms of street-by-street, house-by-house roll-out, but in essence that argument was lost when we chose to have the supplier-led roll-out. There are benefits for doing it on a street-by-street basis to counter some of the benefits we have talked about here, but that argument was lost several years ago and to try to do it within a supplier-led roll-out would be extraordinarily complex.

**Q264 Chair**: We heard a bit about key enablers—EDF was talking about that. Do you agree that we have to have those in place before we can have a successful roll-out?

***Stuart Rolland:*** Our view at British Gas is that the really key enablers are already in place in as much as DECC required the industry to develop standard solutions and specifications for meters, for concepts, for IHDs, and establish what communications protocol was required to make smart metering work; and indeed in the foundation stage we have used those in order to build an infrastructure that absolutely works today. There are obviously developments that have been referred to by others as the key enablers, which include the establishment of SMETS 2, and a fully tested end-to-end DCC. We do not regard them as key enablers for starting roll-out. They are the key enablers for finishing the roll-out and making it as effective as possible. I think it is very important they are not regarded as prerequisites for starting roll-out because if we do regard them as prerequisites, it will

be 2018 before we really start as an industry. There is a very significant distinction to be made between an enabler and a prerequisite.

***Don Leiper:*** Yes, I would agree with that. The points that are made by EDF and others who talk about the key enablers are valid. They are sensible issues and risks that are faced by a very large programme of this magnitude and scale and they will need to be addressed over the course of time, but they should not stop us moving.

***Darren Braham:*** A couple of points. One of the key things to enable the start of a mass roll-out is having sufficient coverage, so not only the wide area network but also the home network. At the moment we are using ZigBee at a certain frequency, 2.4GHz, that does not necessarily propagate that well. For example, if you have a gas meter on the outside of a property, an electricity meter under the stairs, it may struggle to connect and for that matter also to display. There is a concern that you are going to turn up to a property and leave the customer with smart electricity only and have to come back in the future when we have a more complete set of HAN technologies so we can get to that sort of complete connectivity. To enable the start of a mass roll-out for the whole industry we do need other home area solutions.

The other area that might be worth talking about is the whole area of time-of-use tariffing. One of the areas where we can see significant consumer benefit is shifting load and, as British Gas was saying, there is some data there that would evidence the fact that you can save some money by encouraging consumers to move their consumption. However, unless settlement, the way energy suppliers pay for their energy, catches up with this time-of-use tariffing, there is no incentive to deploy the encouragement to consumers to shift their consumption or reduce their consumption, particularly when it comes to gas because you have a settlement system that is fairly archaic. There is an annualised quantity that is set once a year and you are stuck with it for a whole year, so if a customer reduces their consumption we pay the same, irrespective of what the customer actually consumes. That is a real problem that needs to be addressed by the industry in order for us to see the true benefits flowing to the consumer.

**Q265 Chair**: Last week DECC announced a new timetable, putting back the mass roll-out by a year. What do you think about those new dates?

***Stuart Rolland:*** We were not particularly surprised by the announcement, Mr Yeo. The scale of the programme is very significant. I guess our feeling was that we in British Gas were happy that we could achieve what was required to be done by 2019 but in truth, looking across the industry, there has not been enough progress made in foundation by other suppliers to have made that perhaps a realistic date. Moving to 2020 was a pragmatic decision, in our view. 2015 was also a pragmatic decision, inasmuch as the complexity of setting up the entirety of the DCC in the time allowed was going to be quite challenging, in our view, given the problems that we have seen setting up our own infrastructure in the last few years. That said, I think our grave concern would be that the moving of the start date might be seen as a reprieve and an opportunity to continue not doing very much in foundation stage. So while the date is moved back to 2015, in terms of the start of so-called mass roll-out, we would very much encourage DECC and the Government to make sure that there are incentives in place to make sure that everybody starts participating in foundation stage. It makes it all the more important, frankly, that people do participate in foundation and start getting some volume into the marketplace; otherwise again 2020 will become unrealistic.

***Don Leiper:*** We support that view completely. Certainly we would not have been unhappy, as I said earlier, if the roll-out date had not gone back but we do need to be pragmatic about the DCC. It is an important part of the long-term solution. Our philosophy had always been that five years after the date the DCC goes live is a reasonable timescale, if you look at how other countries have done this and the pace that they have rolled out, and we stick with that. If the DCC goes back, then we accept that it is reasonable for the end date to go back as well, but we would really encourage people to put their shoulder to the wheel and get on with it. We are learning lessons, and others who are doing more in the foundation stage are learning lessons that others may benefit from over the course of time. Everybody should be putting their shoulder to the wheel and cracking on at the moment.

***Darren Braham:*** I think it is a sensible and pragmatic approach. As I mentioned earlier, it will allow us to have a complete set of home area technologies, allow the DCC and the whole end to end process to be fully tested. It makes a lot of sense.

**Q266 Sir Robert Smith:** If they change the date, are you still confident they will not have to change the estimate of the net benefit of £6.7 billion? Do you think that is a robust figure?

***Stuart Rolland:*** If I can comment on the figure as it stood when the date was 2019, we think that the benefit could be significantly greater. There was a report produced by Oxford Economics, which is a respected consultancy, at the end of last year that indicates that the net benefit could be considerably higher, based principally on getting greater consumption savings. The original impact assessment assumed that consumers would achieve around about 1% to 2% of consumption saving. The Oxford Economics report indicates that that should be expected to be nearer 5%. Our view is that we are pretty comfortable with the cost benefit analysis of impact assessment. There are obviously line items that will go up and down, in our view, but broadly speaking it is readily achievable and we would hope that consumers would see even greater benefit.

In terms of the impact on the cost benefit of moving the date out by a year, it does not make an enormous difference because there were inefficiencies in having to build up a very substantial engineer force, for example, for installation for use over a very short period of time. In fact there are some efficiencies and savings made by being able to smooth that curve. Instead of building up what for us would be about a 3,000 or 4,000 engineer force to achieve the 2019

deadline, we can probably build up an engineer force that has 500 or 1,000 people fewer in it and then fewer to find new opportunities for thereafter.

**Q267 Sir Robert Smith:** Do the other two witnesses share that confidence?

***Darren Braham:*** I think in terms of benefits at 1% or 2%, the impact assessment is very conservative. We are working with a company called Opower, a US software business. It is part of our analytic platform so it allows us to do comparisons between similar types of homes. That has been deployed in the US to about 15 million users, and across a very large sample. Simply by providing a simple comparison of how you are performing against similar demographic homes, that has reduced consumption by 3%. So a very straight forward comparison on a bit of paper led to very significant savings and, as I say, we are using that as part of our data analytic programme, part of the information we share with consumers. Our experience would indicate that the impact assessment approach is pretty conservative.

***Don Leiper:*** I would add that I think there are other benefits that are not featured in the impact assessment at all. There will be two additional benefits particularly. One is that network reinforcement activity will be reduced in cost if we get the smart metering information rolled out appropriately across the network businesses, and therefore we should see a lower cost coming through from the network businesses to consumers. I also think that if we get this right over the course of time, what the DCC will do is it will allow us to massively simplify our industry. There are huge amounts of complexity behind the scenes that customers do not see except in the form of problems that we potentially create for them with poor data quality. This should enable us to radically simplify the industry over the course of the next five to 10 years, which should in turn see lower costs to us as energy suppliers, which will be passed through to customers in due course.

I think the benefits are potentially understated for reasons other than the energy savings that customers should see for themselves and I do not think the costs are overstated. That kind of cost per installation and unit cost of meters should arrive in due course.

**Q268 Sir Robert Smith:** How do you convince the customers that you have passed through the benefits?

***Don Leiper:*** That is really a functioning of the competitive market in reality. As it is constructed at the moment, the business case for the impact assessment says energy companies will save a certain amount of money but they will spend more money than that in putting smart meters in, so the unit price of a unit of power or gas will actually rise on the back of this but the savings to consumers then dwarf that or overcome that, and as such they end up with a lower overall net bill. Usage is lower but the net cost is higher, so the competitive market has to function in order for the customers to see the benefits.

***Darren Braham:*** Yes, I think that is right. The key message is about helping the customer bring down consumption. The reality is we are in an environment where energy prices are on the increase, not just because of this particular programme but because of various other costs in the whole value chain, and the only way to alleviate that is to help the customer bring down the consumption and smart metering has the capability to do that.

***Stuart Rolland:*** I would support those comments

***Don Leiper:*** One other point I would raise as well is that the more you learn, the earlier you learn, the more the chances you have of having a lower cost, higher quality implementation. That is the reason why we are choosing to adopt the approach that we are adopting to get significant experience prior to the DCC going live, because we think that gives it the potential to have a lower cost roll-out.

**Q269 Sir Robert Smith:** One of the other things we pursued with the previous set of witnesses is the debate over the timescale of the feedback to the consumer. It started out as in-home devices but rapidly people are saying they are a limited technology and we would be better off not spending the money on an in-home device and using other smarter means of communication.

***Stuart Rolland:*** I was in a consumer focus group two weeks ago and in that group we had about 15 smart meter users and about 15 non-users, and there were some tremendous insights that came out of it. What we found is that the level of engagement at the time of installation and individually thereafter with in-home display was very strong but it does not remain the centre of attention in the home for a very long time. It is very important to build engagement through richer insight into energy usage than just having an in-home display. I myself have a SMETS 1 meter and an in-home display and initially you get a lot of insight from it just by switching on and off various appliances around the house. You find out that the television on stand-by, for example, uses just as much as when it is full on and you have some learnings in that initial period of a month or two when you really do condition your behaviours differently. However, the key, frankly, is retaining engagement thereafter, and I think that requires probably an interface through internet offered options such as a webpage, such as the personal energy report that we are already rolling out.

In that context, I would agree with some of the comments made earlier, which is that most consumers will probably want to use what we would call a virtual in-home display, which could be on a smartphone, on a tablet, on a webpage on a computer. We believe that should be probably an option instead of giving an IHD. IHDs will have a role to play—certainly those customers who do not have access to smartphones and tablets should be offered an IHD—but there should be greater optionality and it should not be an absolute requirement to provide an IHD.

***Darren Braham:*** I totally agree. In our experience, our customers do not necessarily want a display. Where we have deployed displays, they are a limited use. There is an initial kind of interaction and usage and then what quite often happens is they are left alone and end up in a kitchen drawer. We think the enduring benefits do come from providing the information through a web interface or providing the sort of comparison data to similar homes that drives

enduring behavioural changes and not through a display that primarily will show instantaneous changes in consumption. They have a role to play for sure, but in terms of driving enduring changes and also perhaps more social engagement I do not think they are necessarily that effective.

***Don Leiper:*** I am not completely sure. I think you are doing them a disservice actually. Our research from our customers suggests that after 12 months 94% of customers are still engaging with their in-home displays on a regular basis and 78% believe that they have changed their behaviour because of them. I do accept that they should not be the only method. I completely agree with all those aspects in that individual customers will want to do things in different ways, and also over the course of time energy efficiency is not the most sexy topic in the world. Frankly, we need to find creative ways of engaging customers about this very important subject on an ongoing basis and that will require us to do different things over the course of time, as you have just described. What you have said are the ones we can see at the moment and I am sure there will be more and different ones over the course of the decades to come. However, I would not sell them short too much. I think they are effective, in the early days certainly, and our research suggests that they have an ongoing effect beyond the "everyone just puts them in the kitchen drawer" view of life.

**Q270 Sir Robert Smith:** If you switch suppliers, do you just keep the in-home device you got with the original?

***Don Leiper:*** Yes, you would keep the in-home device and it would still communicate with the meter. It may not currently be updateable for tariff and those kind of things that would exist over the DCC, but it will still give you information about what you are using.

**Q271 Sir Robert Smith:** If it is going to be optional and someone moves house, the next occupant may be someone who does not have internet skills.

***Darren Braham:*** However, they can still ask their supplier for a display and under the licence conditions the supplier would have to provide a display.

**Sir Robert Smith:** So there would be no cost?

***Darren Braham:*** Yes, at no cost.

**Q272 Dr Whitehead:** Perhaps we could return to the question of consumer engagement. I think you heard some of the discussion earlier concerning how that might take place and certainly the general issue of how smart meters might work being taken on board, perhaps jointly through an implementation and deployment body similar to that employed by the digital switchover. Is that something your company is looking at?

***Don Leiper:*** Certainly, the CDB. Yes, we are very supportive of that. We have always been very supportive of the CDB being in place. I think it is really important that it is as independent as it can be from the industry and that it gets its information from further independent parties as well so it can be out in the press and the media confirming the benefits of smart metering, debunking myths and engaging with real issues where there are real issues to be engaged with. There are many of all three of those categories, I would say, and that sits alongside our own needs. From our perspective, a lot of the work we are doing at the moment is working out how to engage with individual customers at the point of installation, before it, during it and after it, developing what we call customer journeys for different classes of customer. We have a different journey for our vulnerable customers who, once identified, we treat differently throughout the process end to end and we have numerous different customer journeys to try to tailor the journey as best as possible. However, if you have the macro CDB view of life, trying to engage the whole public and give a good story around smart metering, and ourselves as individual companies then doing the same, I think those two things need to come together.

***Stuart Rolland:*** We are going to be major funders of the CDB and we are major supporters of it, and I would echo the comments that it needs to be seen as a credible independent body with full Government support. However, it needs to play that essential role of increasing awareness, and indeed not just awareness but excitement around what smart metering can offer. The observation we would make is that in the digital TV switchover, the above the line advertising campaign commenced about three years prior to the switchover. We are a little bit late in the day in setting this up, so we are very keen to see it very active as soon as possible. There are a lot of myths out there to be debunked, as was said earlier, so that is going to be an important part, addressing concerns around privacy and health, which really should not be major issues, and also getting people excited about engaging with energy.

There is a great appetite out there because, as we all know, energy costs are rising and customers are regarding this particular cost in the household as now worthy of serious attention. I do not think it will take a lot to get customers switched on to the significant benefits from getting better visibility and control of energy through smart metering, and the CDB will play that role.

**Q273 Dr Whitehead:** Right, but bear in mind that, as you said, in this particular instance you are rather late in starting that particular part of the process. When the mass roll-out starts it will not be, as was digital TV, everything rolls out in one place and then everything rolls out two years later in another place and everything rolls out a year later in another place. It will start across the country from the beginning, and therefore I imagine that body will need to be in place and working well at a very early stage. Are you confident that can happen in time, or do you think that will be a bit of an intermittent process?

***Don Leiper:*** We had an interview with the chief executive today and certainly the initial funding is being put in place for this year to get it up and running, with a view to it being fully operational from January next year. There is no reason to believe that timetable will be missed.

***Stuart Rolland:*** We are going to be a little bit pre-emptive. We are going to do a little bit of advertising

ourselves this year around smart metering to help raise awareness, because it is absolutely critical to make the roll-out efficient. What we have found is that probably fewer than half of customers contacted to make an appointment to put a smart meter in their home actually will say yes, and that is simply through ignorance, an assumption that this is something for the company's benefit rather than for their own. That really needs to be addressed as quickly as possible. We will do a bit of advertising this year and we expect CDB to be quite active from 2014.

**Q274 Sir Robert Smith:** In comparison, what were people's responses over the years to being contacted to say, "You need to swap your meter because it needs an upgrade"?
***Stuart Rolland:*** The typical response that we get today is that we probably have to contact 10 people to get four appointments.

**Q275 Sir Robert Smith:** What if you are just putting a dumb meter in?
***Stuart Rolland:*** Putting a dumb meter in is a little different, because at that point we are contacting people whose meter is totally at the end of its life and there is a recognition on their part that the meter has to be changed, so it is less—
**Sir Robert Smith:** So they are willing to accept that?
***Stuart Rolland:*** It is an easier sell and that is really purely down to maybe ignorance and a little bit of suspicion around what smart metering constitutes.

**Q276 Dr Whitehead:** What dealings have you had with people who have come to you citing privacy concerns or health concerns or, in some instances, claims that bills appear to be much higher once a smart meter is installed, possibly because the dumb meter previously was not very accurate whereas the smart meter is a bit more accurate? Are those the sort of issues that have been raised and how have you responded to them?
***Stuart Rolland:*** With regard specifically to concerns around privacy and health, there are customers who have concerns around them but we find it to be a very small minority, a very small percentage. Most of the reluctance to have a smart meter put in their home is just through ignorance of what it entails and the inconvenience of staying in for a day. You have to convince a customer that it is worth that trouble in order to have them make an appointment. However, the incidence of real concern around data and privacy is a very small number of people.
***Darren Braham:*** As far as I am aware, we have not had any issues from customers as regards privacy or health concerns. I would say that there is a very large education process that we need to go through to really explain the benefits of smart to consumers. We did a bit of work a year ago in terms of engaging with consumers on the doorstep, dare I say, and trying to explain to them the benefits, so selling a smart proposition. It was very challenging to fundamentally explain what they were receiving with a smart meter, how it differed from an in-home display and those sort of things. It resulted in a sales process that was probably three times as lengthy as ordinarily would have been the case in terms of just saying, "Well, we can save you money."
***Don Leiper:*** I would just echo that it is a tiny minority of customers who are concerned about these issues, but they are nevertheless real concerns and we are ready to deal with them as and when. As an example, I think there was a headline in a daily paper about "spy in your home" or "privacy issues", those kind of things, and the following day, of all the installations we were planning to do, we had five customers ring up to say, "We don't want to do that any more, we have seen this." That was a small percentage even the day after that kind of story, so it is not a concern that is deep in the public consciousness at the moment certainly, and nor should it be.

**Q277 Dr Whitehead:** That was the same newspaper, I think, that ran stories about "spy in your dustbin" when local authorities were suggesting they might measure the amount of waste that people were putting out, but I merely offer that for information.
Nevertheless, there will be a certain percentage of customers who simply will, for whatever reason, not accept a smart meter in their homes. What are your strategies and thoughts on dealing with that particular cohort of customers? We know from the United States, for example, that there have been different approaches. In some instances they have been charged substantial additional sums of money, in some instances the state troopers have gone around to their homes to install them; various ways of doing things.
***Don Leiper:*** I think in the early days we just marshal all the arguments for ourselves and do our best to persuade customers of what we believe the right thing to do is and why smart meters are valuable, and we believe that they genuinely are. The question you ask about state troopers is potentially for the very tail end of the roll-out. The previous group also talked about what the definition of "reasonableness" is around completion. That is a genuine question. I do not think it needs to be answered immediately but it would be good to get it answered in the not too distant future so that we can be clear about frequency of contact or what that means about being reasonable and so on. However, in the meantime I think we just do our best to persuade customers and if they absolutely refuse then they absolutely refuse and we move on.

**Q278 Dr Whitehead:** However, from your point of view as companies, how reasonable do you regard it, at the other end, of having to keep perhaps a disproportionately expensive meter reading team in place perhaps to read a very patchy group of meters?
***Darren Braham:*** Invariably what will happen is the cost of meter reading will go up as there are fewer people's meters to be read, so that is definitely an issue that we will need to deal with. We do encourage those customers who do not have a smart meter to submit reads themselves on almost a monthly basis and we get roughly 60% of our customers without smart who do that, so a very high engaged proportion of customers. However, it is a problem that we are going to have to address.
***Don Leiper:*** One example you cited from the US is that customers who choose not to do that are asked to

pay an extra cost, which I think is $10 a month or something like that, as well as a one-off charge for whatever reason. That may be where we end up in this country—it may not be—but it does not seem disproportionate to what the cost of a meter reading would be on a monthly or quarterly basis.

**Q279 Dr Whitehead:** Then we have, as I also mentioned earlier, the question of the extent of the 97.5% estimated coverage after all reasonable goes at coverage have been undertaken on the present comms basis. It has been suggested that that may be rather an optimistic suggested outcome, not just in rural areas but, as we have heard, in terms of problems of certain urban areas, basements and high rise flats and awkward buildings and so on. What is your view of that target and how far short do you think you will find yourself at the end of the roll-out period, in reality?

***Don Leiper:*** I do not think we know at this point. I do not think we can give a sensible answer to your very reasonable question because we do not yet know what technologies are going to be employed by the communication companies, and the key thing is they are communication companies. They are being tasked with 97.5%. They will come up with strategies for executing that and they may have multiple strategies for doing that, and if they do not they will no doubt be held to account. However, in reality we are not communication companies and the experts are being asked to do the job. We will obviously work with them to do what we can, and work with Government and them to try to get the optimal solution, but until we know exactly what they are going to do it is really hard to answer your question. All the points about difficult properties we understand.

***Darren Braham:*** I think they will have to deploy a number of technologies to get close to 100% but I am also concerned about the within home, the home area network, in terms of the success rate of binding the display to the electricity meter and the gas meter as well. I think that could be more of an acute issue actually.

***Stuart Rolland:*** Our concern on the 97.5% is how quickly it can be got up and running. If you look at other networks, mesh-based networks, radio-based networks, they will get to that level of coverage but how long does it take to achieve that because mesh needs a sort of critical mass in a given region to achieve that. By the time the DCC goes live, we will have an engineer population of 2,000 or 3,000 engineers who we do not want sitting on their hands because they can't commission a smart meter in that particular region. For that reason we are very much of the view that the technology that we are currently installing, which is GPRS based and is very successful and being installed today, should continue to be installed if necessary as the enduring phase of the mass roll-out phase commences so that you do not have a cliff edge between one technology and the next.

There needs to be some accommodation as a contingency plan, in case the 97.5% is not achieved from day one, that we can continue to use GPRS. In any event, I suspect, as others have said, there will continue to be a mix of technologies to reach as many properties as possible.

**Q280 Dr Whitehead:** When you say you do not know, I appreciate you are not comms companies and it is a comms issue, but you will be left with the properties that will not have smart meters at that point for whatever reason, and therefore they will be the same in principle as what I have called the urban refuseniks.

***Don Leiper:*** Yes, but I also think that in the first year or two of the roll-out the likelihood is that the coverage will be quite extensive and we do not have to do everybody in the first 12 months. I imagine where we will get to is a constructive dialogue with the successful comms companies as to where their network strength is best and therefore where we will probably target our early engagement customers and roll-outs. It will not necessarily be a critical issue that it is not 97.5% on day one, although it might be a frustrating issue.

**Q281 Dr Whitehead:** Will there be a temptation to do the happy, the willing and the easy first and then, as 2020 approaches, increasing scratching of heads and resort to—

***Darren Braham:*** I think we have a slightly different perspective insofar as we are bringing on customers. Part of our sales message is smart and we pick up customers where we can. The point about technology is critical to us so we want a situation where we can carry on using GPRS, so if they do use some wireless technology that does not have the same coverage at the point of launch that would be a big problem for us because we do not have the luxury of saying, "Right, we will pick and choose you guys because we have coverage in that particular area." From a competition point of view and independent supplier perspective, that is an issue.

**Q282 Dr Whitehead:** Do you want to say anything more on your brief comment about your concerns about the ability of linking in a home area network to the process that you mentioned a little earlier? I mentioned earlier the question of whether the home area network could easily sit with all other networks in the home.

***Darren Braham:*** That is a secure network. Obviously once you have connectivity between the various parts of the metering system, that is secure. What DECC are talking about is a kind of bridge device, a consumer access device, that will talk to the home area network. There will be a mechanism for binding that in and having access to the data, but then it is really down to the customer. If they download the data on to their PC then it is really down to them in terms of how they secure their general information.

**Q283 Dr Whitehead:** Are you collectively saying, therefore, that the extent to which the customer may be insecure as a result is down to any sort of actions they may take otherwise, as in running a computer system without a virus checker or whatever?

***Darren Braham:*** I think it is incumbent upon us to make them aware of these issues, so if they do have

access to the data or they download it, we need to make them aware that if their whole system is not protected then it could be accessed.

**Q284 Dr Whitehead:** If you had, for example, read systems that you are using to reach customers, which send data between users, is that then a potential problem in terms of the relative insecurity of certain users who may be receiving and passing on data through their systems? Would everyone have to be really secure? Presumably they would be

***Stuart Rolland:*** Our understanding is that that kind of mesh system has been used in the States now for quite a few years without any issues around data interference, so it is regarded as a secure system.

**Q285 Dr Whitehead:** So it isolates itself. If you have half a dozen homes that are effectively computer driven in terms of their internal services and two of those have been bot captured, presumably that is a potential serious security risk for everyone who is coming into that system—for example if two persons' homes have computers that have been used to crash the Latvian national computer service by remote command or whatever.

***Darren Braham:*** It is part of the communication service provider's infrastructure, so it would be their responsibility to ensure it is appropriately secure. It is sitting on that side of the fence rather than on the consumer side.

**Q286 Dr Whitehead:** So when you can isolate what you are doing as far as smart meters are concerned from other concerns. Is that something you are confident on?

***Don Leiper:*** I believe that to be the case. I am not a security expert but I do understand that the security standards that have been set are pretty tight and have been set by security experts employed by the UK Government. We have our own security experts who have confirmed their view that that is a safe and secure approach and if those standards are met by the providers then we will be fine for data. I believe the issue you have described of hopping would be fine.

**Chair:** Thank you very much indeed.

## Tuesday 4 June 2013

Members present:

Mr Tim Yeo (Chair)

| | |
|---|---|
| Ian Lavery | John Robertson |
| Mr Peter Lilley | Sir Robert Smith |
| Albert Owen | Dr Alan Whitehead |

### Examination of Witness

*Witness:* **Maxine Frerk**, Retail Markets and Research, Ofgem, gave evidence.

**Q287 Chair:** Good morning. Thank you very much for coming in, and sorry we have kept you waiting a few minutes. Could I start by asking what Ofgem is going to do to make sure that the costs of this quite ambitious programme are kept down, and that the benefits are passed on by the suppliers to the consumers?

***Maxine Frerk:*** Yes. It is probably worth starting by saying that obviously there are some benefits that accrue to suppliers—and we are keen to ensure those are passed on—but there are a lot of benefits that accrue directly to consumers, in terms of the ability to better manage their energy bills, better customer service and so on. So I think it is really important to remember consumers will get a lot of benefits from this, whatever happens.

The costs and benefits that suppliers face, and the savings that they make through not having to have meter readers and so on, clearly we are reliant there on a competitive market to make sure that they do that in as efficient a way as possible and pass on the savings to customers. As you know, at the minute we have concerns about how competitive the retail market is. That is why we are doing radical proposals around the Retail Market Review that you talked to Andrew Wright about a few weeks ago. We are not there yet, but, by the time we get to mass roll-out, I think the market should look very different, and by that point we would expect suppliers to be under real pressure to pass those savings on.

**Q288 Chair:** Yes. I think in the present climate there is probably some degree of suspicion that companies are better at keeping the benefits for themselves than they are at passing them on to customers. Certainly the level of trust, after things like mis-selling, after the lack of transparency in some of their company accounts in the past, would not fill consumers—possibly not even this Committee—with confidence that this programme, if left entirely to the free judgment of the companies, will be entirely for the benefit of customers.

***Maxine Frerk:*** As I say, that is why we are taking a lot of action to try to make sure that we get a simpler, clearer, fairer market and rebuild trust. I absolutely agree with you, we are not going to have a successful programme if we do not have consumers engaged and a bit more trust in this market than we have at the minute. That said, relatively speaking, the costs of the programme are a small amount on consumers' bills, so it is important to see this in that context. I know DECC themselves will be doing a lot of work monitoring those costs and monitoring the benefits that are passed through, because ultimately they are accountable for delivery of that business case.

**Q289 Chair:** Consumer Futures has suggested that the programme could be made more efficient if the roll-out was co-ordinated with other energy efficiency schemes and fuel poverty schemes. What do you think about that?

***Maxine Frerk:*** There is quite a lot in there at the minute to ensure that we take the opportunity of the installation visit to make that as good an experience as possible. Part of Ofgem's role is that we approve the Installation Code of Practice. That sets out what suppliers can do, cannot do and must do as part of the installation visit. Within that code of practice, they are required to give customers general energy efficiency advice and to point them to places where they can get information. But then, having told the customer, "We are coming to install a smart meter", we don't want them to try to sell them energy efficiency products, so there are quite tough rules in that code about sales and marketing. There is a balance to be had between making sure that we are taking advantage of those opportunities and the obligation they have to identify vulnerable customers and offer them additional help. To link it up and make it a very different sort of programme, I think we would be worried because we have seen a lot of problems with selling on the doorstep. We don't want those sorts of problems fed through into the smart metering programme.

**Q290 Chair:** What do you think about the suggestions we have had from one of our witnesses that the SMETS 2 design was developed to meet the needs of suppliers, rather than consumers, and it will not add value to the consumer who ultimately pays the bill?

***Maxine Frerk:*** I do not think there is an issue there. There are things that have been thought about. Clearly parts of the design are aimed at enabling network companies to better manage into the future, to control loads and smarter tariffs. All of those things are ultimately helping consumers. As we get into a very different world where we have a lot more renewable, intermittent energy supplies, we need to be able to find ways to help the network companies and suppliers to better match load to that intermittent demand. A lot of the more sophisticated functionality that is in the meters is designed to make sure it is future-proofed to cope with that rather different world.

**Q291 Chair:** If you are a customer with a pre-SMETS 2 meter, will you be able to access the same products as people who have a SMETS 2 meter?
***Maxine Frerk:*** From a customer perspective... Ofgem has not been involved in the detailed design of the metering specifications. I am talking here based on my past experience. The functionality that is in those earlier meters gives customers the things that customers are most interested in, which are an end to estimated bills, the ability to see on their IHD how much they are using, the ability to access time-of-use tariffs and the ability to switch remotely between pre-payment and credit. The things that really matter to consumers are all in the early versions of the meters that are being rolled out now.

**Q292 Chair:** Do you know how many consumers are going to have to have meters replaced because they are noncompliant or do not have all the functions?
***Maxine Frerk:*** The last figures that were published by DECC show that, at September last year, there were just over 600,000 domestic meters of the pre-SMETS type. I think most suppliers are now installing SMETS meters. In many cases those customers would have had to have had a new dumb meter installed, so the question is whether it was better for them to have that early benefit. They were going to have to have a new smart meter or a new dumb meter installed in any event.

**Q293 Sir Robert Smith:** You have highlighted that you are going to rely on the market being efficient so that, in theory, if a company benefits then the consumer benefits because a more efficient company has a lower need for bills.
***Maxine Frerk:*** Yes.

**Q294 Sir Robert Smith:** What are the direct benefits that mean the customer can say, "Tangibly I am getting this from having this put into my house"?
***Maxine Frerk:*** The most obvious benefit that customers see is the in-home display, which allows them to feel much more in control of their energy use. Customers really like that, and most of them see that as being the smart meter. That gives them the ability to understand what is using more energy in their home and to keep track of how much energy they are spending in pounds and pence. Research shows that that enables them to understand their energy use and to put that into effect, in terms of making energy savings.
There is the first bit about putting customers in control of their energy use, leading to more efficient choices about how they use energy. Then there is the end to estimated bills. We know estimated bills is one of the things that causes most complaints. Customers will now be able to get an accurate bill and get much more detail about their past usage, accurate comparisons with their past usage, or usage of other customers. For pre-payment customers, I think it transforms the experience because they will be able to top up. If they have a bank account, they will be able to top up over the phone or online. The supply will not go off in the middle of the night if they run out of credit. They can easily switch back to credit mode from pre-payment if their circumstances change, and they will know how much credit they have left from their in-home display.

**Q295 Sir Robert Smith:** You say one of the benefits is accurate billing, which must be one of the basic benefits you would expect. Consumer Focus—now Consumer Futures—has questioned whether customers, who have experienced smart meters now, have actually been getting those accurate bills. Do you agree that there is an issue of whether the companies have the systems in place to deliver the accurate bills?
***Maxine Frerk:*** I know that there was an issue a year or so ago with concerns about whether customers were getting accurate bills. I think a lot of that was teething problems: silly things like suppliers not realising that, if a customer rang in with a read, now they should not take that read instead of the meter read that was coming from the smart meter; or if a customer switched to a supplier that did not support smart metering, obviously at this stage they would not be able to get an accurate bill. I think it was all put down to teething problems, and the suppliers were put on notice that they needed to sort that out because it was an important benefit for them.

**Q296 Sir Robert Smith:** Would there be a licence condition, going forward, that once you have smart meters you have to produce an accurate bill?
***Maxine Frerk:*** There are already various licence conditions around accurate billing, and this is something that we have looked at. I can't remember exactly what the position is, so it might be better if we send you a note to set out what that is.

**Q297 Sir Robert Smith:** Yes. It just seems that, of all the many benefits, the one blindingly obvious one should be an accurate bill, so if it cannot quite deliver that, it is going to—
***Maxine Frerk:*** Yes, and I think there are existing protections in there, but I can confirm that.

**Q298 Sir Robert Smith:** Does that mean the end of back-billing?
***Maxine Frerk:*** One of the issues is that when you go to install a smart meter, it may uncover problems that already exist. For example, if you have a meter that was wired up to the wrong property or something like that, it may uncover some of those problems. I think there is a concern that there may be a short-term increase in back-billing issues. However, once smart meters are in place, then those problems will be resolved and the existing back-billing arrangements should make sure that customers are protected during the roll-out.

**Q299 Sir Robert Smith:** All the more intangible benefits of lifestyle and managing your circumstances and energy efficiency, do you think those on low incomes are going to have more difficulty accessing those kinds of benefits?
***Maxine Frerk:*** The evidence that we have, from the EDRP trials that were carried out a few years ago, is that those on low incomes were getting similar levels of savings to other customers. Although they will almost certainly be being more economical with their

energy usage, they have more motivation to try to engage with it and to use that information to make other savings. The evidence that we have seen from EDRP, and also from a trial that National Energy Action carried out, was again that those on low incomes were managing in most cases to make similar levels of savings.

**Q300 John Robertson:** On the low incomes, it is surprising that you say there was the same level of savings. What reasons were there for that? Did they know? Did they say?
***Maxine Frerk:*** As I say, they were motivated to try to find ways to make use of the information that they had in order to save energy. So they were looking for ways, and realised that some things did not use as much energy as they might have thought.

**Q301 John Robertson:** I say that because I wonder, was there any accent put on the fact that it could be the price that was making them switch things off? I know from constituents that they worry about running electricity bills up because of the price. Therefore, it would not be unexpected that the fuel poverty people were spending less when they were paying so much more for the actual electricity in the first place. Did they look at that, or was that not part of the criteria for the information?
***Maxine Frerk:*** They were done on the basis of having a control pilot. You had a control group that did not have the smart metering and another group that did, so one was able to compare and try to strip out the effects of things like price. Obviously, if price is what is driving them to want to save energy, what the in-home display is doing is helping them understand which things are using the most energy and, therefore, to make more informed decisions about which things it is important for them to switch off, or to realise that they have left things running when they did not mean to.

**Q302 John Robertson:** Would it be fair then to say that they did not look at the reasons behind the reduction? It was just that they had a reduction?
***Maxine Frerk:*** The EDRP was just that they had a reduction. The National Energy Action study did more qualitative research, looking at the way that they were using that information. Obviously DECC are doing further research at the minute to try to understand and everybody is committed to making sure that low-income customers are able to get those benefits.

**Q303 Ian Lavery:** The IHDs are expected to enable ordinary people, consumers, customers, to see the real-time energy costs in their homes, and basically in pounds, shillings and pence. How integral are these IHDs to help the customers and consumers achieve energy and bill savings with the smart meters?
***Maxine Frerk:*** They are a central part of the programme. They are what consumers think of as the smart meters. Again, going back to a lot of the research, EDRP and European studies have always shown that, with an in-home display, the energy savings are 2% to 4% higher than with other kinds of feedback, because it is there. There are pounds and pence, but there is also a traffic light system on the IHD that is very easy to see out of the corner of your eye, and people who find it hard to get to grips with numbers can see very easily, "It has gone red now. I am using a lot. What is on?" and think about whether they really need to have that on.

**Q304 Ian Lavery:** I fully understand that answer. In that case, why are suppliers not being obliged to provide non-domestic consumers with IHDs?
***Maxine Frerk:*** The way that non-domestic customers work is that different sorts of businesses will have very different sorts of needs. An IHD in the home is quite useful. In a business where you have a number of different people working in the business, it may or may not be a helpful device. Our expectation was that, if that was the best way of interfacing, non-domestic customers would either be able to buy their own IHDs from B&Q and get them installed, or that suppliers would offer them. It is not going to be appropriate for all businesses, so DECC did not mandate having an in-home display for non-domestics.

**Q305 Ian Lavery:** It just seems natural that, if the IHD in a domestic property, with a traffic light system for example, is a really good thing—and I tend to think that it is—surely it would be the same in small businesses.
***Maxine Frerk:*** The point is that small businesses are all very different. Whether it is a small office or a shop or a fish and chip shop, they are going to have different needs and different people managing their energy consumption.

**Q306 Ian Lavery:** How do you respond to the fact that some small businesses are saying that they are being treated as second-class citizens in the roll-out?
***Maxine Frerk:*** I am concerned that they feel that they are. Certainly, DECC have sought very hard to make sure that the views of small businesses and other businesses were taken into account. Indeed, I think many of them are getting smart meters earlier than domestic customers. It is an important part of the work. I know DECC are doing a lot of work now, starting to begin to understand how non-domestic customers are using smart metering and what the opportunities are.

**Q307 Ian Lavery:** Again, in terms of the communication with the consumer in the properties, for example, the EDF survey data from the Energy Demand Research Project showed that customers would have valued more engagement and instructions beyond the installation of their smart meters and the in-home displays. Will the forthcoming smart meter Installation Code of Practice specify a minimum level of information and support that must be provided to consumers upon installation of the smart meter and the IHD?
***Maxine Frerk:*** Yes. Ofgem has just approved that Installation Code of Practice. It came into force this weekend on 1 June. That specifies the information that suppliers must provide to customers as part of that visit. It covers non-domestic customers as well, so on that one not all of the bits apply to non-domestic

customers, but that Installation Code of Practice, in terms of the requirements and the information that must be provided, covers non-domestic as well.

**Q308 Ian Lavery:** Will there be a minimum level of information and support that must be provided?
***Maxine Frerk:*** To all customers, yes.

**Q309 Ian Lavery:** SSE Chief Executive Ian Marchant has said that the four-tariff cap proposed under the Retail Market Review tariff reforms will prevent innovation and will prevent customers reaping the benefits of smart meters. Do you think this is a distinct possibility? Do you think it is right what Mr Marchant says?
***Maxine Frerk:*** I don't think it is right. I don't know when he said it. In our latest proposals we are much clearer now that a customer with a smart meter can be offered either a choice of time-of-use tariffs or a choice of ordinary tariffs. In the last round of responses to our March consultation, none of the suppliers raised any issues about the restrictions of the four-tariff cap in relation to time-of-use tariffs, which they had been concerned about previously.

**Q310 Albert Owen:** DECC have stated on more than one occasion that no one will be obliged to have a smart meter. What percentage of customers do you anticipate will opt out of having a smart meter?
***Maxine Frerk:*** I don't think we know at this stage.

**Q311 Albert Owen:** Do you have any idea?
***Maxine Frerk:*** The experience in other countries has been that it has been very small percentages by the time they have got to the end of the roll-out. Initially there may be some customers who are a bit nervous but, by the time you get to the end of the roll-out, the experience in other countries is that they are 1% or 2%.

**Q312 Albert Owen:** It is a small percentage. As part of this inquiry, we have been to the United States—in California, for instance—and there was a vociferous group against. My next question is, with regards to the opt-out, will they be charged for it? Will the person who, on principle or for whatever reason, does not want a smart meter incur any additional charges?
***Maxine Frerk:*** On one level this is DECC's responsibility, in terms of the plans for the roll-out. I think our view is that it would be unfair at this stage in the roll-out to be charging a customer. For instance Mrs Smith has been offered a smart meter and turned it down but Mrs Jones who lives next door has not yet been offered one, so she would not face any additional charges. I think all the suppliers agree that this is an issue for the end of the roll-out, if it becomes an issue at all. At that stage—

**Q313 Albert Owen:** I hear what you are saying. Obviously we will ask DECC the very same question, but, from your perspective as a regulator, do you not have concerns that some people might not want one on principle but will be charged a lot extra for having an alternative, which they already have and do not want to get rid of and it is working perfectly efficiently for them?
***Maxine Frerk:*** At the minute, under our current RMR proposals, suppliers would not be able to levy that kind of charge, so our simpler, clearer, fairer set of rules precludes them from doing that.

**Q314 Albert Owen:** I hear what you are saying, and all this is in the future—the roll-out has been put back a year—but we are trying to establish what would be in the best interests of all the customers. Looking after that small percentage I think is important as well. As a regulator, you have said you have looked at other countries and you do not see there have been large numbers, but you do see some regimes in other countries where the regulator has had to intervene. In the United States there was a fixed fee for not having one, and then there was a monthly penalty levied at customers who have opted out. Do you see that kind of thing happening in this country?
***Maxine Frerk:*** It would not happen until we get to 2019, 2020, and it is very hard to look ahead that far into the roll-out.

**Q315 Albert Owen:** It is, but some areas are not going to start until then anyway. Some of the peripheral areas are not going to start, and there may be campaigns. The supplier should be able to indicate to those people, "We are going to come to your area in a certain time, and if you don't do it then there is likely to be a charge". I think that is perfectly reasonable, don't you?
***Maxine Frerk:*** It has been very successful in other countries in getting a number of customers, those that just can't be bothered to be at home or are quite happy. There are real costs to suppliers of maintaining two systems, so it may well be that in future we would say it was reasonable for suppliers to charge if there were additional costs.

**Q316 Albert Owen:** In the future, if there are to be additional costs, who would regulate that?
***Maxine Frerk:*** We have a competitive market. We don't regulate prices. What Ofgem has done in the past is say that certain prices count as discriminatory or "You can levy particular charges or not for different sorts of services". Ofgem could be expected to have an interest in that area, but we would not be regulating the level of any charges.

**Q317 Albert Owen:** From what I understand, the regulator in California—I don't know if it went to court, but there was certainly a hearing and it was reduced—said that those were unfair charges. Could you envisage that happening if they are too high in this country?
***Maxine Frerk:*** Certainly, if they are disproportionately too high, then there is the general consumer protection law and Ofgem has powers to enforce the level of incidental charges. California is in a regime where the regulator sets the prices overall, so has much more interest in the prices of those sort of charges than we do here where we have a competitive market.

**Q318 Albert Owen:** So the suppliers could get away with things in this country that they could not in California?
***Maxine Frerk:*** No. You have a competitive market that is setting the prices, rather than a regulator and a monopoly.

**Q319 Albert Owen:** If I could move on to small businesses. As my colleague said, some of them do feel second-class on this, that it is all for the domestic customers and not for businesses and non-domestic customers. With regard to free access to energy use data once the roll-out is complete, will this happen for businesses?
***Maxine Frerk:*** The licence conditions that DECC have put in place include the right for small businesses to have access to their data on request, so they will have access to that data.

**Q320 Albert Owen:** That will be free?
***Maxine Frerk:*** I might have to get back to you on that. I cannot remember whether it specifies that in the licence or not.

**Q321 Albert Owen:** With regards to the data being misused—and obviously this is a concern that some businesses do have—as a regulator, will you have a framework with the licence there that there will be a naming and shaming for some rogue suppliers, if they were to produce this for other companies or whatever and it is a breach of that licence?
***Maxine Frerk:*** There are some licence conditions about access to the data, so the domestic customer has a choice about who has access to their data. Similarly, the smaller businesses, micro-businesses are able to say that they don't want their supplier to collect the more detailed data about their usage if they are concerned about how it might be used. They have the ability to opt out, if they are unhappy, apart from the basic information that the supplier needs to bill them. How that information is then used is governed by the Data Protection Act, if they are sole traders, and it is the Information Commissioner who would then govern how that information is used.

**Q322 Albert Owen:** If I was a small business signing up with a supplier, I would have a little tick-box to say, "I want this limited data made available to certain people"?
***Maxine Frerk:*** Yes.

**Q323 Albert Owen:** In very small print at the bottom?
***Maxine Frerk:*** I hope not, but that is one of the many things that we will want to keep an eye on as it goes forward.
**Chair:** Thank you very much. That probably concludes our questions. Thank you for coming in.

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## Examination of Witnesses

*Witnesses:* **Baroness Verma**, Parliamentary Under-Secretary of State, DECC, **Daron Walker**, Director, Fuel Poverty and Smart Meters, DECC, and **Jacqui Russell**, Head of Consumer Engagement and Roll-out, DECC, gave evidence.

**Q324 Chair:** Good morning. Welcome to the Committee. We are very delighted to have this first opportunity of talking to you. Would you like to just introduce your officials? We were not quite sure who the second one was going to be.
***Baroness Verma:*** Daron Walker, would you like to introduce yourself, and Jacqui, would you like to introduce yourself? I think that would be easier.
***Daron Walker:*** I am Daron Walker. I am the Director of Fuel Poverty and Smart Meters.
***Jacqui Russell:*** I am Jacqui Russell. I head up the Consumer Engagement and Roll-out Team within the smart metering programme of DECC.

**Q325 Chair:** Thank you very much. Could you shed some light on a bit of a mystery about the ministerial responsibilities inside the Department? We discussed this briefly with the Secretary of State a couple of weeks ago. Nothing much seems to have happened since then. On 28 March, which was the last posting on your Department's website, following the appointment of Michael Fallon, it said the exact portfolio of the Energy Minister is still to be confirmed. Do you know, is there a sort of turf war taking place between the private offices and the Department at the moment, or is it just a sort of muddle about who is supposed to be doing what? Has a decision been made about allocating ministerial responsibilities?
***Baroness Verma:*** As far as I am concerned, Mr Chairman, ministerial responsibilities have not changed since Michael Fallon came into his new role. It may well be that the website has not been updated, but I can take that back to the Department and ask them why that has not happened. No, I don't think anything has really changed, apart from the fact that I have an extra little bit to do from John Hayes' portfolio on better regulation.

**Q326 Chair:** Thank you. You have an opportunity to shine, compared with your Secretary of State, because he said he would take it back two weeks ago, since when nothing much seems to have occurred. Just for interest, the only information on the Department's website about Michael Fallon's responsibilities was related to those in the Department for Business and Enterprise. It does not say anything about his responsibilities inside DECC, which seems slightly eccentric for DECC's website.
In terms of your responsibilities, the website says you are responsible for efficiency, but I understand that other efficiency-based initiatives, like the Green Deal, are the responsibility of Greg Barker.
***Baroness Verma:*** That is right.

**Q327 Chair:** Apart from smart meters, what other areas do you handle in terms of efficiency?
***Baroness Verma:*** As I have just mentioned, I have just taken on looking at regulation within the Department. I also look at decommissioning and the GDF programme. Between smart meters, GDF, efficiency and better regulation, I tend to have quite a handful, because, as you are aware, as a person from the House of Lords, I have to have quite a big overview of the whole Department's work anyway. I am well placed to be well busy with everything going on at the moment, I think.

**Q328 Chair:** Of course, very shortly you have the alluring prospect of taking the Energy Bill through the House of Lords.
***Baroness Verma:*** Indeed.

**Q329 Chair:** I am sure that will produce acclamation on all sides. Coming on to smart meters, which, by themselves, are a pretty substantial area of responsibility, what are the benefits that DECC hopes to deliver from the smart meter programme?
***Baroness Verma:*** What we are trying to do is to ensure that, first of all, consumers can have some control over their own usage. I think for a long time the balance between suppliers' relationship with consumers has been slightly in the favour of the supplier. With the smart meter, I think the consumers will be better informed. It also gives them an idea of the sort of appliances that they are using and the levels of energy usage. I think it is about looking at behaviour change, trying to make consumers more empowered, and also make energy companies work a little harder, knowing that they have a much more savvy consumer that they are going to have to deal with.

**Q330 Chair:** The Department has an estimate that the smart meter roll-out will provide a net benefit of £6.7 billion. Are you confident that is going to be achieved?
***Baroness Verma:*** Yes, I am. I think that is on the conservative side of everything. When we have taken into account all the very conservative savings that individuals may make initially, it is a reasonable sum to be looking at. I do think in the long term we will be looking at a much greater benefit, not just in monetary terms but also in usage terms. There is an important relationship to be seen there, and it is not just all about monetary savings, I think it is also about being able to look at being a much more efficient consumer and nation.

**Q331 Chair:** One of our witnesses suggested, and I quote, "Civil servants cook the numbers to come up with a net benefit for roll-out". What do you think about that idea?
***Baroness Verma:*** I have looked at the evidence, Mr Chairman, and I think that cooking the numbers is far, far from the truth. We do in-depth analyses, and I am sure both Daron and Jacqui would verify that. We do go through looking at huge amounts of evidence on a very regular basis to ensure that the numbers stack up.

**Q332 Chair:** I am sure people will judge from previous experience whether DECC is an expert at cooking up numbers or not. How do you hope that costs can be kept down, given the scale of the project and the fact it is using some new, perhaps rather untested technology?
***Baroness Verma:*** It is in the interests of suppliers to ensure that they are looking at it as a proper business case. It is a competitive market out there. It would not be in the interests of anybody to escalate costs. As you rightly pointed out, there are some untested usages that we are putting forward, but, by and large, we have come together with suppliers and with other stakeholders to look at costs, and we think we are at a place reasonable to the estimates that we have made.

**Q333 Chair:** As we have been taking evidence, one of the recurrent suspicions that we have felt is the risk that this is a programme where, although it may be intended to benefit consumers, the bulk of the benefits will be obtained by the suppliers. What can you do to try to keep the balance more in favour of consumers?
***Baroness Verma:*** Ultimately, it will be in the interests of the suppliers to ensure that they are not ratcheting up costs in favour of themselves. As I have said earlier, I think that, with the consumer getting better informed and becoming much more savvy with their own usage, it will be harder for suppliers to be able to use the methods that they have been using up until now, whereby consumers did not really understand what they were being billed for. The balance of understanding is going to shift, and, just on that premise, I think suppliers will find that they are going to have to work harder to retain the customer base that they have, and also to engage with new customers.

**Q334 Chair:** Do you think there are opportunities for achieving efficiencies by co-ordinating the roll-out of this programme with other Government energy efficiency and fuel poverty initiatives?
***Baroness Verma:*** I think that is right, and it is the right way to approach it. Of course, what we don't want to do is muddle the consumer up. When we go out there, part of the code for installation—I may just get some backup in a moment—is to be able to ensure that the installers are talking about other energy efficiency measures, such as the Green Deal. We have made it very clear that, first of all, it has to be a process where the consumer desires that engagement rather than have it thrust upon them. There is still some work to be done on how to engage with consumers better, and that is being done through the Central Delivery Body that we will have set up by the end of this month. I do think that there is a lot that can be done in working with other energy efficiency measures that we already have in place.

**Q335 John Robertson:** The energy installers are talking about efficiencies and things like that. What are the time constraints that the companies put on these engineers? I was an engineer once, and I know that I had to do X amount of work in a day. If these people are busy talking—and some customers will talk longer than others—then they might not reach their productivity targets. What happens then, when

an engineer is disciplined because they actually did what you want them to do?

***Baroness Verma:*** Mr Robertson, I think that is a fair question to ask. The point with consumer engagement before the mass roll-out is to be able to see methods and ways of being able to have that installation process be made as smooth as possible, by ensuring that, before any work starts, the consumer understands what they are going to be getting in the benefits. It isn't just about turning up and saying, "We need to have a conversation" and install. It is about long-term going into consumer engagement. That is why we are setting up the Central Delivery Body to ensure that we are reaching out, particularly through third-party groups, with the benefits, so consumers know beforehand by and large what they are expecting.

**Q336 John Robertson:** That is all very well, but that does not answer the question. That is that large companies will subcontract to smaller companies, who will be under a certain amount of pressure to get X amount of jobs done and each engineer will be expected to do that. I maintain that an engineer at some stage will end up being disciplined for not meeting his targets or not appearing to meet his targets, although he may be doing exactly what you want him to do, and that is to explain to the customer exactly why the smart meter is there and what it does. What I am trying to say is there has to be some cover for these people.

***Baroness Verma:*** If I can just ask Jacqui, would you just—

***Jacqui Russell:*** You describe a risk that we are aware of. Meter installers today do not engage with customers at all. It is a technical job. Their job is to make sure the installation is completed safely and efficiently and that they meet their productivity targets. One of the things that suppliers are looking at during the foundation phase is: what is productivity going to look like in the roll-out of smart meters? The installations will take longer than a dumb meter installation. That is mostly because you have to install the communications equipment as well as the meter. We are also going to have a lot of new installers out there who are less experienced, and we know that their productivity will be lower, particularly when they are new, and there is this extra requirement from us about talking about energy efficiency, demonstrating the IHD.

The reason that we have embedded in the licence conditions relating to the Installation Code of Practice the requirement to give energy efficiency advice, is because we know that is the bit that would probably fall away if it was left to suppliers. What we would expect suppliers to do—and what we know they are doing—is to take the licence conditions around the Installation Code of Practice and embed those into the contracts with meter installer suppliers, and part of that contract is about making sure installers are given the time to provide that energy efficiency advice.

**Q337 John Robertson:** Then will you oversee the contracts, which are made with the subcontractors, to ensure that the subcontractor is not picked because they say they can do X amount of jobs more than Y can do? Will you make sure that is going to happen, and, if so, I would like to know how you are going to do it.

***Jacqui Russell:*** Ultimately it is Ofgem's job to ensure compliance with the licence conditions. From now we are monitoring what suppliers are planning to do. We are collecting information from them now about how they are planning on approaching the installation challenge. Some of them will be using in-house installers; some of them will be going out to procurement; some of them will be using a mixed approach. We are talking to them about what our expectations are, making sure that, as far as possible, DECC and Ofgem are on the same page, so that when it comes to Ofgem with the formal oversight for licence conditions, they can do that.

**John Robertson:** There is a first for everything. On the same page, but are we?

**Q338 Mr Lilley:** The Committee received evidence that a number of early estimates of the cost-benefit showed that costs would exceed the benefits. Normally, as one goes into these things in more detail, one finds additional costs that one had not originally established. In this case, you seem to have managed to evaporate some of the costs and the costs have gone down. Could you tell us which were the costs that the original studies thought would take place but you now no longer think will be incurred, and which were the benefits that you originally overlooked that you subsequently discovered?

***Daron Walker:*** If I may take that question. Originally there was a study done—I think it was 2008—looking at the costs and benefits of a potential smart metering programme. At that point there was lots of uncertainty about the delivery model, lots of uncertainty about the different technologies that might be used.

Under Green Book rules there are requirements to have very high levels of optimism bias when you have lots of uncertainty around the potential costs of different elements, so the big reduction between 2008 and then the published impact assessment in 2009 were driven by better information about the delivery model, better information about the technologies that would be used, which allowed the optimism bias assumptions to be reduced. Also there was better information about the costs of metering and the smart meters. So all of those elements have seen the figures on the costs come down.

At the same time, some of the benefits that were perceived but not yet monetised, they have also increased over time, again, as we understand more about how smart metering works and more about how they are rolled out, especially in the foundation stage. However, there is still £2 billion worth of cost escalation and optimism bias embedded in our impact assessment, so £2 billion of the £12 billion costs are for potential cost escalation and optimism bias.

**Q339 Sir Robert Smith:** In looking at the costs and benefits, because of the breakdown of trust and the lack of confidence in the market, you get a strange dichotomy whereby the consumer does not want their supplier to benefit. Yet, if the market was meant to be working, if the supplier can do something more

efficiently, that should be to the benefit of the consumer. Do you not think that for the smart metering to really be accepted we need to get this trust again in suppliers and the market working?

***Baroness Verma:*** I completely accept that, Sir Robert. It is a huge task for suppliers to be able to build up that trust, but with the steps that we are taking in consumer engagement, whereby we have suppliers and other stakeholders, such as third party trusts like charities, all coming together through the Central Delivery Body, we anticipate that we will be able to start breaking down some of the barrier creep over the last few years, in as much as the consumer does not, by and large, trust suppliers. It was what the Chairman said to the previous witness, or it may have been you, about, "Is it going to be in the small print?" The sort of information that consumers would benefit from.

We are trying to ensure that, before roll-out, consumers are better engaged through the Central Delivery Body and that it is an onus on us as Government, as a Department, to ensure that all the stakeholders are working towards building that trust up. It is a task, it is a challenge, and one that we have to very much overcome.

**Q340 Sir Robert Smith:** You have shifted the timescale for roll-out by a year. What were the factors behind that, and what do you hope to be achieved in that extra year?

***Baroness Verma:*** I think that it was right that we reviewed things as they went along. On behalf of the Department, I did undertake to have a good look at everything towards the end of last year to see where we were with certain programmes. We listened very carefully to what suppliers were saying, but also to other stakeholders. What we want to make sure is that the roll-out achieves what it is supposed to achieve. That is, at the end of the day, to give the consumer a good experience of having a smart meter. Listening to all the voices around the table, at that time I felt that a year's delay was the right thing to do. I think, by and large, it has been welcomed across all stakeholder groups, that it was the right thing to do, because ultimately—as I am sure the Committee wants—it needs to be a successful roll-out programme.

**Q341 Sir Robert Smith:** What sort of key systems need to be ironed out before the roll-out takes place?

***Baroness Verma:*** We need to make sure that all the mechanisms, such as the DCC, have had real, vigorous, end-to-end testing, so that we are absolutely prepared and suppliers are absolutely prepared that they are able to go out there and deliver to an end date, whereby they comply with our desire to ensure that there is a mass roll-out by 2020. There are still some systems that need testing. We need to make sure that what we want to deliver out of a mass roll-out is going to happen and that, at the end of it, consumers feel assured that what they are getting is beneficial to them. Do you want to add to that, Daron?

***Daron Walker:*** If it is helpful to set out a few specifics. When the timetable for the period of designing, building and testing the DCC systems was set out, back in March 2011, it was necessarily based on an estimate at that time. As the Minister said, last December we said that we would review the timetable in March and April of this year, particularly to take account of the lessons learned from those suppliers rolling out early in foundation. Also, we are in the final stages of the contract discussion and dialogue for the DCC services and the providers of those.

What became clear in the period up to March and April was that there wasn't sufficient time allowed for the designing, the building and the testing of the systems. Effectively, we have taken note of that and added an extra year, which will allow more testing of the DCC service provider systems, but, in addition, a six-month period for those systems to then be tested end-to-end into the energy supplier systems and the energy company systems. That extra year was seen as necessary, but also seen as prudent. We now expect the mass roll-out to start in autumn 2015. To compensate that we have also moved the date at the end of the roll-out back by a year. The broad consensus was that five years was do-able for the roll-out, but condensing that down to the four years that would have been left was effectively generating too many operational cost risks.

**Q342 Sir Robert Smith:** Are you still cautious that if the security cannot be rigorously tested, you would be able to delay the roll-out even further to make sure that security was going to be—

***Baroness Verma:*** We are now in a very confident place that with what we have done—particularly around security, which we have taken very, very seriously—we will have all pieces in place to ensure that the roll-out will take place at the end of 2015. The foundation period is a good learning period for us as well, because it is being able to yield out some of the difficulties that some of the suppliers are facing. Again, it is not just about waiting for mass roll-out; it is learning and looking at what is already happening during the foundation stages.

**Q343 Sir Robert Smith:** One concern raised with us is that if it is a rigorously enforced timetable, you could end up with costs escalating as people try to get in under the wire to meet the deadlines at the end. Do you see any flexibility about how long the roll-out would take?

***Baroness Verma:*** There are some suppliers who are already doing roll-out. They are already putting meters in in the foundation period, and I think one or two of the suppliers have shown that they would rather wait a little longer. I don't see further delays. We have listened carefully, we have taken into account all the concerns that have been raised by supplier groups, by other stakeholder groups, and I think that the timetable now—given what we want to achieve—has allowed them a little bit more flexibility in how they want to roll-out. Also, it allows us to be able to look and test and review as that roll-out is happening, so I think we are in a very good place now.

**Q344 Dr Whitehead:** When the smart meter programme was first announced, the original roll-out was the end of 2020. That was at the end of 2009. Then it came forward to 2018. Then it went back to 2019. That was May 2011. Now it is the end of 2020,

an exact completion of the circle of the original date of roll-out. Are we really to believe that is the final word on the matter, or do we think there are there further modifications to come?

***Baroness Verma:*** Dr Whitehead, what we have very sensibly done is looked at and reviewed the dates as they have come along, and I think any sensible Government—be it the previous one or ours—would be reviewing at every juncture. As Daron has said, those dates are dates that are there for reviewing. If we need to sensibly move the date, then that was the right thing to do. I have been in post about nine months now, and I have looked very, very carefully at the programme and listened very carefully to all groups involved in it. The conclusion I came to at the end, and that was my recommendation to the Secretary of State, was that it would be beneficial to have this extra period to make sure that we did the testing. I do not think there is anything more behind that. It is about reviewing what is in front of you with the evidence that you have at the time.

**Q345 Dr Whitehead:** We still do not have the SMETS 2 specification finalised, do we not? When will that be finalised with you?

***Baroness Verma:*** I think it is December next year.

***Daron Walker:*** Obviously energy suppliers are able to roll-out SMETS 1 meters and that will contribute to their roll-out obligations, and some of them are already doing that. We have successfully notified part 1 of the SMETS 2 specification, which effectively allows manufacturers to get on and build and design the actual meters. There is a remaining part that is due to be completed in quarter 1 next year, which is more about specifying some of the standards for the HAN communication, so that that and the security requirements will allow all of these meters to work with the DCC systems when they are in place. Manufacturers now have the information successfully notified to the EU to allow them to get on and start manufacturing and designing those meters.

**Q346 Dr Whitehead:** For the person who is not entirely up with SMETS 1 and SMETS 2, what would you describe as the real difference in functionality between the two standards?

***Daron Walker:*** I think the main difference—because there are some smaller, technical differences—for SMETS 1 is we didn't define the HAN standard, so we effectively said, "You need to use an open standard, but beyond that it is for energy suppliers to choose". For SMETS 2 we have effectively chosen the HAN standard and defined that, and that is the work that needs to be done to work through into the detailed specifications that will be published in quarter 1 next year. That is really important for the interoperability, so that when the DCC systems are up and running, if you switch supplier, the new supplier will be able to use that equipment in the way that the previous supplier did. That is the main difference—the specification of the HAN communication standards.

**Q347 Dr Whitehead:** Effectively we now have three different standards: SMETS 1 compliant, SMETS 1A compliant, SMETS 2 forthcoming, smart meter non-compliant.

***Daron Walker:*** It is right that there are effectively three standards. The non-compliant is a smarter type of meters that energy companies that decided that they wanted to roll-out smarter meters to their consumers, so that they could benefit from those early deployments, have done at their own risk. Effectively we have SMETS 1 compliant meters now available. People are installing those. On the split of SMETS 2, effectively, it will come together in one meter when those meters are manufactured. By splitting part 1 of SMETS 2 and part 2, we have allowed the meter manufacturers to start designing the hardware and start designing the meters. In the meantime, we continue to work through the detail of the software that will go on those. That will come together in time for those meters to be available for testing with the DCC systems.

**Q348 Dr Whitehead:** Right, but if a customer switches at the moment, they will be required to have a different meter installed as a result of their switching, or they may do, depending on whether the meter that they have already—which they may not know about—is or is not compliant; that is, if they have had a smart meter that they thought was a smart meter installed by a non-compliant company, they would have to have that meter taken out. I noticed the change in ruling recently. That would not have to be replaced by a SMETS 2 meter but could be replaced by a SMETS 1 meter, which will continue to be compliant. Am I still—

***Daron Walker:*** You are on track. It is quite a complex setup. For a non—

**Q349 Dr Whitehead:** I think the thrust of my question is: first, what degree of really non-compliant meters are likely to have to be ripped out and straightforwardly replaced? What level of meters look like they are compliant and, therefore, can work into the system, and to what extent is that going to cause distress and confusion among customers who thought they had a smart meter and perhaps don't? On the other hand, they may do.

***Daron Walker:*** The first thing is, for non-compliant meters, in effect, if you inherit that as a new supplier, you can choose to keep that equipment in the home and continue to operate it. Most likely you would operate it in dumb mode, but there is no requirement to rip it out. The requirements that we are suggesting that will come forward in December are for compliant meters. If you inherit a compliant meter as a new supplier to that home, you will have two choices. You will either negotiate with the original installing supplier and negotiate terms to take over responsibility for that and operate those meters, or install your own SMETS 1 compliant meter. What we envisage will happen is that suppliers will need to make their choices, but effectively what that will do is create the commercial environment for the installing supplier to negotiate terms with the inheriting supplier. We expect that over time that market will allow the customer to keep their meter and also, over time, keep their smart service as well.

**Q350 Dr Whitehead:** How many customers do you think that affects in terms of—
***Daron Walker:*** At the moment, there are small numbers of compliant meters. There are around 600,000 non-compliant meters out there, which have been installed over a number of years, separate to the smart metering programme that we are defining here.

**Q351 Dr Whitehead:** We may say that that is tough luck on those companies that went in for early adopter arrangements and will see their meters removed. Nevertheless, that will increase the overall cost of roll-out, will it not?
***Daron Walker:*** Again, they will not need to be removed until the end of 2020 now. That is the first thing to say. Consumers obviously will be benefiting from having a smart meter. The response is even—

**Q352 Dr Whitehead:** Will they not count?
***Daron Walker:*** They will not count towards the obligation, because one of the important—

**Q353 Dr Whitehead:** Towards the overall cost of roll-out?
***Daron Walker:*** They will contribute to the overall cost of the roll-out. Obviously it is still seven years away before they will need to be ripped off the wall. Of course, this is for the individual suppliers to have made their own commercial choices. We were very clear that if you were installing non-compliant meters, you did so at your own commercial risk. Those companies have taken the decision to do that because they saw benefits to retaining or acquiring new customers, but because it is not compliant, because we cannot ensure interoperability, we felt it was right to make it clear that they did that at their own commercial risk.

**Q354 Dr Whitehead:** Would it not be a good idea—bearing in mind where we are now, in terms of the quasi-completion of SMETS 2 and some information on manufacturing but not all information being available, and therefore the suggestion that perhaps all this will be repeated all over again—to wait until SMETS 2 is fully completed and we can confidently go ahead on a roll-out, to do that roll-out at that stage, rather than phasing it in the way that we have described this morning?
***Daron Walker:*** Again it is important to separate the non-compliant meters, which we have talked about already, and the SMETS 1 compliant meters. Those meters allow consumers to benefit from all of the things that are consistent with the business case in the smart metering programme. Those meters will contribute to the suppliers' roll-out obligations, they will stay on the wall, and the consumers will be getting all the benefits of accurate billing and remote readings. It will also allow those suppliers to invest now, because we want them to invest now, because we want them to learn from foundation and we want consumers to benefit from smart metering as soon as possible. The ability for those to be installed now, for those suppliers that want to do that, we think is a good thing for the overall programme.
***Baroness Verma:*** Ultimately, it is supplier choice. If that is the decision they take, then it is a business decision they have taken.

**Q355 Sir Robert Smith:** In terms of consumer engagement, do you think we should move away from the language of "ripped off" and talk about "removed" or "unscrewed"? I am sure the engineers—
***Daron Walker:*** Probably so.

**Q356 Sir Robert Smith:** In terms of the development of the standard, you said that the hardware had been approved and the software was still being developed. Is there any risk that the software engineers would say, "If only I had known this and you could have tweaked the hardware, it would have made my life a lot easier", or is that feedback loop already in place?
***Daron Walker:*** I would say that feedback loop is already in place. In fact, one of the things that we are very clear about within the programme, in terms of taking decisions about whether to separate SMETS 2 part 1 from SMETS 2 part 2 was to validate that that was not going to be a risk. Enough work was done on the software side to allow us to progress the hardware side.

**Q357 John Robertson:** It strikes me that what you are doing is you are just covering the manufacturers that were making the original SMETS 1 meter to give them something to sell, rather than waiting for the next generation of meter, which will come along in a matter of months. You are not going to be helping the consumer at all because they are going to have to replace the SMETS 1 meter with another meter, so there are two bites at the cherry. I do not see how this helps the consumer in their costs when you can do it all in one go and go to a better meter, rather than putting in an inferior meter knowing that a better one is coming along.
***Baroness Verma:*** I am not quite sure I buy the argument, Mr Robertson. I think what we are trying to do is give immediate or quick access to those consumers who want it, so that—

**Q358 John Robertson:** Being quick does not necessarily mean good. It is much better to get a state-of-the-art meter that you know you can rely on and will work, than put something in there that you know you are going to have to replace. It just strikes me as being nonsensical that you would fit something that you are going to replace.
***Baroness Verma:*** The consumer will benefit from the SMETS 1 anyway. All SMETS 2 is doing is adding a little bit more functionality, and Daron is far better placed to tell you about the technical side of that.

**Q359 John Robertson:** This is not about technology, this is about cost. At the end of the day, the person that is going to end up paying for this will be the consumer who will have to pay for two meters and two installations. Unless you can guarantee the Government is going to handle the cost of the replacement meter, then I would be quite happy. If it

is going to be that the cost will be passed on to the consumer then I am not happy.
***Daron Walker:*** SMETS 1 is not an inferior meter to SMETS 2. It doesn't have a defined—
**John Robertson:** It is just not as good.
***Daron Walker:*** No, SMETS 1 meters—

**Q360 John Robertson:** Hang on a second here, I may not be the cleverest person in this room but if I have a replacement meter, and it is obviously a generation thing, it will be better than the previous one. If it is not, what is the point of having it in the first place? So it must be better.
***Daron Walker:*** The main difference is SMETS 1 meters you can deploy ahead of the availability of the DCC.

**Q361 John Robertson:** But why? What for?
***Daron Walker:*** Because there is a whole load of complexity of learning, there is a whole load of manufacturing design and development that will need to take place.

**Q362 John Robertson:** Going back to what I said, it is for the manufacturers. It has nothing to do with the consumer. You are doing it for the manufacturers. Be honest with us, it is for the benefit of the manufacturer. It has nothing to do with the consumer. They couldn't care less what kind of meter it is, whether it is the SMETS 1 or the SMETS 2. They don't care. They want the meter. I do object to the fact that you will be charging twice.
***Daron Walker:*** They will not have to be replaced. That is the point.

**Q363 John Robertson:** Never?
***Daron Walker:*** At the end of their life they will need to be replaced, but SMETS 1 meters will not have to be replaced. They will last their lifetime and then effectively the next generation will come along. I imagine over time we will have a—

**Q364 John Robertson:** But the next generation has come along. It is not that we are waiting for the next generation to be invented. It has been invented. It is there. Why bother with the first one when you can go straight to the second one? Unless you want to help the manufacturers.
***Daron Walker:*** The key thing is that if those companies that want to install smart meters know that they are installing a compliant meter, that will stay on the wall and contribute to their obligation, they can do so. When the DCC is in place you need additional specifications to ensure it is interoperable, and that is the element. It is the HAN communication that we are specifying for the SMETS 2 meter. The SMETS 1 meter allows the customer to do all of the things that they will want to do: real-time data, access to historical information.

**Q365 John Robertson:** You mean new criteria for the second one. Why? Because you think it is better, so why not just wait and go for the better model? But you won't. Look, you are not going to get me to agree here because I just feel that, if you are going to spend all the money on a meter, let's go for the best one and not put an inferior one in. You can say it is not inferior, it is inferior otherwise it would not be being replaced and it certainly would not meet the criteria that you are putting on it.
***Baroness Verma:*** Mr Robertson, it is not about inferiority or superiority, it is just about added functionality, which will be able to be delivered through the DCC and SMETS 2. Consumers being engaged in SMETS 1 now, up front, will get the benefits of that now rather than wait until further on in the development of SMETS 2.

**Q366 John Robertson:** Have you done a cost assessment of fitting the SMETS 1 meters and then following in with the SMETS 2, and what it would be if you just went straight to SMETS 2? Have you done a cost on it? Although the next model is always cheaper than the first model.
***Daron Walker:*** We have done impact assessments on the way we are rolling the meters out, and in effect—

**Q367 John Robertson:** It is the cost I am concerned about. I appreciate you have done that. I appreciate that, but it is the cost.
***Daron Walker:*** Would it be okay to write to the Committee on that? I would rather do that than give slightly wrong information.
**John Robertson:** Yes.

**Q368 Albert Owen:** Minister, can I take you back to the response you gave to the Chairman with regards to consumer benefit against the perception? Many of our witnesses were concerned that energy suppliers would be the main beneficiaries of smart metering roll-out. You mentioned that some of the benefits to the customer would be simpler billing and engagement with new customers. With respect, as a Committee, we have recommended simple bills. The regulator has done its Retail Market Review and recommended simple billing. The Government wants simple billing. It is going to legislate for simpler billing. That is already there, why do we need smart metering on top of that to provide what you said would be the main benefits to the customer?
***Baroness Verma:*** It is not just about billing. I think this is something I also said to the Chairman in the beginning, that it is not just about billing, it is also about being able to change our behaviour to how we utilise energy. Part of the problem has been that people do not quite understand what it is that they are being billed for. By being able to show them the levels of energy usage during the day, through smart metering and in-home displays, it actually—

**Q369 Albert Owen:** I understand the theory. What I am saying is that in practice now people are getting simpler billing. People are getting help through environmental and social benefits. They are getting their houses lagged, their lofts lagged. All that is happening now. That is not going to happen because of smart metering. It is happening now.
***Baroness Verma:*** No, but it adds on. It adds on to the fact that we do want to make sure that consumers do actually understand. Even through simpler billing a lot

of consumers are still not reaping the benefits, and what we are trying to do is to ensure that through—

**Q370 Albert Owen:** So switching doesn't work then?
***Baroness Verma:*** Switching does work but it also works if you are better informed, and what we want to try and do, ultimately, is to make sure that the consumer has better information at their fingertips on what it is that they are using their energy for. It may be time-of-use tariffs. That is another area that we are looking at, which Jacqui can elaborate a little bit more on.
The ultimate goal for us in the Department is to ensure that the balance is better placed, where the consumer has a little bit more control over, first of all, what they are paying for but also how they are using their energy. That has been something that has been missing out of the equation for a very long time.

**Q371 Albert Owen:** Some of the witnesses have said to us that, yes, they would get all these gadgets but after a while they would not use them anyway. So it is a complete waste. They get it, but it is just like another remote control and they put it to one side. How do you respond to that?
***Baroness Verma:*** I don't buy that argument. Like the Committee, I have also spoken to a lot of people who have seen such benefits in being able to visualise through their in-home displays the sort of energy uses that they are doing. It has changed the way that they actually do switch on and switch off. So I don't buy the argument. We are becoming a much more gadget-driven society, and I think we are becoming far more aware—

**Q372 Albert Owen:** There is a threshold. You can have three remote controls for your TV. You just use the one. You put the other two in the drawer and never use them again when the battery runs out.
***Baroness Verma:*** Perhaps I am not as pessimistic of the consumer. I personally think that it is a good device and a good method of being able to really do what we should have been doing for a long time, which is actually getting consumers more in control of how they are using their energy.

**Q373 Albert Owen:** I understand that. DECC has also said that accurate bills is one of the main benefits as well. If I could concentrate on that because, in evidence to us, Consumer Focus suggested that those who already have smart meters are not currently receiving accurate real-time billing information. Do you see this as a problem, Minister?
***Baroness Verma:*** I think it is near to real-time information, but I think Jacqui can elaborate on that.
***Jacqui Russell:*** Yes. You are right to identify accurate billing as what we see as one of the key benefits. We are doing quite a lot of research understanding what consumers see as the key benefits of smart metering, and the evidence shows that they see accurate billing as really important. One of the benefits of foundation is that it allows energy suppliers to do all the work they need to do with their back office systems to make sure they can deliver that accurate billing. There have been some teething problems for a small proportion of customers. That has been particularly around getting the meter reads from the meter to the supplier, getting all the way through the appropriate bits of their IT systems and landing accurate real-time on billing day. That hasn't always happened and there was a particular problem with one of the suppliers around a year ago, which is exactly what we see the foundation stage is about. It is to identify where these issues arise, and they are tackling those. It makes us feel more confident that when it gets to mass roll-out, and we are starting to see millions of customers with smart meters rather than thousands, we will start to see those benefits right from day one.

**Q374 Albert Owen:** Will there be a requirement for suppliers to provide that real-time accurate billing?
***Jacqui Russell:*** The existing licence condition requires suppliers to bill on the best information that is available to them.

**Q375 Albert Owen:** It is a bit vague, isn't it?
***Jacqui Russell:*** The licence conditions that we, DECC, have put in place require energy suppliers to establish a connection with the smart meter, so we have taken a facilitating step so that we know the suppliers will have information from the smart meter. The bit about the accurate billing falls into Ofgem's territory. Their judgment at the moment is that the extra licence conditions we have put in place, around using the smart meter, with the existing licence conditions around billing, together should mean that you have to use your smart meter data to provide an accurate bill. Ofgem have said they will keep that under review, and if they need to amend that billing licence condition then they will look at doing that.

**Q376 Albert Owen:** So, I have all the gadgets, I want to know between midday and 6.00pm how much energy I use, and after 6.00pm. I would be able to do that regularly?
***Jacqui Russell:*** You ought to be able to do that on your in-home display. We have defined the minimum functionality that an in-home display has to be able to provide, and it has to be able to give you both real-time and historic data on your energy consumption. Of course, what we hope is that a new market will develop. People will innovate, they will be offering consumers all sorts of fancy gadgets and widgets that they will be able to use in their home to access their energy data and to interpret it.

**Q377 Albert Owen:** Will suppliers be prevented from back-billing once customers have smart meters installed?
***Jacqui Russell:*** Again, it is Ofgem that regulates in this space. Suppliers are aware now that they have quite a lot of meters out there that have not been read for a long time. Some of them are being quite active in trying to get out there and get readings from those meters before the smart meter roll-out starts, so that they can get any back-billing issues sorted out, within the constraints Ofgem have already placed on back-billing, before they go and install a smart meter. I

guess there is a concern that people will associate the installation of a smart meter with back-billing.
Once a smart meter is there, and you can get to your meter reads without needing to get entry to the property, which is what the challenge is at the moment, then there should be no reason for people to be able to back-bill. There is no excuse. It is for Ofgem to regulate on that specifically.

**Q378 Albert Owen:** What is DECC's view on it? You have a view. I understand the regulator will make the decisions, but we are now in this foundation phase. You are learning. You are listening to everybody. Certainly, as DECC, you should have a view. Do you think there should be back-billing once these have been installed? Or the day they come in, I have a new meter, a historic reading is taken, from then on I am in the new technology age. Then I shouldn't need back-billing, and I would suggest they should be prevented.
***Baroness Verma:*** It is a question that we need to take back, and it is a question that needs in-depth response back to the Committee.

**Q379 Albert Owen:** Thank you. I have one final question with regards to the energy saving benefits from smart meters. There are a number of concerns that vulnerable and low income families—who are already rationing their energy bills—will not benefit from this. How do you respond? What extra can smart metering give somebody who is living very close to the breadline and is concerned about that, so they are doing everything possible? As I indicated earlier, these are the people who will have their lofts insulated, they will have the social benefit, which are good things, that comes through with some of the charges that are on all customers, to benefit these vulnerable people. What extra benefits can they get from smart metering?
***Baroness Verma:*** Evidence that we have seen has shown that, by and large, it is comparable savings and benefits across the population.

**Q380 Albert Owen:** No, I understand somebody is wasting, and leaving things on and gadgets and alarms go off, and they can switch it off. I am talking about the person who in the winter when the lights go on they put them off in every room, all that is done. What benefits are they going to get from smart metering? These are savvy people, they might not be technically savvy but they are very savvy people.
***Baroness Verma:*** Absolutely, Mr Owen. One of my biggest concerns when I came into the Department was: how do we ensure that those who really do need the benefits of this actually will access the benefits of this? I think key to all of this will be our own ability, through our customer engagement strategy, to ensure that those consumers—particularly, from my own experience of going out and speaking to groups, the elderly, poor or the BME community poor—are able to understand what benefits can arise from having a smart meter in place.
The long and the short of it will be about better informed consumer usage. I think that is something that is in the minds of all of us, including suppliers, because ultimately nobody wants to lose a customer. So it will be for suppliers to be able to better engage, better offer the best possible tariff times of use for those customers, but also to be able to ensure that the consumers themselves know what they have to do to be able to engage better.

**Q381 Albert Owen:** I am suggesting these people already know what they are doing. They are struggling. What extra things are they going to get—
***Baroness Verma:*** Ultimately, it is about being able to use energy at cheaper times of the day and all sorts of things like that that can happen. Our strategy and consumer engagement will draw that out much further, and that is what we are waiting for in developing that. Do you want to build on that?
***Daron Walker:*** Just a couple more points. You make a very fair point because obviously, if someone is budgeting carefully, then the scope for them to save will naturally be diminished. The trials that we did a few years ago actually showed, in control groups for people who were classified as fuel poor, that they were still able to make savings as a result of the combination of the IHD and the smart meter. Obviously there will be special cases, like you describe, that may find it harder but there is still learning from the smart meter and the IHD.
There is another element that we will hope to deliver through the programme as well, which is to remove the cost differential between pre-payment costs and standard costs, because you will be able to provide pre-payment without having to visit the home and without all of the costs associated with traditional systems to support pre-payment. One of the things we want to do through the system is to get rid of that cost.

**Q382 Albert Owen:** If the Energy Bill goes through and these new tariffs come in, on a smart meter, a pre-paid customer who has debt with that company will be able to, what, levelise the debt—
***Daron Walker:*** It is all to do with the service costs because, at the moment, quite a lot of the costs are having the infrastructure to allow you to have a pre-payment system. Also quite often they require several visits to the home, and all of those costs will be removed once you can do pre-payment remotely. That is one element. The other thing that—

**Q383 Albert Owen:** Wouldn't it be in the interests of the vulnerable low income people if the roll-out started in those areas where there is a high percentage of low income people?
***Daron Walker:*** Some of the companies who are rolling out already are focusing on pre-payment because it is beneficial, both to the consumer and to them.

**Q384 Ian Lavery:** Getting back to the IHDs and whether the customers are getting the benefit financially from cheaper bills, has DECC made a recent estimation on how much the consumers will save as a result of these formulas?
***Baroness Verma:*** The conservative estimate is about £24 a year, is it?
***Daron Walker:*** By 2020.

***Baroness Verma:*** By 2020. That is the very conservative amount that the consumers will save. By evidence that we have seen once a consumer gets an IHD into their homes they do become far more aware of the way they are utilising their energy, and just on that note we envisage that consumer savings will be much bigger.

***Jacqui Russell:*** Our impact assessment assumes that domestic consumers will reduce their consumption by 2.8%. That was based on evidence that was available a few years ago. What is coming through now—both in the UK and internationally—is that that is quite a conservative assumption and we could expect to see larger energy savings. We have quite a lot of research going on, over the next year to 18 months, trying to understand how people have responded to smart metering in this country and what sort of things we can do to optimise our energy savings and support them with behaviour change. Our assumption remains 2.8% in the impact assessment. That is one of the things the Minister referred to at the beginning, saying that our impact assessment is relatively conservative in terms of the total benefits it is looking at for GB, and that is one of the areas where we are quite conservative at the moment.

**Q385 Ian Lavery:** Purely in cost terms, £24 in seven years' time certainly wouldn't encourage me to have a smart meter installed. Would it be right to say that between now and 2020 the cost benefit to the consumer will be a lot less than £24, building up to a maximum of £24 or 2.8% of the bill? Is that right?

***Baroness Verma:*** No. What we are trying to get across is that this is a benefit at the conservative end. The assumption will be that there will be greater benefits, because the consumer will be able to visualise when they are using their energy at the highest level and the cost of that energy at that time. Jacqui is right in saying that we have ongoing research to be able to monitor what is happening here in the UK through the foundation period, but also what we are seeing across countries outside of the UK who have smart meters. There has been a behaviour change, which does impact on bills because you are tending to use energy in a different way to what you would have normally done had you taken no steps to change from the regular meter to a smart meter and in-home displays.

I have talked to consumers who have said that just by having an in-home display it has made them think very carefully about how they use energy. I think that will happen to a lot of consumers, particularly those consumers who tend to be more frugal in wanting to save anyway.

**Q386 Ian Lavery:** How integral do you believe the IHDs are to achieving these savings?

***Baroness Verma:*** I think they are integral. Evidence has shown that, where they have been installed, people have understood very much more about the savings on monetary terms as well as on energy usage far more than those that did not have an IHD. In fact I don't think that there has been any home that has not accepted an IHD.

***Jacqui Russell:*** The Energy Demand Research Project, which was carried out for a couple of years in the run up to 2011, looked specifically at the information you can give to people to help them change their behaviour. That showed that the combination of a smart meter and IHD made a real difference to the level of energy savings that people were able to make. That is what informed our requirement that all domestic consumers should be offered an IHD, because we saw a real difference in that trial.

**Q387 Ian Lavery:** On the overall cost of providing each household with an IHD with a smart meter, has there been an assessment by DECC of how much that overall cost would be and perhaps how much an individual IHD smart meter would cost?

***Baroness Verma:*** I think an IHD costs about £15.

***Jacqui Russell:*** The assumption in our impact assessment at the moment is that an IHD would cost £15 each.

**Q388 Ian Lavery:** Forgive my ignorance, but that is just part of the smart meter. What would the overall cost of a smart meter be with the IHD?

***Daron Walker:*** I have it. The IHD is roughly £15. The total installation cost—so you are including the smart gas meter, the smart electricity meter, the communications hub to allow you to communicate, the installation process and visiting—comes to roughly £200 for the dual fuel, obviously spread over the 15 years of the life of the assets.

**Q389 Ian Lavery:** We have had a lot of evidence in front of this Committee with regards to the roll-out of the smart meters. There has been discussion and people oppose the fact that you need IHDs as part of smart meters. What do you think of the idea that there should be opportunities and options to people to use smart phones, web portals and other devices to access the consumption data on the smart meter? Is that a viable option?

***Jacqui Russell:*** Absolutely. We have specifically designed the system to encourage that sort of innovation. Customers will have two ways that they can access their data. They can access it directly from their meter in their home, so they will be offered an IHD that will do that for them from day one. But we hope that people will develop all sorts of widgets and clever things that they can, within their home, connect to their own meter that will allow them to see their data. Their data will also be able to be drawn from their meter through the DCC out to other parties, whether that is suppliers or whether that is people offering exciting energy services and online apps and stuff. The consumer can also choose to opt into those services, and ask people to access their data from their meter and feed back to them an interpretation of what their energy consumption is looking like. That could come through any wizzy bits of technology that might develop over the next decade.

**Q390 Ian Lavery:** Getting back to the costs of the IHDs, Mr Walker, do you think the cost that you mention is justified?

***Daron Walker:*** What is clear from the work that we have done—both from the trials in the UK but also from international comparisons—is having a device like the IHD will save much more cost than the cost of the IHD itself, in terms of through energy savings. We are not mandating that everyone has one. We are mandating that everyone is offered one. So, if the consumer decides that they don't want the IHD and they want to opt for some of the wizzy devices that Jacqui was talking about, they can do that. One of the things that we are defining is the specification for something called a consumer access device, which will allow consumers to buy other products that will allow them to extract the data very much along the lines that Jacqui said. So the business case is sound for the IHD. As time goes on, and if some of these other devices become more popular, more attractive, and individual consumers want to buy those instead, then they are able to do that, but the case for having an IHD to drive the benefits case is strong.

**Q391 Ian Lavery:** If it is that strong, the cost justified, why are suppliers not being obliged to provide non-domestic consumers with the devices?
***Daron Walker:*** Are you happy to take that?
***Jacqui Russell:*** Yes. Non-domestic consumers is a different group of people from domestic. It is quite a diverse group. There are about 2 million premises that are covered in the roll-out of non-domestic, and that is a whole mix of different types of people. Our understanding is that, across that group of 2 million, they will each access or have different approaches to the way they manage their energy. Some of those non-domestic businesses employ energy managers. They are already quite active. They may have advanced metering already, and it is someone's job to worry about energy. Actually, an IHD in that context is not likely to make a lot of difference.
If businesses think an IHD or a wizzy gadget in their home with real-time in front of somebody relevant is what they need, they will be able to access those from the market and connect them to their meter within the home. What there isn't is a business case for saying, "Every non-domestic premises should be offered an IHD" and that is the diversity of the types of businesses that we are talking about and the different ways that they approach their energy management.

**Q392 Ian Lavery:** Finally, Baroness Verma, you mentioned the need for consultations and communications with the consumers when they get the smart meters and the IHDs installed on their property. Will there be a minimum level of information in support that must be provided at that point in time?
***Baroness Verma:*** Absolutely. The key crucial question is: what information will be given to consumers? That is where we are working very closely with all the groups to ensure that what the consumer is going to get has made clear and utter sense to the consumer, so that they know how to utilise those benefits. There is still work being done, and it is an ongoing process, but I do think what I am very clear about is that, at the end of it, the consumer must know his or her rights and also what the benefits are for them to be able to have these instruments in place. My worry has always been that those groups that Mr Owen talked about would be the ones that would be missed out. Hence, we have made it very clear to the Central Delivery Body that one of their key areas must be making sure that all suppliers are obliged to ensure that those groups are able to access and understand information equally as easily as the mainstream groups. We are working on that, and I am determined to ensure that we see much greater engagement than there has been so far from suppliers to those hard-to-reach groups.
***Jacqui Russell:*** If I could just add to that? It is the Installation Code of Practice that is supported by the licence conditions. It sets out the advice that installers will have to provide during the installation visit. So it specifies, for example, that they must demonstrate the smart metering system and the IHD to the customers, so they actually get to see it work. They must provide them with energy efficient advice, and that has to include pointing people towards independent advice from people other than their own supplier. It has to include giving generic information about schemes like the Green Deal. That is set out in the Installation Code of Practice. We hope the Central Delivery Body will come along and make some of that real. For example, they may produce common materials that all suppliers might use. That is the sort of thing, once the CDB is set up at the end of this month, that they will start to think about: how can they support all of the suppliers in fulfilling their licence obligations around providing advice.

**Q393 Sir Robert Smith:** One thing that has come up is time-of-use pricing and the benefits of smart meters and in-home displays that will interact with that. Is there anything in the drive for simplifying the market, and to have a reduced number of tariffs, that could cut across innovative time-of-use information and time-of-use pricing?
***Baroness Verma:*** What we will see is that time-of-use tariffs will be part of the simplified tariffs available to consumers. There are four, are there not, at the moment? I think time-of-use plays a part in that.

**Q394 Sir Robert Smith:** You were mentioning how a lot of businesses have their own energy manager but, of course, a lot of businesses are micro and small businesses, and the history of the electricity market in that area is one of fairly uncontrolled behaviour by the suppliers because it has been assumed that you are entering into a contract. But these businesses are virtually domestic consumers in all but name, in terms of their skills and the time they can devote to it. Is there some desire, perhaps, for those smaller micro businesses that they should be treated more as domestic consumers?
***Jacqui Russell:*** We are aware we have a really diverse group of non-domestic. It includes your local branches of Tesco and Sainsbury's, right through to someone sitting in their garden shed in their office and they both fall into this same roll-out. The Central Delivery Body does have an obligation to support non-domestic consumers, particularly where they can do that by adapting domestic materials. We are thinking there

particularly about the types of people that you are describing. While on paper they have a non-domestic supply contract, actually in the way they behave they are more like a domestic consumer. The Central Delivery Body should be reaching out to those people to help them to understand what they can get out of a smart meter and make the most of it.

**Q395 Dr Whitehead:** All this is dependent, to a considerable extent, is it not, on the success of the comms strategy subsequent to all this installation, and you have a requirement of 97.5% coverage on the general system. Presumably that requirement will be ready to go in the autumn of 2015, will it?
***Baroness Verma:*** We have been told, and have been assured, that suppliers will be able to do 97.5% coverage. Of course, the licence conditions in the DCC will ask them to work towards 100%. What the suppliers are doing and those that have started early through foundation, these are the very teething problems that they are able to address. But, yes, by 2015 we would expect all suppliers to be working towards getting a very high percentage of their coverage out there.
***Jacqui Russell:*** You are right that in competition for the communications service providers we set 97.5% as our minimum requirement. The evaluation procedure is designed to incentivise and to come forward with bids higher than that, although we do not expect to get to 100% because of the cost escalation as you get to that final area. We are allowing flexibility. It will be acceptable for them to come forward with a bid that gives a lower level of coverage on day one, growing to pretty close to whatever we contract for within a year. So it is possible that the coverage on day one will be lower than it will be in autumn 2015. It may be lower than autumn 2016, and whatever the contracted level is at has to be there by the end of roll-out. That growth in the coverage is about making a cost effective roll-out of the communications, not incurring too many costs up front.

**Q396 Dr Whitehead:** Will there be penalties if they fail to reach that requirement?
***Jacqui Russell:*** Absolutely. There are incentives and penalties built into the contract—a combination—both around hitting the milestones within the roll-out period for coverage and for the enduring coverage from 2020 and beyond.

**Q397 Dr Whitehead:** As you roll-out—and bearing in mind that, as you say, there will probably not be 97.5% coverage on day one—it will be necessary presumably, rather than leave that at least 2.5% behind until the end of 2020, to start developing a mix of technologies to overcome that coverage, some of which may be redundant, presumably, if we get to the higher coverage. Or is it the intention to start going on a mix of technologies, patch technology and so on from day one?
***Jacqui Russell:*** Are you talking about communications technologies?
**Dr Whitehead:** Yes. Where you do not have coverage, and you presumably wish to start installing, then I understand there will be an obligation to—I am not quite sure on whom—
***Jacqui Russell:*** To install a smart meter.
**Dr Whitehead:** To install a smart meter, and provide some form of alternative technology that is able to make that meter viable.
***Jacqui Russell:*** If you were an energy supplier, and you have a meter that has come to the end of its life and it happens to be in an area where there no one coverage available yet, the current licence conditions, once activated, would require you to install a smart meter. We would expect them to operate that in dumb mode until the communications came along. So if you needed to install a meter in 2015, the coverage is not going to arrive until 2016, you install a smart meter, you walk away, it keeps operating in dumb mode and we have designed the system so that when the coverage arrives the meter wakes up on its own. You don't need to revisit the property, it becomes a smart meter and it starts talking to the system.
That is a sort of interim approach while the coverage is rolling out, and I guess part of the challenge there is the customer will want to know when their meter starts becoming smart because they want to know when they can start to see the benefits, like accurate billing, because in the meantime, in effect, they still have a dumb meter.

**Q398 Dr Whitehead:** How will they know? Will there be a little tune or something?
***Jacqui Russell:*** One of the things that the CSPs will have to provide is coverage maps, both to the suppliers and to the Central Delivery Body, which will show where the coverage is available and how that coverage is going to grow over time.

**Q399 Sir Robert Smith:** Can I just ask one thing? If you are installing when you do not have the actual coverage to find out where to put the aerial or where to position the meter, how is the meter going to know to wake up if it is not in the right part of the building?
***Jacqui Russell:*** There is a risk that some meters might not wake up on their own, so there are solutions that the communications service providers are coming forward with. We are not expecting meters to be installed in different places from where they are now. We are not expecting there to be a lot of use of external aerials. There is a risk that some meters might not wake up, but the evidence we have so far gives us good reason to believe that the vast majority should wake up on their own.
There is a slightly different issue around the contracts that we sign now. A contract is signed for coverage of somewhere between 97.5% and 100% coverage at the end of 2020. What about those people? As the Minister mentioned, built into the DCC licence is the requirement to always strive to reach 100%. It is quite possible that, before we reach 2020, there will be developments in the technologies, and it has become cheaper to reach out further and the coverage will be higher than whatever we sign a contract for now. There are still likely to be some people outside that. Now that we are seeing what the coverage is likely to look like, what we are starting to look at is: who are those households and are there other technology

options we can offer them in the home, so they can see some of the benefits of smart metering? For example, could you enable them to have an IHD in their home so that they could see their real-time energy consumption and access that part of the benefits, although they might not get the remote meter readings and the accurate billing benefits? That is the sort of thing that we are starting to test now, now that we are getting more information about what the coverage is going to look like.

**Q400 Dr Whitehead:** Are you saying then that, by the end of 2020, to all intents and purposes, there will be 100% WAN coverage of the country and, therefore, we can reasonably confidently state that the system will encompass everybody or that there will be a number of people—not 2.5%, but let's say 1%—who will either never or certainly by 2020 will not receive WAN coverage, and will therefore have to, for the purpose of the programme, receive other forms of coverage? Who would be responsible for putting that in? Would that be the contractor? Would that be the supplier, and how would we get any sort of correlation between who is putting in what system and the security of the systems between each other?
***Baroness Verma:*** It would be in the interests of the suppliers, of course, to be able to reach out as reasonably as possible to 100%. That is what the licence conditions ask of them. So that is where the work will go towards and that is what the research, looking at what is happening through the period from now until 2020, will be. Ultimately, what we do recognise is that there still remains that risk that there will be a very small percentage that may not just get that coverage. In effect, what we are asking suppliers to do is to work towards making sure that that is a reduced risk as we move towards 2020.

**Q401 Albert Owen:** Chair, can I just come in on this very point? We have been here before, with mobile phone coverage, with broadband. There are not-spots in the United Kingdom and people know where they are, and we as constituent MPs know the people who live there. They say there are 1.2% in not-spots. Prior to rolling out this contract, have you identified that there is going to be 2.5% of the population in difficult-to-reach areas?
***Jacqui Russell:*** What we have asked all of the bidders in the competition for the communications service provider is to come back to us with information about where they are offering to provide coverage, and what they would charge for those levels of coverage. What we are trying to balance is getting as high a level of coverage as we can with securing value for money. That is the challenge for us. We are testing the evidence they are providing, so when they say, "We can provide," they are all above 97.5% and that is what we are encouraging them to come forward with. They are all coming back with evidence saying, "We have robust evidence to show that we can reach the meter points in these homes". Of course meters are not in the most convenient places.

**Q402 Albert Owen:** I understand that, but I am talking about geographical areas, because what concerns me is that the areas that don't have very good broadband, don't have mobile phone coverage, will be the very same areas. In some of these rural areas they have the fuel poor, and they are the very people that don't get gas and electricity and dual fuel benefits. So why can't we be targeting them very early on in the process?
***Baroness Verma:*** I think Jacqui has already alluded to the fact that they can still get some benefits, still having—

**Q403 Albert Owen:** Yes, but if you have no gas mains, you are not getting the benefit of dual fuel, you are not going to get the full benefit of smart metering, you are going to feel like a second class citizen in the UK.
***Baroness Verma:*** That is why we are working very hard with all the stakeholders. Our ultimate goal is to ensure that we cover all the population. We have seen that we are on better coverage than some of the mobile phone provision. We are working in the right direction, but I think there are some challenges still that we have to overcome. As new technologies evolve, of course, there will be other ways and means of being able to ensure that smart metering reaches those very hard-to-reach groups that both you and I are very concerned about.

**Q404 Dr Whitehead:** There is a separate and additional problem, though, isn't there, which is that the SMETS 2 meters on the 2.4GHz HAN frequency are only likely to reach about 70% of the population. So two thoughts: there is going to be a super SMETS 2 definition on 868MHz, I believe, but presumably a large number of SMETS 2 meters—let alone the ones that will stay there as we talked about earlier, which are not SMETS 2 meters—will stay in installation, and will have to have other methods of communications arranged for them, presumably, in order to access the theoretically available WAN system. Is that right?
***Daron Walker:*** There are lots of questions in that question. Just to break it down, one of the things that is designed into the system is that the meter is going to be separate from the comms hub. Obviously you are talking about the Home Area Network there with your 70% rather than the Wide Area Network, so the comms hub that will be installed initially as we see the roll-out starting will be using the 2.4GHz.

**Q405 Dr Whitehead:** If I can get this clear, the meters have to talk to themselves and then talk to the WAN?
***Daron Walker:*** Absolutely. The meters will be connected to the comms hub and then the comms hub will talk to the WAN.

**Q406 Dr Whitehead:** Yes, but it is a question then of the extent of , for example, first the SMETS 2 problem but there is also the issue of where meters are placed relative to the comms hub, in basements of flats, in high buildings and various other things, all of which reduces the total—
***Daron Walker:*** The comms hub is likely to be placed very near the electricity meter. You are then concerned

about how you make sure you get the signal to the gas meter. So the comms hub will be very closely located. We are clear that already the solution that we are putting into the standard will cover 70% of homes. We have also identified solutions that are being developed that will take that up to 95%. You have mentioned the 868 as part of that, and that will be developed over time and is already being worked on. There are problems around multi-block buildings, so the other thing the programme is looking at working with industry on is fixed HANs; so they won't be wireless, they will be wired HANs. Our aspiration is to get to 100% of coverage. We believe there are already solutions there or being developed to get us to 95%, and we are now working on the wired HAN to get us all the way up to 100%.

**Q407 Dr Whitehead:** Sorry, I was thinking of hands-free there and various other things. We have had suggestions that something like 60% of flats and converted buildings can't be served by SMETS 2 for those reasons. Is that a figure you recognise or is that an over-estimate?
***Daron Walker:*** Is it 60% of multi-block tenancies or 60% of flats?
**Dr Whitehead:** It is 60% of flats and converted buildings, i.e. you would need other forms of assistance in addition to the standard specification.
***Daron Walker:*** We would not recognise that figure. I have figures that are based on total dwellings, and we will need wired HANs for around 5% of those dwellings. It is possible the 60% is of a different starting point, but we have 868 and 2.4 will take us to 95% and we will be needing to look at wired HAN to get us all the way up to 100% from 95%.

**Q408 Dr Whitehead:** Yes. Are you confident that those sort of additional solutions and the combination of frequency actually resolve those problems over the period of roll-out, or might it not be sensible to just look a little bit further to make sure a common solution can be found and rolled out?
***Daron Walker:*** For the 95% we are very confident because we have done our own trials in the programme. Industry in the last few months have done their own trials within multi-block tenancies, and they are finding, using wired HAN technology, they can get the signal up to the top floors and more work will need to go on to develop that but we are clear that already we are getting up to a high 90% with that, and obviously we need to continue to develop the wired HAN solution.

**Q409 Dr Whitehead:** The HAN is the same sort of thing that you might have with a home hub and, increasingly, you will stick other things on to your Home Area Network, i.e. you will start controlling various elements of your home management through the HAN. Therefore, that will mean that a range of other things, other than smart meter information itself, will be going through the HAN, so I understand. Are there concerns about the security of other things, other than the smart meter information, being accessible through the HAN to make other systems in the household insecure, even if the material that is coming out as far as the smart meter function itself may be secure?
***Daron Walker:*** First of all, you are absolutely right, the smart metering HAN itself is very secure. The evidence that I have been given is that there is a number of layers of control and, in principle, the kind of security standards you have are akin to what you might see in online banking. It is a closed loop system, so to get access to it you need to have a device that is meeting certain security standards, it needs to be identified and tagged and different parties need to give it the ability to hook into the system.
The smart metering system itself, because it will be secure, you will not be able to access it and then start doing naughty stuff inside people's homes. Obviously what we are not trying to do is secure people's own home Wi-Fi through this programme, but we are very clear that our system is secure. Things like attaching a consumer access device, all that will be able to do is drag information about price and information about usage. It will not be able to feed information backwards or forwards beyond that. So I don't think the presence of the smart metering HAN adds to the security risk of that home. In fact you have a very secure system there, from our programme at least.

**Q410 Sir Robert Smith:** Albert Owen's houses are already losing out on broadband and gas. In my constituency they also tend to be built of granite and the meter is on the outside. Will they have to have a wired Home Area Network? Even if the meter is not accessing the communication centrally they are going to have difficulty because most wireless signals doesn't go through granite.
***Daron Walker:*** There will be a range of dwellings where the Home Area Network might not allow you to penetrate all the way through to the gas meter, for example. So, again, the wired HAN might well be the solution for those. In effect that is what will need to be tested over the coming years.

**Q411 Sir Robert Smith:** How intrusive is the wiring?
***Jacqui Russell:*** The tests are on using existing wiring, so there is no new wiring going in at all. The first round of trials has just been testing the feasibility of using existing wiring and it is looking promising at this stage. If it works that is obviously quite an attractive solution.

**Q412 Sir Robert Smith:** What sort of percentage of customers do you think will say, either for health reasons, for security reasons or for Big Brother reasons, that they are not going to have a smart meter?
***Baroness Verma:*** There will always be a small number of consumers that will have health concerns, but the evidence that has been produced and given to us from Public Health England shows that there is very little evidence that there are any health risks. Again, it is about being able to give informed knowledge to consumers about the truth rather than the myths around smart meters. I think those consumers that still find it would be difficult for them to have a smart meter will not be obliged to have one. They will be offered one because that is what

suppliers will be asked to do but, ultimately, it has to be consumer choice.

**Q413 Sir Robert Smith:** In the US, if consumers choose not to have a smart meter what has often happened is the companies have said, "That is your choice" but then there are extra costs, especially there they do monthly readings. But even in the UK the whole point of smart metering is to get rid of the meter reader. So will consumers who opt not to have a smart meter face extra costs from being read manually?

***Baroness Verma:*** That will be something that suppliers will have to address ultimately. It will be the suppliers' role to work out how they are going to engage with those consumers that will not take a smart meter. It is a competitive market; suppliers will know that, to retain and keep those consumers engaged, they can't pile on costs to a consumer that is not going to have a smart meter.

**Q414 Sir Robert Smith:** Presumably, there will no regulatory control on charges, it will be the market?

***Baroness Verma:*** Ofgem is the regulator, and if consumers feel that they are being unfairly treated then they have recourse to go back to Ofgem. So there are checks and balances in place.

**Q415 Sir Robert Smith:** The suppliers are under the obligation to take all reasonable steps to install smart meters for everybody. What is that meant to mean? What is "reasonable steps"?

***Baroness Verma:*** Again, it is about being able to ensure that those people who want to have a smart meter get a smart meter. It has been pointed out where there may be pockets where, ultimately, it is not doable in the first instance, but they need to make sure that it is in their programming, using newer technologies, newer instances to be able to ensure that those people who want a smart meter can get the benefits of having a smart meter. We have kept it reasonably flexible to be able to ensure that all suppliers are working towards 100% coverage. It is in the interests of suppliers. Ultimately it reduces their costs, so they would see it as a benefit to try and get 100% coverage in the end. It has been rightly pointed out by Mr Owen and yourself, Sir Robert, that there will be instances where there will be harder-to-reach properties and they will take a little time and perhaps newer technologies.

**Q416 Albert Owen:** I am not saying that. I am saying the market will not deliver it in the first instance because, in my opinion, the market will be great for the easy ones, for the large cities and towns. I am asking the Government, as I did not get the answer—sorry, Chair, for intervening at this point—to give some direction to help the vulnerable. I am not saying it is just about technology, it is sometimes market driven and there is not the economic benefits of doing it there first.

I wanted to raise another point with regards to those people who—and you say it is their choice—are going to be penalised for not going with the flow. We see it now in telecom. If you pay BT by cheque or anything you get penalised because you don't want to go online and pay online. So it is not real choice, is it? I would be more comfortable if the Government was to look at this seriously and say, "There are people, for whatever reason, whether there be perceived health reasons or for Big Brother, that don't want to do it." Then there should be some system there, not left to the suppliers, that could be regulated so that they can't be penalised over and above what is deemed to be their costs. Yes, they will be incurring extra costs, but those people have taken that choice to have the status quo. They might today have the best available technology, and just because a new technology is coming along, and they don't want it, should they be penalised? I think that is something that can be looked at seriously because we did not get an answer from the regulator. We got an answer from you that it would be up to the suppliers. I don't think it is good enough to be left to the suppliers.

***Baroness Verma:*** I have also caveated that with the fact that, if consumers feel that they are being unfairly penalised, they do have recourse to go to Ofgem. It would not be in the interest of suppliers not to ensure that they aren't overly burdening any individual consumer, just because they have made a choice not to have the smart meter. I do not think it is Government's place to intervene at that juncture. I think it is a job for Ofgem to ensure that the rights and—

**Q417 Albert Owen:** You would be giving guidance to Ofgem to look at this seriously?

***Baroness Verma:*** Ofgem is part and parcel of the engagement that we are doing.

**Q418 Albert Owen:** You did not give us a clear answer earlier on, that is why I am pressing you.

***Baroness Verma:*** Ofgem is part of the discussions in consumer engagement. They are part and parcel of it, as are third party groups, as are the suppliers. So there is real engagement going on, particularly in making sure that we respond to concerns, either on health issues or coverage issues, so that we do not inadvertently over-penalise those consumers, whatever choices are made, either through, "I'm not wanting to have it on health issues or Big Brother issues", or on the basis that they are not getting coverage due to technology. Those engagements are going on and they will continue to go on. The whole point of setting up the Consumer Delivery Body is to be able to feed in to that.

**Chair:** I think we are done now. Thank you very much for being so generous with your time.

# Written evidence

**Written evidence submitted by Alex Henney**

"THE KING NEVER BUYS CHEAPLY"
ATTRIBUTED TO SAMUEL PEPYS

## Executive Summary

The British roll-out of smart meters is one of the most incompetent, one of the most expensive, and definitely the most complex because of the supplier lead and the centralised comms system (whose licence runs to 170 pages). The project is likely to be a shambles which will have negligible consumer benefit. I titled an article published in *New Power* in October "Smart metering—a case study in Whitehall incompetence".

The initial cost-benefit analysis in 2007 by a reputable firm of consulting engineers came up with a net-disbenefit of minus £4 billion. This "gave the wrong answer" so the civil servants cooked the numbers to come up with a net benefit of plus £4.9 billion in 2011. *And if one believes that, one may also believe pigs can fly.* The Energy Demand Research Project found (from a self selected sample) a saving of consumption of 3%, which is trivial compared with the Committee on Climate Change's estimate of a potential 20% reduction from improved efficiency of lighting and appliances by 2020 which will be realized without any governmental song and dance. The following figures for the all-in installed cost for smart electricity meters (2009 prices) highlight the high costs:

| | *Britain* | *ENEL (Italy)* | *ACEA (Italy)* | *Iberdrola (Spain)* |
|---|---|---|---|---|
| All in cost per meter (£) | **135** | **65** | **75** | **70** |
| Programme cost for 30 million electric meters (£bn) | 4.05 | 1.95 | 2.25 | 2.1 |

Although part of the additional cost is due to the ill-judged proposal to provide in-home displays—many of which will not be used—for a cost of £600 milion, the rest is due to the structure of the arrangements. (I would not be surprised if there is not much more wasted on the gas smart meters, but they are not within my expertise).

The complexity is shown by comparing with the Italian roll-out. In 2000 ENEL designed and tested a smart meter. It ran a pilot study and then by 2008 had installed 32 million, an overall period of eight years. In May 2007 the British government envisaged a national roll-out of smart meters completed in 10 years—the start date is now 2014. A period of eight years has been filled with faffing and make-work by Ofgem and the civil service exercising their speciality of creating complexity out of irrelevancies and trivialities.

The wasteful roll-out should be stopped in its present form and replaced by a roll-out run by distribution network operators (DNOs) to a basic specification for new installations and replacement meters, with DNOs responsible for backhauling the data. The costs of the basic smart meters and comms would be socialised. DNOs and other companies would give customers the option of installing more sophisticated meters with in-home displays if they wish to have them—customers would pay the incremental costs.

Apparently the Major Projects Review Group of the Cabinet Office wanted to stop the centralised comms system, but DECC got its way. On 9 November I asked for a copy of the Group's review under FOI I have been twice informed that DECC has "not yet reached a decision on the balance of the public interest" in providing me with the document. I recommend the Committee ask for a copy.

## My Involvement in Smart Metering

In the late 1980s I knew Messrs. Bob Peddie, who had been the Chairman of the South Eastern Electricity Board (SEEBOARD), and John Fielden, an electronics engineer. They had designed the first smart meter in the world which was called the Credit and Load Management Unit (CALMU), which was (successfully) trialled by SEEBOARD in 300 homes commencing in December 1983 for approximately two years. We looked at trying to commercialise it, but the time was not ripe as the focus in the electric industry was on privatisation[1].

Over the period 2008–09, I undertook a study of smart metering in the following jurisdictions—Britain, California, Denmark, Finland, France, Germany, Italy, Netherlands, New Zealand, Norway, Ontario, Spain, Sweden, Victoria—which produced reports on each ranging up to 115 pages. I visited all of the European countries, and drew on my extensive range of contacts for the American and ANZAC jurisdictions. In 2011, I updated the summary. The studies took about a man year of effort. I also studied the history of the roll-out in Britain for the chapter "Smart Metering Provided Unsmartly" in my book *The British Electric Industry 1990–2010: the rise and demise of competition.*

My expertise is limited to electricity and so I do not comment on the gas part of the roll-out except for common aspects of the economic assessment of the roll-out and the aggregate figures in the cost-benefit analyses. That said, since smart gas meters are more expensive than smart electric meters; most people have

[1] Subsequently an Indian company PRI bought the intellectual property rights to CALMU and supplied meters for the introduction in 1994 of competition to 100kW+ customers.

their central heating on timers and pay a simple tariff; the scope for conserving gas may be less than for electricity by managing it (as opposed to installing a modern condensing boiler), I suspect that it is also a waste of money on smart gas meters.

## The Evolution of the Roll-Out

In 2004 the Carbon Trust ran a field trial of advanced metering for small and medium enterprises. Overall there was a societal benefit for larger companies, but a disbenefit for the smaller companies of £110/meter/year from which one might infer there was likely to be a disbenefit for domestic customers[2].

Until 2006 neither the government nor Ofgem was interested in smart metering beyond token words. In August 2005, Energywatch, the then statutory consumer body, initiated a debate by publishing "Get Smart: Bringing Meters into the 21st Century", which reflected more a concern about inaccurate estimated bills than the potential sophistications of smart meters. In February 2006, Ofgem published "Domestic Metering Innovation" and discovered a fundamental economic barrier to a market roll-out of smart metering, namely that the benefits arising from it are split between the suppliers, the DNOs, and the customers[3].

Some stimulus to smart metering came from Directive 2006/32/EC on Energy End-use Efficiency and Energy Services. While the Directive did not mandate smart meters, it pointed the way and provided a lobbying base for meter manufacturers and meter services providers. Subsequently Directive 2009/72/EC (electricity), part of the EU Third Package (in force and having direct effect in the UK since summer 2009), went much further requiring Member States to implement "intelligent metering systems that shall assist the active participation of consumers in the electricity supply market". However, "The implementation of those metering systems may be subject to an economic assessment of all the long-term costs and benefits to the market and the individual consumer and of which form of intelligent metering is economically reasonable and cost-effective and which timeframe is feasible for their distribution."

Another strand of the evolution was the development of the government's commitment to greening the electric industry. In May 2007, the White Paper, "Meeting the Energy Challenge", envisaged that "…within the next 10 years, all domestic energy customers will have smart meters with visual displays of real-time information…" (para 2.64).

Next the government allocated £9.75 million of matching finance for the Energy Demand Research Project (EDRP) which involved four suppliers and 47,000 households. The government took the decision to mandate a roll-out of meters in October 2009, a year and a half before the results of EDRP were published in June 2011. The study showed there were only savings—and modest savings at that, of about 3%—when customers were provided with a smart meter plus a real-time display (of which more below)[4]. (Subsequently the Committee on Climate Change has indicated that the more or less natural evolution of improving efficiency of lighting and electrical appliances could save 20% by 2020[5]. But that natural evolution provides no work for DECC and Ofgem, and no scope for Ministerial pronouncements and futuristic stories about politically "sexy" synergist relationships between smart meters, (so called) smart grids, windmills, and electric vehicles (which few people yet want to afford).

Concurrently with that survey, the government led two other activities. First to commission or undertake a series of cost-benefit analyses (CBAs) or Impact Analyses (IAs), which are discussed in the next section; second to determine a market model. Initially there were three market models, including the one eventually chosen, the "Central Communications Model", which in due course led to the idea for the Data Communications Company (DCC), for which DECC has assumed responsibility. Significantly, there was initially no consideration of a roll-out by the distribution network operators (DNOs), which is the approach used in nearly all—if not all—the mandated roll-outs in Europe, North America, and Australia. There appear to be two reasons for this omission:

— It unthinkingly adopted the so called "supplier hub" model conceived by Ofgem 15 years ago for the introduction of mass market retail competition whereby notionally the supplier was responsible for all services that the customer needed including metering. This concept was linked with the opening to competition of mass market metering, which has been of no benefit whatever to customers. Thus DECC, taking its cue from Ofgem's ideological view of metering as a quasi-commodity service rather than a fundamental infrastructure asset, assumed that suppliers should take the lead in rolling out the meters.

[2] Advanced metering for SMEs Carbon and cost savings, Carbon Trust, May 2007.

[3] Ofgem estimated that the annual cost would be £10/meter and the benefit would be £14 divided between suppliers £3, DNOs £1 and customers £10.

[4] Energy Demand Research Project: Final Analysis, AECOM, June 2011, Ofgem. The study suffered from the problem that the participants were not a random sample but were self selected. The correct and low risk approach to evaluating the smart meter project would have been to commence with a 3 year pilot project of rolling out meters to (say) two cities each of 100–200,000 households and then to have evaluated both the system costs and customer responses in a non-experimental context to avoid the typical effect of self selection of more interested customers that is typical in trials. This is partly what EDF have done in Lyons and Tours.

[5] Energy prices and bills—impacts of meeting carbon budgets, Committee in Climate Change, 1 December 2012, http://hmccc.s3.amazonaws.com/ENERGYbill12/1672_CCC_Energy-Bills_bookmarked.pdf

— DECC did not understand (and still shows no sign of understanding) that power line carrier (PLC) using the distribution network as a data communications medium is (provided the topology of the network is suitable) generally cheaper than wireless comms. PLC is widely used in Europe and North America.

Yet the suppler led roll-out with a centralised comms system is significantly more complex organisationally than a DNO roll-out; is more difficult to implement and project manage coherently than a networks-based solution; is more expensive because it cannot use PLC; and requires an additional database to keep track of who owns which meter as customers switch from a supplier that installed a meter to another supplier—which will lead to more errors.

When, under pressure, DECC commissioned a cost-benefit analysis of a DNO roll-out, it made two mistakes. First, it did not use a lower regulated cost of capital (eg 6% real) for the meters which would be part of the regulated asset base rather than the 10% used for a supplier roll-out, which would have saved customers some £300m p.a. Second, it assumed that the data would be backhauled with a central communications system, thus ignoring the potential savings from PLC. Consequently, the analysis concluded that a DNO roll-out showed no benefit compared with DECC's favoured Central Communication Model, and was put aside.

### An Attempt to Stop the Roll-Out

Ross Anderson, who is Professor of Security Engineering at Cambridge University, was concerned that the DCC would be another government IT disaster waiting to happen. We combined forces to prepare "Smart Metering—a poisoned chalice"[6] which we gave to Minister Charles Hendry last February. Professor Anderson argued that "Britain has a long history of public-sector IT disasters and the smart meter project displays all the classic signs of imminent failure. There is a quite unrealistic timescale; no stable specification; no clear technical leadership; an insufficiently experienced and accountable procurement team; an over-optimistic view of critical components, such as data communications and standards; the omission of other critical components, such as a means to communicate with the home area network; an inappropriate architecture; and a lack of a systems view."

Under a section titled "Cooking the books", I pointed out that "The first three economic assessments of residential smart metering found that it wouldn't pay for itself…So the Government's ministers kept on trying until they got a positive result." The first CBA was published in April 2007 by consulting engineers Mott MacDonald, who concluded that "Provision of feedback through advanced metering solutions is heavily burdened by the high costs associated with legacy meters and developing the comms infrastructure." Mott MacDonald arrived at a net negative disbenefit for the type of system now envisaged of minus £4bn. Then the civil service got to work on the numbers and started modestly by first reducing the net disbenefit to a range from £1.3–0bn in 2008[7], but by August 2011[8] had manipulated the figures to produce a net benefit of £4.9bn[9]. *And if one believes that one may also believe pigs can fly.*

To improve "profitability" the government stretched the assumptions:

— The electricity price forecasts used to evaluate savings increase in real terms over 15 years by 41% (2.3% p.a.) (But that assumption was not set out in the Impact Assessment).

— There were major changes in "Optimism Bias", the allowance made for uncertainty in the Treasury methodology. Mott MacDonald assessed the factors as 30% for a meter, 30–40% for comms, and 135% for the Meter Data Management System. While the factor for the meters was not unreasonably reduced to 15%, the factor for IT had been reduced to 10% which is absurd for an unspecified system, and there did not appear to be a figure for comms. The Chief Executive of EDF Energy commented to the Public Accounts Committee on the magnitude of the "huge implementation risk" involved in physically installing the meters, which required six times the current number of installers. DECC's factor was only 10%.

— The discount rate used was the Treasury's figure of 3.5% real, which compares with the 5% used in France and the 8% in New Zealand. Although a discount rate of 3.5% may be appropriate for a long-life public infrastructure project, it is not suitable for smart meters because:

1. consumers do not use such a low discount rate for their own purchases;
2. the Impact Assessment assumes suppliers will charge 10% real;
3. the meters will be replaced every 10–15 years while the rest of the equipment will be replaced even more often. IT systems cannot be given an accounting life of over 10 years; and
4. many of the in-house display units will have a very short life and many will not be used, see below.

[6] http://www.lightbluetouchpaper.org/2012/09/17/the-perils-of-smart-metering/

[7] When I asked some officials in DECC why there had been so many CBAs after Mott MacDonalds I was told "because it gave the wrong answer."

[8] http://www.decc.gov.uk/assets/decc/11/consultation/smart-metering-imp-prog/2549-smart-meter-rollout-domestic-ia-180811.pdf. Note there was a following Impact Assessment in 2012 but there are no material differences.

[9] Professor Anderson heard confirmation from a well known economist who had been involved that the figures had been politically manipulated.

The effect of the low discount rate is to magnify the difference between benefits and costs as compared with using a higher and more realistic rate[10].

— There was no attempt to discriminate between customers with small consumptions (say <2000kWh p.a.) whose cost of installation would be the same yet benefits would be lower than those with larger consumptions and larger potential benefits

We recommended "that Britain stop trying to invent the wheel and just use one that already works. The two models that immediately suggest themselves are the Dutch/Spanish[11] and New Zealand[12]; any would be much cheaper than the current proposals and would largely remove the technological risk of a systems disaster that would become apparent just in time for the next election in 2015. DCC is not necessary; no other country is attempting to build such a system; and there are good reasons for expecting a very poor outcome if we try." At our meeting with Mr. Hendry I suggested that officials should visit Iberdrola[13] in Bilbao and ENEL and ACEA in Rome (and would provide contact details).

Following the meeting I put together an elaboration of the economic part of the paper as "A critique of the impact assessment of the smart meter roll-out for the domestic sector (GB) 18/08/2011"—Annex 1 consists of the Executive Summary (the whole report has been provided to the Clerk to the Committee[14]). The key finding was that "the roll-out for electric-only appears very expensive (2009 prices)":

| | *Britain* | *ENEL (Italy)* | *ACEA (Italy)* | *Iberdrola (Spain)* |
|---|---|---|---|---|
| All in cost per meter (£) | **135** | **65** | **75** | **70** |
| Programme cost for 30 million electric meters (£bn) | 4.05 | 1.95 | 2.25 | 2.1 |

One factor in the higher cost is the proposal to provide "free" in-home displays which are likely to cost £20+ all-in, representing a cost of £600 million. This is a most wasteful idea—many will not be used, or will be thrown away because households are either elderly, illiterate/innumerate, or too busy. In a recent study for the Electricity Authority of New Zealand, the New Zealand Institute of Economic Research concluded that an in-house display was not economic and noted that "IHDs are subject to damage or loss by consumers. We assume they require replacement every five years."[15] It would be cheaper and more effective to let customers use their laptops or smartphones.

Professor Anderson and I provided our material to various people in the Cabinet Office, and the Major Projects Review Group decided to look at smart metering. One person commented to me "DECC's evidence base was flimsy." In due course we heard that the Review Group wanted to stop the DCC and modify the project, but in the end DECC got its way. On 9 November I asked for a copy of the Review Group's report. I have now twice been informed that DECC is "considering the balance of public interest with respect to Section 35 (Formulation of Government Policy) of the Freedom of Information Act 2000", but it has "not yet reached a decision on the balance of the public interest regarding the exemption and will not be able to respond to your request in full as originally intended by this date." I note the Prime Minister's assertion that "The government must set new standards for transparency"[16]—I hope this applies to a proposal to spend many £billions of customers' money. Apparently one part of DECC's story is that the reason for the much lower cost of the Italian and Spanish roll-outs is that the functionality is lower. While that claim may be correct for ENEL's roll-out, it does not apply to Iberdrola's roll-out which has a later and more developed PLC system with 10 times the bandwidth and could—if required by regulations—provide an extensive backhaul.

Furthermore, DECC's claim begs the question as to what amount of detail and how quickly information that will be useful is wanted by customers. (Needless to say, in the customary manner of the electric industry projects, compromise is achieved by incorporating the highest common denominator of requirements at the expense of customers who are not party to the debates behind closed doors.) How many people want to be

[10] There is an analogy between the manner in which the economics of Sizewell B were rigged at the Inquiry using the low rate of 5%, which was exposed as absurd when privatisation came and the rate had to be realistic. It was withdrawn from the privatisation along with the existing nuclear plants, see chapter 7, The nuclear fiasco, The Privatisation of the Electricity Supply Industry of England & Wales, Alex Henney, 1994.

[11] In the Netherlands and Spain Parliament has mandated a roll-out but the ownership of meters, meter reading and transmission of data is the responsibility of the DNOs.

[12] There is no mandated roll-out in New Zealand. Meters may be owned by the DNOs, suppliers or independent meter companies—this is a genuine market solution.

[13] Iberdrola and two other companies have developed an open metering standard and an open broadband system that has 10 times the bandwidth of ENEL's.

[14] The Impact Assessment was poorly drafted with missing and poorly presented information. Not all of the underlying assumptions were set out; one section termed "Evidence Base" included many figures that were assumptions, not evidence; there were many examples of unclear English wording.

[15] Cost-benefit analysis of additional smart meter functionality: Home area networks and in-home devices. Report to the Electricity Commission, NZIER, Dec 2009, http://www.ea.govt.nz/document/8915/download/industry/market/metering/advanced-metering/

[16] "Greater transparency across Government is at the heart of our shared commitment to enable the public to hold politicians and public bodies to account; to reduce the deficit and deliver better value for money in public spending" and "The Government must set new standards for transparency", http://www.number10.gov.uk/news/letter-to-government-departments-on-opening-up-data/

flooded with up-to-date detailed information about electricity consumption and prices? In any case, the current and long overdue proposals for simplifying tariffs run directly counter to the need for an elaborate backhaul.

Instead of visiting Iberdrola in Bilbao (to which there was an invitation), which would have provided an opportunity to see advanced PLC in operation and to learn how Iberdrola was controlling its costs, an official of DECC went to its subsidiary Central Maine Power whose network is not suitable for PLC. An e-mail from Iberdrola dated 29 November 2012 commented:

> "1. [there was a] $96 million US dollar grant received from the President Obama economic stimulus bill, ie, by all US tax payers.
> 2. Total cost per supply point for the Maine deployment is approx. $ 250, all inclusive. This is twice as much as the cost of our deployment in Spain."

*What Should Be Done?*

The roll-out should be stopped in its current form, including dropping the ongoing tender for the DCC. The DNOs' licences should be amended so that they are made responsible for providing metering and metering services. They should furthermore be obliged when replacing or installing new meters to install smart meters with a basic specification[17]. Along with the meters, the DNOs would be obliged to install a communications system which would backhaul data. The costs of the basic smart meters and comms would be socialised. DNOs and other companies would give customers the option of installing more sophisticated meters with in-home displays if they wish them—customers would pay the incremental costs.

ANSWERS TO SOME OF THE QUESTIONS IN THE TERMS OF REFERENCE

— Are the Government's cost and timescale predictions for roll-out realistic and will it deliver value for money? The cost and timescale predictions are probably reasonable; the roll-out is so expensive that it provides no value for money. But this should not be surprising because rhetoric apart, DECC have never shown any concern with customers' money. A fool and "his money are quickly parted|"—especially when it is the public's money.

— What are the potential benefits of smart meters for consumers, and what barriers need to be overcome in order for consumers to realise them? The benefits are that consumers will always receive bills based on actual rather than estimated consumption, and some customers will reduce consumption moderately. The reduction needs, however, to be put within the context of the current low average annual consumption of about 4000kWh.

— Is there a possibility that suppliers will gain considerably more than consumers from smart meters? Is enough being done to ensure that any financial benefits accruing to suppliers will be passed on to consumers? The numbers suggest that suppliers will incur a net cost rather than a benefit[18]. They will pass this cost on to customers: it will not be absorbed under competitive pressures, but will simply become another non-transparent element in the general market overhead cost of energy.

— What lessons can be learned from successful smart meter implementation and usage elsewhere in the world?

  1. The DNOs should roll-out the meters.
  2. PLC should be used where economic.
  3. No other jurisdiction has assessed smart metering as favourably as Britain apart from perhaps Italy (2200) where the detail of the benefits for ENEL are not available, but it is widely thought the main benefit is reduced theft, see Annex 2. The range of figures suggest that one can get any answer one wants—and HMG wanted the most optimistic.

— Will smart meters empower customers to take greater control of their energy consumption? Yes, in principle, and for those who wish it. But many without electric heating may have little scope to reduce consumption if they already have energy efficient lighting, a modern fridge/freezer and washing equipment, and have the habit of turning lights off.

— What are the potential obstacles to rolling out smart meters in the UK and how should these be addressed? What pitfalls have hindered roll-out programmes elsewhere and are we doing all we can to avoid them?

  1. The obstacles are the complexity of the arrangements based on a supplier led roll-out and centralized comms.
  2. Stop the current roll-out and reorganise it as a DNO roll-out when new meters have to be installed with DNOs backhauling the data.
  3. But whether it is DNO or supplier led, the logistics of the project are daunting, given that it will be the largest UK home-visiting programme for 40 years and is directed at a consumer population that

[17] There might be a very basic spec amounting to little more than automatic meter reading and pre-pay facility for customers consuming less than (say) 2000kWh.

[18] The customer benefit of £4.6bn in the August 2011 Impact Assessment is slightly less than the total net benefit of £4.9bn. These figures imply that once the benefits to network companies (which may or may not be recovered through regulation) are subtracted along with those to "UK from carbon savings" which (if they exist) are dispersed among the populace, then the costs to suppliers exceed the benefits by nearly £2bn.

is alienated from the energy industry's aspirations and in many cases hostile to its activities and indifferent to the roll-out's objectives.

— Will the commercial benefits of smart meter roll-out be captured within the UK? No—many of the meters will be manufactured in China and other countries (eg Eastern Europe, India).

— Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy? Most definitely not. It is an expensive, cumbersome, and organisationally fragmented approach that is unwise. It is a consequence in part of DECC's ignorance of PLC and in part the uncritical acceptance of the "supplier hub" concept.

**Annex 1**

EXECUTIVE SUMMARY OF THE CRITIQUE

The IAs for 2007 and 2008 showed a net disbenefit of -£4½bn and -£1.3bn respectively, which was transmuted into a significant net benefit in 2009 and increased further in 2011 to a benefit of £4.9bn, a change of >£9bn which stretches credulity. There are significant shortcomings with the August 2011 Impact Assessment (IA):

1. It is assessing a very large project where there are many unknowns eg regarding the effectiveness of the in-home-display (IHD) in saving electricity; the costs of the comms, DCC, and modifications to suppliers systems; and the benefits to network companies are perforce speculative. But more significantly, the correct and low risk approach to the smart meter project would have been to commence with a 3 year pilot project of rolling out meters to (say) two cities each of 100–200,000 households and to have evaluated both the system costs and customer responses i*n a non-experimental context*.
2. There is basic information missing from the IA—no mention of the future prices for electricity; no mention of the savings from not replacing dumb meters; no undiscounted costs, in particular the costs of the initial roll-out. And there are many examples of unclear drafting which make the document very difficult to understand.
3. The risks have not been realistically appraised, particular for IT; for comms, which is not mentioned; and for installation.
4. We consider some of the methodology is either flawed or inappropriate. For a start the IA should not have adopted a one size fits all approach, but should have analysed alternates of less sophisticated data; discriminated between the benefit of higher/lower consumption groups of customers; separated gas and electric roll-outs; and scoped a minimum cost solution. The evaluation of the DNO option was incorrect. Furthermore, the discount rate was too low, a flaw exacerbated by assuming (without disclosing the details) an increasing electricity price in real terms.
5. The roll-out for electric only appears very expensive (2009 prices):

| | *Britain* | *ENEL (Italy)* | *ACEA (Italy)* | *Iberdrola (Spain)* |
|---|---|---|---|---|
| All in cost per meter (£) | **135** | **65** | **75** | **70** |
| Programme cost for 30 million electric meters (£bn) | 4.05 | 1.95 | 2.25 | 2.1 |

6. The result of these shortcomings is that the British assessment of the benefits is by far the most optimistic of the eight others that we have analysed. We have difficulty in believing it.

**Annex 2**

A SYNOPSIS OF SOME OST-BENEFIT ANALYSES

*Victoria* (5,700[19])—after more than a quarter of the roll-out Deloitte were commissioned to undertake a CBA, which concluded:

— "Over 2008–28, the Victorian AMI Program will result in net costs to customers of $319 million (NPV at 2008). This reflects a significant change from previous cost benefit analyses undertaken… This change is driven by the fact that costs have significantly increased since the previous forecasts, benefits have been reduced and barriers to the early provision of automated metering information services have further slowed benefit realisation.

— Half of the Program costs will be sunk "or incurred by distributors by the end of 2011. Most benefits are yet to be realised."

*Spain* (3,200)—although the government was not interested, an unofficial CBA undertaken within the regulator's office found net disbenefit.

[19] The bracketed figures are the average overall consumptions for residential customers in kWh.

*Sweden* (average 8,000 but 12,000 for single family homes; 6,000 for apartments)—full smart metering only justified for dwellings taking >8,000kWH pa.

*Norway* (16,000)—no benefit without including "uncertainties".

*Denmark* (3,800)—some benefit if include customers reducing consumption.

*France* (4,750)—benefits just cover costs from the perspective of the DNO.

*Netherlands* (3,350)—a positive net benefit, but "if 20% of consumers opt for the "switch off" situation the NPV will be [marginally] negative".

*New Zealand* (7,400)—benefits likely to exceed costs for the majority of residential customers.

No CBAs were undertaken for Germany (3,500) and Finland (7,600).

*January 2013*

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**Supplementary written evidence submitted by Alex Henney**

1. On 9 November I asked for a copy of the Assessment of the smart meter project by the Cabinet Office's Major Project Review Group. After two delays because DECC was "thinking" I received four pages of specious Whitehall gibble gabble. Graciously I was provided with a 15 page report of which 14½ pages had been redacted. But significantly the only part not redacted makes a misleading assertion. Namely it states:

> "The European Union gas and electricity market Directives require that EU member states implement "intelligent metering systems that shall assist the active participation of consumers". The Directives require member states to roll out smart electricity meters to 80% of households by 2020 (with certain exceptions)."

In fact Annex 1, 2 of Directive 2009/72/EC states:

> "Member States shall ensure the implementation of intelligent metering systems that shall assist the active participation of consumers in the electricity supply market. *The implementation of those metering systems may be subject to an economic assessment of all the long-term costs and benefits to the market and the individual consumer or which form of intelligent metering is economically reasonable and cost-effective and which timeframe is feasible for their distribution."* [Italics added]

I wonder what else is misleading in the Assessment? Are there more errors? Is this another rail franchise type job? So much for Cameron's claim in a letter to all Departments dated 31/5/10 "The government must set new standards for transparency."

2. DECC has just published (yet) another Impact Assessment of the roll-out of domestic smart meters. The net present value (NPV) (best estimate) of the benefit has marginally reduced from the August 2011 Assessment (from £16.0bn to £15.9bn) but the NPV of cost has increased slightly from £10.9bn to £11.5bn. In consequence the alleged the net benefit has decreased from £4.9bn to £4.1bn. (Although it is claimed that the price base has changed from 2009 to 2011, curiously a major proportion of the basic figures remain exactly the same). The benefits have now been enumerated in a table, and show how DECC has scraped the barrel to stack the numbers up, ranging from £101m for a reduction in customer lost minutes to a generation benefit of £745m from time-of-use pricing. Both of these numbers are speculative (or a fiction of DECC's modeling) and bear out the comment which Ms. Vicky Pryce told my colleague Professor Anderson that the numbers were politically maniupulated.

3. The Impact Assessment contains exactly the same main errors as previously, notably:

- Some of the optimism bias figures are fanciful, especially that of the IT capex and opex at 10%.
- The discount rate of 3.5% real is unrealistically low for this type of project; it inflates the net benefit by valuing distant benefits more highly than if a higher—and more realistic—rate were used.
- The proposals still include the unnecessary in-home display, many of which will not be used, consequently wasting £00Ms. The Federal Energy Regulatory Commission's Staff Report for 2012 on "Demand Response & Advanced Metering" notes that while nearly 18 million customers with smart meters (out of a total of 38 million) use the internet to access consumption information a negligible number use an in-home display. (The report also notes that only 2 million—about 1½%—of residential customers are on time of use tariffs).
- The cost of the electric meter and comms remains about twice the cost of the Italian and Spanish roll-outs.
- The proposed roll-out is the most complex in the world.

With half the costs and half—if not a third—of the complexity with the DNO roll-out the project would pay-off. As it stands it is very likely to be both a mess and a waste of money. But who in the dream factory of Whitehall Place cares?

4. It would provide a good discipline if the senior civil servants who prepare, and Ministers who signed off, these Impact Assessments had their pensions negatively correlated with the actual net benefit of the outcome.

*March 2013*

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**Written evidence submitted by RWE npower**

KEY MESSAGES

— RWE npower supports the Government's rollout of smart meters. This is being led by DECC and therefore it is essential that the central DECC Programme remains in place until the DCC is fully implemented, if the success of the Programme is to be guaranteed. We also believe that the current approach contains the appropriate incentives to facilitate the delivery of customer benefits;

— In order to secure maximum benefit from the deployment of smart meters, consideration must be given to optimising the supply chain for GB manufacturers, technology providers and installers and how this can be delivered;

— Customer awareness is key and Government, suppliers, consumer groups and others must work together to get this right. Messages should stem from, and align with, understandings gained from wider, honest conversations with consumers regarding energy prices, the costs of delivering Government Policy objectives and the need for customers to engage with energy suppliers to manage and reduce their energy costs;

— The Programme must ensure a coordinated alignment with other Government policies to secure maximum benefits and consumer engagement. For example, the link between tariff reform and smart is fundamental and must not limit customers' ability to realise the benefits of smart;

— The smart Impact Assessment recognises the net cost to suppliers of implementing smart. However, the competitive market will drive suppliers to find the most efficient ways of managing and reducing these costs. Notwithstanding this, the sheer scale of capital outlay on suppliers' balance sheets should not be underestimated. This has implications for their credit worthiness which is continually monitored by rating agencies; and

— It is critical that we secure the right outcomes from rollout to capture the benefits of smart for customers, suppliers and GB PLC. However, meeting the requirements of the 2019 completion date is both challenging and partly contingent on the timely implementation of the fully-functioning DCC and the availability of SMETS 2 metering systems. A well considered rollout, with a robust end to end design, is more likely to secure consumer benefits than one that is driven by tight deadlines.

1. *Are the Government's cost and timescale predictions for roll-out realistic and will it deliver value for money?*

1.1 The Government's Impact Assessment (IA) (24/01/13) suggests that the top [5] cost drivers identified by their analysis are:

— Cost of meters and IHDs (£4.135bn);

— Installation of smart Metering equipment (£1.746bn);

— Communication Service charges for the Wide Area Network (£1.291bn);

— Communication equipment (£1.150bn); and

— Energy costs of running new smart metering equipment (£734m).

Whilst we agree that these are key cost drivers and that they generally align with our own analysis, we have also highlighted others that we believe need to be considered. In particular:

*Security*—the overall costs required to ensure that complete, end to end system and process developments are established to provide secure data handling systems and processes for both the metering equipment and the supporting communication infrastructure;

*IT development*—the overall costs associated with the end-to-end, system and process changes and updates required to accommodate the new smart metering arrangements; and

*Meter disposal and stranded assets*—the current IA covers the costs associated with disposing of meters as they reach the end of their life-time. However it does not take into account any premature meter replacement costs. This will be a substantial cost for suppliers.

1.2 The cost-benefit case for the smart metering Programme rests on the benefits to customers of being better able to manage their energy consumption, control their bills and so reduce $CO_2$ emissions. Value for money will only be realised if these benefits can be achieved and this will require the following:

*Consumer engagement*—a strong consumer engagement must be established in order for customers to understand the smart meter opportunities and the benefits that can be achieved if they are able to change their behaviour;

*A robust end to end design*—that is clearly and consistently communicated, understood and appropriately controlled is a priority requirement. Higher levels of certainty reduce investment risk and encourage appropriate and timely development and procurement activities. This is particularly true for a Programme such as this where an approach of parallel design and build has been established to better meet the timescales that have been set; and

*Reporting and Monitoring*—to continually monitor the Programme as it develops to manage it holistically.

1.3 Timescales—We are keen both to commence and complete deployment and build upon the opportunities that smart can bring to our customers. However, this is a complex technology of which consumers are unfamiliar. Consequently, meeting the requirements of the 2019 completion date is both challenging and partly contingent on the timely implementation of the fully-functioning DCC and the availability of SMETS 2 metering systems. We must not compromise on the integrity of the end-to-end design nor jeopardise our customers' trust by rushing the implementation.

2. *What are the potential benefits of smart meters for consumers, and what barriers need to be overcome in order for consumers to realise them*?

2.1 A number of benefits that are likely to accrue over time, as the market develops, will depend on the increasing maturity of:

- The technology of metering equipment and communications infrastructure;
- Industry systems, processes, customer services and change of supply activities;
- Consumers, their engagement and the value to them; and
- The energy market and product developments such as, smart homes, energy management and domestic appliances.

2.2 We anticipate that smart metering will enable a range of benefits to be realised throughout the Programme life-cycle, these will include:

- Short-term:
  - Bills based on meter readings;
  - Provision of useful "customer-specific" consumption information;
  - Some operational cost reductions; and
  - Shift in consumption patterns to reduce overall peak demand.
- Longer-term:
  - Enabling increased micro-generation;
  - Industry process efficiency improvements;
  - Proactive management of customer debt;
  - Integration of intelligent devices and appliances for demand management—smart homes; and
  - Services beyond the meter.

2.3 Barriers that need to be overcome include:

*Trust and awareness*—Independent research[20] has found that consumers currently see energy supply more as a form of taxation than a fundamental service that is required to improve the quality of life. DECC's own qualitative research[21] estimates that around 30% of consumers are in favour of smart meters, 20% are against and the remaining 50% are undecided. Whilst these perceptions remain the full benefits of the smart programme will not be realised.

*Technology*—enabled by ensuring that robust end-to-end design is developed, and technical solutions and equipment are appropriate, understood and accepted to ensure good customer experience is achieved. It is important that technological developments keep pace with the Programme and do not overtake and drive it; and

*Supplier Performance*—the reasoning behind aborted installations need to be clearly understood and used to improve products and processes where possible and that the increase in exceptions that will arise during the early stages of roll-out are properly identified and managed;

3. *Is there a possibility that suppliers will gain considerably more than consumers from smart meters? Is enough being done to ensure that any financial benefits accruing to suppliers will be passed on to consumers*?

3.1 The Government's IA indicates estimated costs of £11.7bn, the majority of which are expected to be met by suppliers with stated supplier benefits of £9bn. Therefore, we do not currently see a positive benefits case for suppliers. Indeed some of these costs will need to be passed on to customers in line with the self-regulation

[20] Foolproof—Smart Meters: the customer's view, June 2010.
[21] 6194: qualitative-research-into-public awareness-attit (21/8/12).

that competitive markets will bring and this is stated within the 2010 Prospectus relating to Consumer Protection (section 5.3). We would ask that the following points are also taken into consideration:

- The IA assumes "full capability" from day 1, but benefits will be realised over time and later in the Programme.
- The IA does not fully consider the range of equipment and solutions that will be developed in a competitive market, that will have time and cost implications.
- The impacts of issues that have arisen since the IA was last published (April 2012) have still to be communicated to the Industry.

3.2 The competitive market drives suppliers to better and more innovative ways to manage the costs of smart and these benefits then flow to customers. Further consideration should be given to the following:

*Mandatory reporting and monitoring*—Suppliers have a series of obligations placed upon them via Licence Conditions outlined by DECC to report on progress and benefits;

*Stranded asset costs*—the Programme will mandate Suppliers to replace traditional meters ahead of their scheduled lifetime with a metering system that is considerably more expensive. The considerable value of these stranded assets will need to be met by Suppliers, which undermines any benefits case; and

*Cost and alignment of DECC policies*—the overall cost for suppliers of smart, Green Deal and ECO initiatives is considerable. As these programmes of work form part of DECC's overall strategy it would be useful to identify and align any complementary aspects in order to account for costs and benefits appropriately.

4. *What lessons can be learned from successful smart meter implementation and usage elsewhere in the world*?

4.1 The majority of other smart implementations have been geographically led rollouts conducted by Network Operators. The main lessons learnt to date are with regard to operational efficiencies, privacy and metering technology issues. These include managing firmware updates and the premature introduction of complex tariffs. We have yet to understand and so benefit, from lessons arising from consumer engagement, changes in consumer behaviour and the further development of the energy market.

4.2 Further consideration should also be given to the following:

*Privacy and security*—We acknowledge that the Government is seeking to learn from international experience and that this has been reflected in their approach to consumer privacy and security issues and recognise that these areas are now being dealt with.; and

*Central Delivery Board (CDB)*—is building on the success of the digital switchover (bearing in mind the differences) and recognising the importance of good consumer engagement in terms of a successful rollout.

5. *Will smart meters empower customers to take greater control of their energy consumption*?

5.1 Not by themselves, the following should also be considered:

*Customer education*—initiated by co-ordinated, consumer engagement activities by the CDB nationally, that brings legitimacy to the Programme and individual suppliers locally, and which will be responsible for the introduction and support of new propositions. However, ultimately it will be for the customer to accept and act on these messages;

*Customer empowerment*—will only be fully realised through the development of a better working relationship with their supplier who will be able to help them understand the new technology and how best to use the new information that will become available, in order to assess the way that they use their energy;

*Smart meter enabler*—the meter and to a greater extent for the customer, the in-home display, is just the enabler to realise any benefit from better energy consumption management and the development of smarter, more energy efficient appliances etc; and

*Impact of competitive market*—will enable the development of a range of new smart applications and technologies designed to optimise energy consumption in the home.

6. *Will consumers on pre-pay meters obtain the same benefits from smart meters as other consumers*?

6.1 We believe that prepayment customers will have the same opportunities to obtain smart benefits as any other customer groups.

*Benefits*—Our expectation is that there should be no difference in the potential benefits that pre-payment customers can obtain. However, current behaviour is essentially driven by price and budgeting and it is yet to be seen what effect(s) new consumption information will have, but we anticipate that these will be positive; and

*Prepayment*—is simply a method of payment that some customers prefer. The popularity of prepayment is growing as new Pay As You Go style tariffs are introduced and an increasingly positive view of this form of payment is emerging. Prepayment customers will be treated the same as any other group under

new smart arrangements and as such should have the same opportunity to alter their consumption behaviour.

7. *Should vulnerable customers and the fuel-poor be first in line for smart meters so they can get the benefits sooner*?

7.1 Whilst we understand the logic behind the suggestion, we do not believe that early roll-out of smart metering to vulnerable customers is appropriate. Suppliers must choose customers carefully against an evolving backdrop of rollout activity and ramp-up in available technologies. We ask that the following aspects are also taken into account:

*System and process instabilities*—that may be present during the early stages of this large-scale Programme may adversely and disproportionately impact vulnerable customers;

*Ramp-up of technology*—Suppliers will have to manage a ramp-up of DCC WAN coverage and metering system HAN coverage; and early technology releases may present firmware and hardware issues to manage;

*Customer support*—Government's Response to the Prospectus Consultation, Supporting Document 2 of 5, Rollout Strategy, March 2011, section 2.71., stated that, the majority of consumer groups stressed that vulnerable consumers in particular may not have the support they require in the early stages of rollout; and

*Adverse Public Relations*—negative impacts on vulnerable customers would seriously impact the customer—supplier relationship and generate negative PR for the Programme.

8. *What is the best way of involving third-party trusted messengers, such as charities, consumer groups, community organisations, local authorities and housing associations in roll-out*?

8.1 A well planned and coordinated range of national and local customer engagement activities to raise awareness of the Programme and its aims and to address customer concerns, with a view to optimising the customers' experience:

*Central Delivery Board*—must initiate engagement with third party groups in the first instance in order to develop appropriate working relationships based on clear and consistent concepts and messages from Government, the Programme and Suppliers;

*Suppliers*—making local arrangements and contacts with the various groups to establish an understanding of roll-out activities and associated propositions; and

*Third parties*—need appropriate support from the Programme to be able to endorse and consistently communicate the range of messages, particularly to vulnerable groups. Experience gained should be used to inform and enhance further Programme activities.

9. *What are the potential obstacles to rolling out smart meters in the UK and how should these be addressed? What pitfalls have hindered roll-out programmes elsewhere and are we doing all we can to avoid them*?

9.1 Potential obstacles include:

*Over*—promising of benefits—careful and co-ordinated messaging from both CDB and Suppliers is required to ensure that unrealistic expectations are not created;

*Adverse media coverage*—addressing these issues is a key role for the CDB that must be openly supported by all stakeholders, including the Government;

*Enduring technical, end to end design*—needs to be established quickly to generate certainty and ensure that equipment is developed and manufactured to provide the industry with the capability to provide 100% coverage, in a consistent and timely manner;

*Customer acceptance*—whilst there will always be customers who will not wish to make lifestyle changes for a variety of reasons, we envisage that the expectations and understanding of these customers will be managed by the range of central and local messages that will be developed. Further support for these customers, where required, will also need to be considered; and

*Difficult installations*—will always be present either as a result of physical or equipment constraints. It is envisaged that a form of continual assessment for these sites will be required to manage them effectively and provide appropriate management information.

10. *Are levels of public awareness of and support for smart meter roll-out increasing*?

10.1 Levels of public awareness are increasing and the evidence that we have so far obtained suggests that there will be a good level of support for the Programme if the customer can be assured of a positive experience:

*Level of awareness*—we believe that the current level of awareness of smart metering is appropriate for this stage of the Programme. Customer awareness initiatives need to be carefully designed to strike the right balance between informing customers whilst not raising unrealistic expectations early in the Programme;

*Customer*—Supplier relationship—is being undermined as a result of negative Government, customer focus group and press activities and messages. It should be noted that these messages will adversely influence customers' decisions to readily adopt new and "un-tested" technologies;

*Negative campaigns*—such as StopsmartUK has gained some ground (around 700 instances nationally) and these need to be managed by central Government Press Office until such time that the CDB has been fully established; and

*Smart priority queue*—is our own initiative to capture positive, early interest has received in access of 100,000 enquiries and we hope to be developing this concept further.

11. *Is enough being done to increase consumer awareness about smart meters? Could DECC's consumer engagement strategy be improved*?

11.1 Yes, we believe that enough is being done:

*Central Delivery Board*—the establishment of the CDB will become the corner-stone for customer engagement. The development of these roles and the initiatives that will emerge are well timed to coincide with mass roll-out. The key is to ensure that appropriate and timely messages are produced and that these are communicated accordingly; and

*Balance of engagement*—it is important that messages are set to increase customer awareness, improve knowledge and understanding of the Smart Programme, but do not create an untimely, artificial market for smart products that may not be available and that could de-stabilise roll-out strategies. The balance of the content and timing of messages therefore needs to be carefully considered.

12. *Are consumers' concerns about privacy and health being addressed adequately*?

12.1 Yes, we believe they are:

*Privacy and consent*—a number of Licence Conditions placed on Suppliers are due to come into effect, which oblige suppliers to capture customer consent, or otherwise, for access to new smart meter data. These records will be subject to independent audit;

*Data Protection Act*—this overarching Act covers all aspects of Data Control and Processing, with serious penalties for breach;

*Privacy charter*—to be published ahead of Licence Conditions is currently being drafted by Energy UK in consultation with stakeholders including networks, consumer groups, privacy advocates, Government (both DECC and Ofgem) and the Information Commissioner's Office. The charter will be publicly available to customers via suppliers and the Central Delivery Body; and

*Health*—CDB and suppliers will be taking expert advice from the Government's Health Protection Agency (HPA) on health issues to ensure accurate and consistent messages are provided to consumers on this subject.

13. *Is there any evidence that consumers' concerns about smart meters are declining or growing*?

13.1 We have not obtained any evidence, to date, that suggests that customers have any major concerns at this early stage:

*Negative Campaign*—There is however a small protest group that appears to have come from the US (StopsmartUK) that has proved attractive to a very small number of customers. Consideration must therefore be given to addressing the concerns that this group has raised.

14. *Will the commercial benefits of smart meter roll-out be captured within the UK*?

14.1 We believe that there are opportunities for some commercial benefits to be captured:

*Parent companies*—we anticipate that parent companies that reside outside of the UK will expect to realise some form of return on the significant investment they are being asked to provide;

*Customer benefits*—we anticipate that a successful smart programme that delivers any commercial benefit to customers will ultimately benefit the UK economy;

*Employment*—the smart programme will ensure and probably create a number of new jobs within the areas of meter manufacture and meter operation services, particularly during the early stages of the Programme as smart meter installation volumes ramp-up to meet supplier roll-out strategies; and

*Benefit timescales*—commercial benefits to the UK may be impacted when mass roll-out is completed in 2019 reducing the volume of metering equipment and installations required. This situation is likely to continue until recertification and policy exchange activities begin again around 2023. This approach may also result in a loss of knowledge and experience.

15. *Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy*?

15.1

*The role of the DCC*—is vital for an efficient and effective smart energy supply market in the UK. It will form part the critical national infrastructure that is required to provide a secure, reliable conduit for data in the new smart environment. It will create a wide area communications technology across GB and has the potential to reduce industry complexity and to minimise the duplication of functionality between Suppliers;

*Contestability and simplicity*—the Programme must recognise the balance that must be struck between the need to procure a simple and ubiquitous UK communications solution and to maximise the contestability of the procured services to suppress costs. The country has been divided into three zones, each of which could theoretically end up with a different mix of primary and infill communications technologies. Increasing the variety of assets for suppliers to manage reduces economies of scale and introduces complexity and cost into the supply chain;

*Scope control and industry costs*—we recognise the importance of DECC's procurement process and the establishment of the scope of the services that will be provided by the DCC. Again, there is a tension between scope control and ensuring that key requirements are not dropped in order to de-risk DECC's delivery. Consequently, we warmly welcome DECC's decision to require the DCC to own and provide the communications box rather than risk disparate procurement of devices by suppliers. Similarly, we believe that customers in multi-occupancy dwellings would benefit from the installation of one, common WAN/HAN communications infrastructure. This would minimise disruption to consumers and lower support costs; and

*An end to end view of costs*—The issues above illustrate the importance of considering the total costs to the industry and the customer impact when procuring DCC services.

16. *What criteria should DECC use to measure the ongoing success of roll-out*?

16.1 We believe that it is first important to understand that we cannot measure success until the appropriate building blocks are in place for the Programme. With this in mind we suggest that the following should be considered:

- Capability:
  - Suppliers have an appropriately trained and sized workforce;
  - Full and approved end-to-end testing and trialling has been completed;
  - DCC in place with full services including full coverage WAN and HAN solutions that support suppliers' rollout deployment profiles;
  - Roadmap to full capability with a shared view of key stages of the Programme;
  - Appropriate change control systems and processes are in place; and
  - A complete supply chain is in place.
- Consumers:
  - Fully engaged and supportive of Smart Metering;
  - Consumer requirements to facilitate behavioural change have been identified;
  - CDB and local supplier engagement activities are in place; and
  - An understanding of the links with other Government policies are understood (eg Green Deal).
- Cost Effectiveness:
  - Monitoring of Programme costs and benefits;
  - Ensure that industry manages change effectively and collaboratively; and
  - Suppliers have appropriate capability to learn from their deployment and the ability to amend strategies and to share these experiences where appropriate.
- Smart Meter Rollout:
  - Ensure that metering equipment roll-out is tightly managed; and
  - Installation and customer engagement issues are identified and used for continual improvement.

*February 2013*

**Written evidence submitted by E.ON**

## Executive Summary

A successful rollout of smart metering has potential to transform the relationships between suppliers and their customers and deliver a wide range of benefits for consumers. A successful rollout is also an important milestone in the facilitation of U.K. greenhouse gas reduction targets.

We have already started delivering benefits to our consumers by undertaking trials and installing over 200k meters to date. Our smart meter trials will ensure we are equipped to rollout in the most efficient way to minimise cost and disruption to customers. We have also shared practical learning with DECC to assist the industry programme. We believe a successful deployment can only be achieved by first understanding consumer attitudes along with practical trials to determine the most cost efficient way to rollout.

We have created two smart centres of excellence to provide specific help and advice to customers with smart meters and to ensure learning can be disseminated effectively across our operational businesses. In addition we will be shortly undertaking training of all our front line staff in the provision of energy efficiency advice and through our best deal for you we are ensuring all our customers have the opportunity to be certain that they are on the best tariff for their needs.

Learning from other smart meter rollout programmes is also vital for successful deployment. We believe the reviews undertaken by DECC and the steps taken to apply such learning will put the industry in a good position to deliver success. Deployments in other countries have on the whole been successfully delivered. However where issues have arisen this is usually down to poor customer communication from industry and the government/regulatory body responsible for overseeing the rollout. This has led to mistrust and failure by some customers to accept smart meters in their homes and businesses.

Delivery of the potential benefits depends on acceptance across a range of customers (eg residential, business, vulnerable, prepayment etc). We have been conducting trials with a range of customers to understand what works best to get them engaged with smart metering. It is important that customers are not excluded from the potential benefits through a lack of understanding or engagement. The recent confirmation that a Central Delivery Body (CDB) will be set up to raise awareness is a major step forward in this area.

## Responses to Specific Questions

*Are the Government's cost and timescale predictions for roll-out realistic and will it deliver value for money?*

1. The rollout predictions are realistic and it is on this basis that we submitted rollout profiles to DECC which we believe can successfully be achieved. We remain convinced that a successful rollout will deliver great value for consumers.

*What are the potential benefits of smart meters for consumers, and what barriers need to be overcome in order for consumers to realise them?*

2. Benefits include the removal of estimated bills and the provision of near real time views of consumption which will enable consumers to make informed decisions so that they can really take control of the energy they use in their homes. Smart metering could transform the traditional view of prepayment with new innovative ways to pay as an alternative for customers to visit shops to "top up". There is also potential for consumers to benefit from improvements to the change of supplier process to facilitate quicker and easier switching and better engagement with the competitive market.

3. Customers need to see the installation of smart meters as beneficial to them. The work of the Central Delivery Body is therefore extremely important to create a positive image of smart metering and to swiftly address any unduly negative press.

4. A good customer experience of the installation is critical to ensuring customers become engaged and therefore take control. The new Smart Metering Installation Code of Practice will facilitate a good standard of service and this is something that we have voluntarily applied to our smart metering trials. The offer of energy efficiency advice, an in home display and an explanation of the newly installed technology will help consumers make the changes they need to take to derive full benefit.

*Is there a possibility that suppliers will gain considerably more than consumers from smart meters? Is enough being done to ensure that any financial benefits accruing to suppliers will be passed on to consumers?*

5. It should be noted that the Impact Assessment identifies a combination of consumer and supplier benefits that together provide a positive business case. Supplier benefits are important and will help transform the service suppliers give to customers. However supplier benefits alone do not provide the positive business case needed for the UK. Competition in supply and services will result in benefits being passed to consumers through the regime of consumer protection applied via new supply licence conditions and voluntary arrangements.

6. E.ON has already taken a number of steps to ensure customers can benefit. Our smart meter trials will ensure we are equipped to rollout in the most efficient way to minimise cost and disruption to customers.

7. We have opened two smart centres of excellence to provide specific help and advice to customers with smart meters and to ensure learning can be disseminated effectively across our operational businesses. We are also undertaking training of all our front line staff in the provision of energy efficiency advice and through our "best deal for you" we are ensuring all our customers can check they are on the best tariff for their needs.

*What lessons can be learned from successful smart meter implementation and usage elsewhere in the world?*

8. Deployments in other countries have on the whole been successful. Government have taken good practice elements from other rollouts such as formal programme management and rich functionality. Where issues have arisen overseas, this is usually down to poor customer communication from industry and the government/ regulatory body responsible for overseeing the rollout. This has led to mistrust and failure by some customers to accept smart meters in their homes and businesses. Examples include data privacy concerns in the Netherlands, introduction of new tariffs in Australia and health concerns in northern America.

9. Government have considered these issues which have resulted in the introduction of consumer protection measures. These include compliance with the new Smart Metering Installation Code of Practice, new data privacy framework and data charter. Through the implementation of the Central Delivery Body customers will have recourse to independent assurance to answer concerns.

*Will smart meters empower customers to take greater control of their energy consumption?*

10. Smart meters will provide customers with the tools to take control of their energy.

11. We have recently carried out research that has shown:

(a) 94% of consumers with a smart metering in home display continue to use this over a year after the smart metering system was installed;

(b) 78% say their behaviour has changed as a result of the smart meter installation; and

(c) 42% of consumers have undertaken energy efficiency measures as a direct result of having the smart meter and display installed.

12. Customers will see factual information of the cost of energy via the in home display in near real time and their bills will no longer be estimated. This will provide better information and empower customers by having greater awareness of costs. We have also been taking steps to train all our front line staff in the provision of energy efficiency advice to customers and through our "best deal for you" we are ensuring all our customers can check they are on the best tariff for their needs.

*Will consumers on pre-pay meters obtain the same benefits from smart meters as other consumers?*

13. Smart metering could transform the traditional view of prepayment. Smart meters remove the need for a physical device to be inserted in a meter to "top up" and instead offer new innovative ways to pay, negating the need for customers to visit shops to "top up" although this remains an option.

14. As customer convenience increases we expect prepayment will grow to evolve into a "Pay As You Go" lifestyle product such as that valued in mobile telecommunications.

*Should vulnerable customers and the fuel-poor be first in line for smart meters so they can get the benefits sooner?*

15. It is important that the benefits of smart metering are extended to all customers as soon as possible and that no customers are excluded. It is therefore important that the government procurement of the Wide Area Network for communications delivers a near to 100% coverage to ensure as many customers as possible will be able to receive the full potential of smart meters.

16. The success of the rollout depends greatly on acceptance of the benefits of smart metering across a range of customers. We have been developing different approaches for different consumer groups to ensure no single community is left behind and in doing so conducting trials with a range of customers to understand what works best, to get them engaged with smart metering. This approach has also facilitated improved access rates to customer premises.

17. There is a wider commercial driver on suppliers to maximise efficiencies in the way smart meters are installed by visiting all their customers (vulnerable or otherwise) within a given location over a defined period to maximise the efficiency of the rollout.

*What is the best way of involving third-party trusted messengers, such as charities, consumer groups, community organisations, local authorities and housing associations in roll-out?*

18. The recent confirmation that a Central Delivery Body (CDB) will be set up to raise awareness is a major step forward. It is also important that consumers can get independent advice from trusted organisations such as local authorities and other non governmental organisations.

19. We have been undertaking trials to raise awareness of smart metering. In doing so we have seen unprecedented levels of responses from consumers opting in to these trials through co branding exercises with Kettering Borough Council and more recently with AGE UK. Through a long standing relationship with AGE UK we have seen the great value that such a trusted organisation can deliver. This has included training AGE UK personnel to be able to provide smart metering help and advice.

20. We are very active supporters of research coordinated by Consumer Focus to identify the needs of differing categories of customers and have been a key contributor to the research by National Energy Action[22].

*What are the potential obstacles to rolling out smart meters in the UK and how should these be addressed? What pitfalls have hindered roll-out programmes elsewhere and are we doing all we can to avoid them?*

21. There are major challenges in the sheer scale of changing c.53m meters within a short timescale and using new technology, processes and communications systems. We see significant value in using time now to gain practical learning prior to the mass roll out. We are doing this by inviting customers to join trials to understand the best way to engage with different customer groups and to gain practical experience in the field. Our smart meter trials will ensure we are equipped to rollout in the most efficient way to minimise cost and disruption to customers. We have already gained valuable practical learning which we have shared with DECC.

22. Where issues have arisen in rollouts overseas this is usually down to poor customer communication from industry and the government/regulatory body responsible for overseeing the rollout. This has led to mistrust and failure by some customers to accept smart meters in their homes and businesses. Examples include data privacy concerns in the Netherlands, introduction of new tariffs in Australia and health concerns in North America.

23. Government have considered these issues which have resulted in the introduction of consumer protection measures. These include compliance with the new Smart Metering Installation Code of Practice, data privacy framework and data charter. Through the implementation of the Central Delivery Body customers will have recourse to independent assurance to answer concerns.

*Are levels of public awareness of and support for smart meter roll-out increasing?*

24. From our experience we have seen an unprecedented level of response to our trials compared to traditional direct marketing campaigns.

25. We have been developing different approaches for customer groups to understand what works best to get them engaged with smart metering. This approach has also facilitated improved access rates to customer premises.

26. We expect awareness to grow as mass rollout approaches and the Central Delivery Body becomes operational.

*Is enough being done to increase consumer awareness about smart meters? Could DECC's consumer engagement strategy be improved?*

27. The recent confirmation that a Central Delivery Body will be set up to raise awareness is a major step forward. There has been a need for some time to ensure consistent messages are made available in a timely manner to counter negative media articles and facilitate responses to specific customer concerns. We are actively involved with the positive steps that are being taken to facilitate some early work in this area led by Energy UK prior to the formal start of operations of the Central Delivery Body.

*Are consumers' concerns about privacy and health being addressed adequately?*

28. Data Privacy has been a cause of concern for a number of smart meter rollouts most notably in the Netherlands where adverse reaction resulted in a cessation of the rollout. Lessons have been learned and the recent publication of the Data Privacy Framework by DECC is the culmination of work in this area to address similar concerns in G.B.

29. Following extensive consultation and stakeholder engagement work is soon to complete, between consumer groups, government and suppliers on development of a Data Charter to provide assurance to customers regarding the safety and security of their data.

30. Consumer opposition to smart meters on grounds of health has also caused issue elsewhere, most notably in North America. We are pleased with the efforts made by DECC to engage with a wide set of stakeholders on this issue. Maintaining an open and honest dialogue with key stakeholders will help alleviate concerns in this area.

31. We believe that utilising and making available the latest advice from the Health Protection Agency as the right action to take at this time. Independent expert advice is also required from trusted parties for both

[22] http://www.nea.org.uk/Resources/NEA/Publications/2012/Smart-for-All-Understanding-consumer-vulnerability-during-the-experience-of-smart-meter-installation.pdf

Health and Privacy issues to stop myths permeating in the media, creating unfounded unease amongst consumers.

*Is there any evidence that consumers' concerns about smart meters are declining or growing?*

32. We have no evidence of consumer concerns growing. Our own direct marketing campaigns have seen unprecedented positive levels of response to take part in our smart metering trials.

*Will the commercial benefits of smart meter roll-out be captured within the UK?*

33. We are already seeing the creation of new "green" jobs and have plans for many more. As a result of our trials we have opened two smart metering centres of excellence, we have trained over half our in house meter installation workforce to complete both gas and electricity installations and will be recruiting further to up-skill and address resourcing issues for the rollout.

*Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy?*

34. We support the approach taken by DECC. The procurement activity appears to have identified a number of high quality contenders for data and communications service provision.

35. The Data Communication Company delivers interoperability and provides further opportunities to simplify industry processes, to enable a better customer experience and deliver better value for customers.

*What criteria should DECC use to measure the ongoing success of roll-out?*

36. The DECC impact assessment includes costs and benefits. The ultimate measure will be the extent to which these are delivered and in particular the sustained reduction in energy consumption which is the prime driver. A key early measure will be the level of customer acceptance of smart metering as a positive initiative. DECC recently published a framework for measuring and monitoring the rollout and potential benefits which they along with Ofgem will use to track and report on progress.

*February 2013*

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## Written evidence submitted by Ofgem

### 1. Introduction

1.1 Ofgem is the regulator of Britain's gas and electricity markets. Our principal objective is to protect the interests of current and future energy consumers. The roll-out of smart meters is a government policy that will affect every home and smaller business[23] in Britain. We have an interest in ensuring that consumers remain protected, both during the transition to smart meters and once the roll-out is complete.

1.2 Government has decided to implement the smart meter roll-out through regulation. This will include new obligations on suppliers requiring them to roll out smart meters, and establishing a new licensed entity (the Data and Communications Company, DCC) to manage data and communications to and from smart meters. There will also be regulation to help ensure that consumers are protected. For example, there will be new rules to ensure appropriate access by suppliers, networks companies and authorised third parties to consumers' smart meter energy consumption data.

1.3 Ofgem E-Serve managed the policy design phase (Phase 1) of the Smart Metering Implementation Programme (SMIP) on behalf of the Department of Energy and Climate Change (DECC). This phase ended with the publication of the Response to Prospectus in March 2011,[24] which set out a robust high-level policy design for the smart meter roll-out, consistent with protecting the interests of consumers.

1.4 Since April 2011, DECC has been directly responsible for managing the implementation phase (Phase 2) of the SMIP. We have been engaging with the SMIP by providing independent regulatory advice, to help ensure that changes to the regulatory framework are managed efficiently and effectively, and that the new rules operate in the interests of consumers. We will also monitor and, where appropriate, enforce compliance with new regulatory obligations put in place by government to mandate the roll-out. This runs in parallel to our work with government in considering the opportunities and issues associated with the development of a smart grid.

1.5 Some suppliers have been providing "smart-type"[25] or compliant smart meters[26] to their domestic and smaller business consumers in advance of any formal obligations being introduced. We have therefore already put in place measures to help ensure domestic and smaller business consumers who receive either "smart-type"

[23] In the context of the smart meter roll-out, smaller businesses are defined as those sites in electricity profile classes 3 and 4, and those non-domestic gas sites with consumption of less than 732 MWh per annum

[24] *Smart Metering Implementation Programme: Response to Prospectus Consultation*, DECC/Ofgem, March 2011

[25] "Smart-type" meters are those with some smart functionality, but which do not meet the government's mandated technical standard for compliant smart meters

[26] "Compliant smart" meters are those which meet the government's mandated technical standard

or compliant smart meters early are protected. We will also approve, and oversee changes to, the Smart Metering Installation Code of Practice (SMICoP). The SMICoP will be an important consumer protection measure during the roll-out, setting out rules and standards of conduct for suppliers installing compliant smart meters.

1.6 Looking forward, we will continue to introduce new measures to protect and empower consumers in response to the roll-out of smart meters[27] where appropriate. Longer-term, we also want to ensure that the wider benefits of market developments facilitated by smart meters are realised. We have therefore established our Smarter Markets Programme to help ensure that these developments happen in a co-ordinated and timely way.[28]

1.7 The remainder of this submission sets out:

— how smart meters can improve on existing arrangements for consumers;

— a summary of our research in relation to smart meters; and

— what we have done, and are doing, to help ensure domestic and business consumers remain protected during the transition to smart meters and beyond.

## 2. How Smart Meters can Benefit Consumers

2.1 Smart metering has the potential to be an important catalyst for change in the energy sector. As recognised by the Committee when launching this inquiry, smart metering can lead to significant improvements to existing metering arrangements for consumers, and the market more widely. Potential improvements for consumers beyond those referenced by the Committee include:

— improved customer service, such as an end to estimated billing;

— easier and quicker switching between different methods of payment (credit or prepayment); and

— a wider range of payment options, for example top-ups to prepayment meters over the internet, which may facilitate the development of a wider prepayment market. This in turn may benefit consumers, for example by helping them to budget.

2.2 Smart meters also have the potential to stimulate competition by providing opportunities for innovation. For example, companies may emerge that offer consumers tailored analysis of their energy consumption data and new services or products based on that analysis. Smart meters can also enable reform of existing industry processes, for example by making it quicker and easier for consumers to change supplier.[29]

2.3 However, given the scale of the roll-out—a programme to modernise the entire stock of gas and electricity meters in Great Britain by the end of 2019—there are challenges ahead. Positive consumer engagement will be vital to ensure that the full benefits of smart metering are realised. And as well as consumer, supplier and wider benefits from the roll-out, there are significant costs which will ultimately be borne by consumers. Competitive market pressures should help to ensure that suppliers control their costs, with cost savings passed through to consumers. Our Retail Market Review (RMR) set out evidence that there are significant barriers to effective consumer engagement in the retail energy market, which contributes to weakened competition. For example, research carried out as part of the RMR indicates that there are a significant number of domestic consumers disengaged from the energy market.[30]

2.4 We are therefore developing and implementing proposals through the RMR which will offer a simpler, clearer and fairer retail energy market that works in the interests of all consumers. One aim of our proposals is to improve effective consumer engagement in the market. This improved engagement now will provide a strong foundation for consumers to be able to engage with future innovative products and services facilitated by smart meters.

2.5 Effective consumer engagement in the market will also increase competitive pressures on suppliers to keep costs, including metering costs, at efficient levels. We will keep monitoring closely the development of the retail energy market and the effect of our RMR proposals. In our October 2012 consultation we committed to review formally the impact of our RMR proposals no later than 2017, subject to the new measures coming into effect in line with our published timetable[31].

2.6 The RMR has a strong focus on addressing current problems with the consumer experience of the retail energy market. All of this work, however, is being undertaken in the context of supporting longer-term development of the market. We recognise that future innovation may bring challenges. For example, a potential increase in the number, variety and sophistication of tariffs on offer may make it harder for consumers to find one that meets their needs. More engaged consumers may find they are offered customised deals, while disengaged consumers struggle with the complexity of the market.

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[27] In the remainder of this document, we use the term "smart meter" to include both "smart-type" and "compliant smart" meters

[28] http://www.ofgem.gov.uk/Markets/sm/strategy/Documents1/Promoting%20smarter%20energy%20markets%20-%20a%20work%20programme.pdf

[29] A recent survey by Consumer Focus "*Switched on?—consumer experiences of switching*" highlighted several areas where the switching experience could be improved

[30] *Customer Engagement with the Energy Market—Tracking Survey 2012*, Ipsos MORI, October 2012

[31] *The Retail Market Review—Updated domestic proposals*, Ofgem, October 2012

2.7 Our Smarter Markets Programme is considering both longer-term opportunities and risks for consumers from the smart meter roll-out. Our objective is to help ensure that regulatory arrangements empower and protect all consumers so that they can participate effectively in "smarter", more sophisticated retail energy markets (Section 4 below provides further detail).

## 3. Ofgem Research Relating to Smart Meters

3.1 This section summarises research we have undertaken, or been involved in, in relation to smart metering. Much of the research described below was undertaken during Phase 1 of the SMIP, ie in 2010 and 2011.

3.2 Trials of smart metering in homes undertaken as part of the *Energy Demand Research Project* (EDRP)[32] were found to be more successful in reducing energy consumption than non-smart meter trials. However, the EDRP also showed that a smart meter alone may not be enough to influence behaviour. Consumers need to know how to access the data that their In-Home Display (IHD) provides, understand what to do with that data and have an interest in doing so.[33]

3.3 In 2010, we commissioned qualitative research into domestic *consumer awareness of, and attitudes towards, smart metering*.[34] This focus group-based research was published alongside the Smart Metering Prospectus[35] in July 2010. About a third of participants claimed to have heard of smart meters, though their understanding of what a smart meter is was often inexact. Participants generally focussed on the energy saving and monitoring elements of the meter, rather than remote readings. Perceptions of smart metering were positive and there appeared to be extremely few, if any, negative misconceptions. Typical reactions were cautiously positive. There was slightly more interest in smart meters among those for whom bills were an issue, but these differences were not that consistent between groups.

3.4 We have also undertaken two pieces of qualitative research into domestic consumers' views of smart meters using our Consumer First Panel.[36] The first took place in late 2010 and considered *consumers' views of the smart meter roll-out* in general.[37] This found that Consumer First Panellists had some awareness of smart meters. However, only a few had a detailed understanding of what they are, and there was no understanding of the difference between a smart meter and an IHD. Reactions to smart meters were neither overwhelmingly positive nor negative when they were discussed at some length.

3.5 Panellists welcomed certain benefits that would help them reduce and regulate energy usage and save money on energy bills. However, the cost of the roll-out was mentioned as being potentially very high and some were concerned about data privacy and security. Panellists expressed some anxiety about feedback on expenditure, and the effects it may have on the behaviour of some consumer groups such as the elderly, to the extent that they thought some might stop using their heating when they really need to. Panellists also thought that some consumers would be disadvantaged because they may find the smart meter and IHD difficult to understand or use.

3.6 Secondly, we undertook a specific piece of research on *smart metering data privacy* issues in early 2011.[38] Overarching points from the research included that Panellists did not want more "noise and confusion" in their lives as a result of sharing their smart meter data, such as increased levels of direct marketing. On balance, however, most Panellists indicated that these concerns were generally no more pronounced than in other industries in terms of the governance of data. They wanted choice about how their data is used—and clear information about who is using their data and for what purposes.

## 4. Consumer Protection in a Smart World

4.1 This section summarises what we have done, and are doing, to help ensure that domestic and business consumers remain protected during the transition to smart meters and beyond. We have focussed on issues that are specific to smart meters, rather than broader consumer protection issues. The measures described below are in addition to other existing consumer protections. We also describe in more detail our work to shape market development through our Smarter Markets Programme.

[32] The Energy Demand Research Project (EDRP) was a suite of large scale trials across Great Britain. The aim was to understand how consumers react to improved information about their energy consumption over the long term. The EDRP trailed a range of methods of providing consumers with improved feedback on their energy consumption, including smart electricity and gas meters. Ofgem oversaw the trials on behalf of DECC

[33] *Energy Demand Research Project: Final Analysis*, Aecom, 2011

[34] *Consumers' views of smart metering*, Report by FDS International, July 2010

[35] *Smart Metering Implementation Programme: Prospectus*, DECC/Ofgem, July 2010

[36] The Consumer First Panel is a deliberative forum comprising over 100 consumers from around Great Britain who are chosen to be broadly representative of the population. Since January 2009 Panellists have met regularly to discuss key issues impacting on their participation in the energy market. Panellists change each year

[37] *Ofgem Consumer First Panel; Year 3 2010/2011: Findings from first workshop held in November 2010*, Ofgem, March 2011

[38] *Ofgem Consumer First Panel; Year 3 2010/2011: Report from the third set of workshops: Smart Metering Data Privacy Issues*, Ofgem, June 2011

4.2 The wide range of activity described below, as well as our independent regulatory advice to the SMIP, contributes to promoting value for money for all consumers (one of the four key themes set out in Ofgem's draft Forward Work Programme for 2013–14[39]).

*Taking a proactive approach to addressing consumer issues*

4.3 A key first step in addressing consumer issues relating to smart metering was our *Smart Metering Consumer Protections Package* ("Spring Package"). As part of this, we introduced licence modifications in October 2011 that strengthen existing protections for domestic consumers, especially vulnerable consumers.[40] These new protections relate to disconnection and the use of meters operating in prepayment mode.

4.4 These changes will ensure that existing safeguards for such consumers continue to apply in relation to smart meters. Suppliers now have to have regard to detailed guidance on identifying vulnerability before taking the decision to disconnect any domestic consumer. The "Big Six" suppliers already voluntarily commit never to knowingly disconnect a vulnerable consumer and have undertaken to pay compensation on a voluntary basis to any domestic consumers who are disconnected in error. The Spring Package measures also introduced rules governing the use of load limiting functionality (where the flow or amount of electricity supplied to a consumer is restricted[41]) and credit limiting (where the supplier limits the amount of credit available to the consumer).

4.5 Business consumers do not have the same levels of protection in relation to debt and disconnection as domestic consumers. We do not currently see that similar, enforceable licence protections are necessary or desirable for business consumers. However, suppliers should treat business consumers who are in payment difficulties and face disconnection fairly, including where the business consumer has a smart meter.

4.6 As part of the Spring Package, in November 2011 we put forward a set of self-regulatory requirements for suppliers to apply to *help ensure that businesses receiving smart meters are treated fairly.*[42] This included steps suppliers should take before and after disconnection, steps suppliers should take to remedy cases of wrongful disconnection, and compensation to smaller business consumers in cases of wrongful disconnection. In addition, we reminded suppliers of their obligations to issue statutory notices before disconnecting a business consumer or installing a prepayment meter. We have monitored these issues by collecting quarterly data from January 2012 on disconnections and use of prepayment functionality for smaller business consumers with smart meters.

4.7 We also published an open letter setting out our expectations more generally in relation to disconnection of business consumers in December 2012[43]. This confirmed that we expect to see suppliers applying good practice in these areas for all business consumers, including those with smart meters. We also committed to review the quarterly information we have been receiving from suppliers on disconnection rates in Spring 2013, with a view to publishing this data in the future.

4.8 In December 2012 we reviewed suppliers' *practices in relation to load-limiting* in the domestic sector.[44] Load limiting may bring benefits to consumers. Prepayment consumers might, for example, find load limiting functionality useful in allowing them to continue using basic appliances on running out of credit. However, we are keen that the use of load limiting functionality does not expose consumers to disconnection "by the back door". We also wish to see load limiting functionality introduced in a way that is clear and easy for consumers to understand.

4.9 Our review did not identify plans to trial or introduce load limiting in the domestic sector in the near future. We understand that the majority of suppliers are some way off developing plans for the use of load limiting in the domestic sector, if they intend to utilise the functionality at all. We are therefore not proposing the introduction of new measures in this area at present, having already introduced measures targeted at load limiting as part of our Spring Package. However, given the importance of this issue to consumers we will continue monitoring developments.

4.10 We have also put in place new licence conditions to *support effective switching* for domestic consumers that have smart meters installed.[45] These are intended to be a transitional measure, which will no longer be needed when all consumers have fully interoperable[46] smart meters.

[39] http://www.ofgem.gov.uk/About%20us/CorpPlan/Documents1/Forward%20Work%20Programme%202013–14%20Draft%20for%20Consultation%2018%20December%202012.pdf

[40] http://www.ofgem.gov.uk/Sustainability/SocAction/Publications/Documents1/Modification%20Direction.pdf

[41] In 2011, we commissioned a programme of qualitative research to provide insight into customer reactions to alternative disconnection methods for credit customers and alternatives to self disconnection for those who run out of credit on a prepayment meter. The findings from this research were used to inform our approach to introducing rules around the use of load limiting functionality as part of the Smart Metering Consumer Protections Package

[42] http://www.ofgem.gov.uk/Sustainability/SocAction/Publications/Documents1/nondomsmartmeterspringpackageopenletnov.pdf

[43] http://www.ofgem.gov.uk/Sustainability/Cp/Ewbc/Documents1/Non-dom%20disconnection%20openletter%2020–12–2012.pdf

[44] http://www.ofgem.gov.uk/Sustainability/SocAction/Publications/Documents1/Ofgem%20Statement%2017_12_2012.pdf

[45] http://www.ofgem.gov.uk/Markets/sm/metering/sm/Documents1/smart%20meters%20-%20effective%20switching.pdf

[46] The SMIP is introducing new industry arrangements to support smart metering. This includes setting the technical standard for compliant smart meters, and the central arrangements under the DCC that will allow suppliers to communicate with them. Smart meters operated under these arrangements in accordance with the Smart Energy Code will be fully interoperable; a new supplier will be able to take over the operation of a smart meter with no loss of the core functionality. This means that consumers will continue to receive smart services on change of supplier

The new rules cover two areas. The first set is designed to help domestic consumers understand if the smart services they are receiving will be maintained if they switch supplier. The second set removes some of the barriers that could prevent the new supplier from operating the meter in smart mode, if they wish to do so. These rules took effect in November 2012 and January 2013 respectively.

*Consumer protection during the roll-out*

4.11 We support government's decision to establish a licence-backed *Smart Metering Installation Code of Practice (SMICoP)* to govern installers' behaviour when installing a compliant smart meter in domestic and micro-business premises.[47] The installation visit will provide a unique opportunity for consumers to access the benefits offered by engaging with their smart meter and, for domestic consumers, the IHD. The SMICoP should help to facilitate this engagement, while also ensuring that consumers, particularly vulnerable consumers, are fully protected.

4.12 Government published its decision on the high-level policy design for the SMICoP in April 2012;[48] the associated licence conditions came into force in November 2012. Decisions taken included that suppliers will be obliged to comply with overarching principles to ensure, among other things, that installation visits are conducted in a fair, transparent, appropriate and professional manner. In addition to existing obligations in relation to sales and marketing, the SMICoP will prohibit sales to domestic consumers during the installation visit. Domestic consumers must also give prior consent for face-to-face marketing to take place during the installation visit.

4.13 The licence conditions made by government require Ofgem to approve the first version of the SMICoP. We will therefore shortly be consulting on the draft SMICoP submitted to us by suppliers in December 2012, in advance of publishing the final approved version later this year. Once the SMICoP is in place, we will be responsible for monitoring and, where appropriate, enforcing suppliers' compliance with its requirements. We will also be able to instigate changes to the SMICoP if we think these are needed.

4.14 We are currently developing our strategy for *regulating the new rules* that will underpin the mandated roll-out of compliant smart meters. This includes monitoring the roll-out by suppliers and checking that obligations regarding the installation visit are fulfilled. We want to ensure that suppliers are held accountable for delivery of the roll-out and that there are practical and effective safeguards against poor delivery. We therefore welcome the government's proposals to give us new powers to implement an interim monitoring regime which would enable us to take action during the roll-out if appropriate. Subject to the underpinning licence conditions successfully completing the relevant Parliamentary processes, we will be consulting in relation to these powers later this year.

*Shaping market development*

4.15 Smart meters can enable reform to existing market arrangements, such as change of supplier processes, which can in turn make the market work better for consumers. Our *Smarter Markets Programme* aims to proactively identify, and see implemented, changes to these arrangements to enable the development of smarter markets. By "smarter markets", we mean those which are more efficient, dynamic and competitive, delivering better outcomes for all consumers.

4.16 Following consultation with stakeholders, we have prioritised four key projects: change of supplier processes, electricity settlement arrangements,[49] the regulatory and commercial framework around demand-side response (DSR)[50] and arrangements for consumer empowerment and protection. The consumer empowerment and protection project will look forward to identify both risks and opportunities for domestic and business consumers from the smart meter roll-out in the medium to long term. It will also look at whether new rules, or changes to existing rules, are needed to protect consumers or facilitate innovation in light of these risks and opportunities. We intend to consult on the workplan for this project later this year.

4.17 We will continue to take a proactive approach to addressing consumer protection issues in relation to smart metering. We will also be developing appropriate next steps to help ensure that the wider regulatory framework empowers and protects consumers to participate effectively in smarter retail energy markets.

*February 2013*

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[47] A micro-business is defined as a business which has: an annual consumption of electricity of not more than 55,000 kWh; or annual consumption of gas of not more than 200,000 kWh; or fewer than ten employees (or their full-time equivalent), and an annual turnover or annual balance sheet total not exceeding €2 million

[48] http://www.decc.gov.uk/assets/decc/11/consultation/smart-metering-imp-prog/4841-government-response-to-licence-conditions-for-inst.pdf

[49] Electricity settlement is the process for comparing the amount of energy that a supplier has arranged to be put on the network with the amount that their consumers have consumed

[50] Demand-side Response (DSR) refers to changes in energy use by consumers in response to a signal, for example cheaper prices

**Supplementary written evidence submitted by Ofgem**

1. *Will there be an obligation on suppliers to produce accurate bills for consumers once smart meters have been installed? If so, where will this obligation be set out? [see Qs 296–297 below]*

In May 2013, the Government laid draft licence conditions before Parliament, which included an "Operational Licence Condition," which requires energy suppliers to establish and maintain a remote connection with the smart meter.[51] The provision of regular remote meter readings will be a core Data Communications Company (DCC) service that will be provided to the supplier, the per-read cost of which will be very low. Standard Licence Condition 21B of the gas and electricity supply licences requires suppliers to take all reasonable steps to reflect any meter readings that they take in the customer's next bill. These obligations and associated commercial incentives together mean that suppliers can be expected to provide accurate bills to their customers using remote reads. However, we will keep this under review and consider further action if there is any evidence of problems.

2. *Will there be any limitations on back-billing domestic and non-domestic consumers once suppliers have installed smart or advanced meters (ie, after any initial discrepancies have been dealt with)? If so, where will this be set out? [see Q298 below]*

With regards to back-billing, consumers are currently protected in a number of ways.

Energy UK have developed a code on billing which, among other things, limits back-billing to domestic consumers to a maximum of one year.[52] Five of the "Big 6" suppliers are signatories, the exception being Scottish and Southern Energy, which has a similar commitment with relation to back-billing in their Domestic Customer Charter.[53]

More recently, voluntary standards for back-billing micro-businesses have been developed by Energy UK and the Industrial and Commercial Shippers and Suppliers (ICoSS) Group.[54] This commits signatories to limit back-billing to a maximum of three years for electricity consumers and four to five years for gas consumers (depending on the time of year the back-bill is issued). Most energy suppliers supplying micro-businesses have signed up to these standards and a number, including the Big 6, have committed to limiting back-billing to one year by the end of 2014.[55]

As part of our recent Retail Market Review, we plan to introduce new Standards of Conduct with regards to how suppliers interact with consumers. These Standards of Conduct will require that domestic and micro-business consumers are treated fairly in terms of the processes and procedures a supplier has in place. This will cover their procedures for accurate billing and the time a customer has to pay a back bill. Subject to the outcome of our Statutory Consultation, these new Standards of Conduct are due to come into force in late August.[56,57]

As stated in our response to your first question, smart meters should provide consumers with accurate bills. Setting aside any existing discrepancies which might be discovered during the meter exchange, this should make back-billing unnecessary, except in cases where the meter has been tampered with or damaged.

3. *Will non-domestic consumers be entitled to free access to their energy consumption data from smart or advanced meters? If so, where is this set out? If not, what is the reason for this? [see Qs 319–320 below]*

Larger non-domestic consumers are subject to an advanced meter roll-out, which is due to be completed in April 2014. Standard Licence Condition 12 of the gas and electricity supply licences requires that these consumers be given timely access to the data provided by their advanced meter, on request. The Government has said that it intends to extend this requirement to smaller non-domestic consumers (who are subject to the smart meter roll-out) as well.

In the non-domestic market, the level of data provision and the complexity of the data service offers may vary and there are no rules governing charging for metering or data services. In practice, early experience from the installation of smart-type electricity meters to smaller non-domestic sites indicates that consumers are not being separately charged for access to half-hourly consumption data at the moment.

[51] The text of the Operational Licence Condition can be found here: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/197887/13–05–09_SEC_and_OLC_web_docV3.pdf

[52] The code of practise can be found here: http://www.energy-uk.org.uk/publication/finish/43/411.html

[53] https://www.southern-electric.co.uk/uploadedFiles/CoreMarketingSites/Assets/Documents/CustomerCharterSE.pdf

[54] The voluntary standards can be found here: http://www.energy-uk.org.uk/publication/finish/43-code-of-practice-for-accurate-bills/467-voluntary-standards-for-back-billing-microbusiness-energy-customers.html

[55] More details of what each supplier has committed to can be found here: http://www.consumerfocus.org.uk/files/2011/10/Suppliers%E2%80%99-back-billing-commitments-to-micro-businesses-consumers1.pdf

[56] The Statutory Consultation for the domestic Standards of Conduct can be found here: http://www.ofgem.gov.uk/MARKETS/RETMKTS/RMR/Documents1/RMR%20Domestic%20Statutory%20Consultation_SOC_online.pdf

[57] The Statutory Consultation for the non-domestic Standards of Conduct can be found here: http://www.ofgem.gov.uk/Markets/RetMkts/rmr/Documents1/The%20Retail%20Market%20Review%20-%20Final%20non%20domestic%20proposals_22%20March_FINAL.pdf

Aside from receiving data from their suppliers, smaller non-domestic consumers with a SMETS 2[58] compliant meter will be able to directly access detailed consumption information held by the meter, for free. This will be done via the Home Area Network (HAN), using a compliant Consumer Access Device. SMETS 2 and the associated HAN specifications are currently being developed by the Government and industry.

4. *Licence condition 39 in the Electricity Supply Licence standard conditions states that: "The licensee must take all reasonable steps to ensure that a Smart Metering System is installed on or before 31 December 2019 at each Domestic Premises or Designated Premises in respect of which it is the Relevant Electricity Supplier." What does this mean in practice for suppliers? What is expected of suppliers when customers wish to opt out of having a smart meter or when there are communications issues with smart meter connection?*

In December 2009, the Government concluded that suppliers are best placed to take on responsibility for the rollout of smart meters.[59] As a result, an obligation was placed on suppliers to take "all reasonable steps" to roll-out the meters. The "all reasonable steps" caveat was included in recognition of the fact that there may be instances where installation is impossible.

Suppliers will generally be best placed to decide how to manage their own rollouts. They may face difficulties in certain installations that they need to overcome. It is important that they have the incentives to develop their own solutions in these situations. Although, Ofgem can issue guidance to suppliers as to what might constitute all reasonable steps we do not consider it appropriate to do so at this early stage. This is because the difficulties that suppliers may face when installing meters and the solutions they may deploy to mitigate these difficulties are not yet understood. Guidance without this information could be misplaced, resulting in lower incentives on suppliers to find best-fit solutions for difficult installations and, consequently, a worse outcome for consumers. We will, however, keep this under review as the rollout progresses.

With regards to customers who wish to opt out of having a smart meter, the Government has stated that it does not expect suppliers to take legal action to fit one if they cannot get the householder's co-operation.[60] However, consumer attitudes could change over time. For example consumers that do not want a smart meter now, may change their mind when they see them use in their friends' and neighbours' homes. Our understanding is that the Government is actively considering how the needs of consumers should be met in instances where there are communications issues with the smart meter connection.

*June 2013*

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**Written evidence submitted by The Institution of Engineering and Technology**

EXECUTIVE SUMMARY

1. In the course of this inquiry we predict that the Committee will receive a large amount of apparently contradictory evidence because the subject of smart metering and smart grid spans so many disciplines: power system planning; energy retail; IT; telecommunications; meter design and manufacture; regulation; consumer affairs; behavioural analysis and more. Few, if any, individuals or organisations have practical knowledge in more than two of these areas. This is why *technical programme management* is so crucial.

2. When the Institution of Engineering and Technology (IET) addresses smart metering issues we draw on the expertise of professional engineers and particularly the IET's three Policy Panels on Energy, IT and Communications. However, we are not qualified to comment on the social and behavioural aspects, highly important as they are.

3. In this evidence we draw attention to some key themes that we believe will be helpful to the Committee.

4. Our key points are:

(a) The roll-out of smart meters is a complex programme with significant risk. The timeline for roll-out should be determined based on what can reasonably be achieved rather than driven to meet political goals without consideration of practicalities. The potential consequences of a poorly conceived or overly rushed roll-out include cost escalation, poor functionality and rejection by consumers.

(b) The costs in the business case need to be tested against best current knowledge; costs are likely to have escalated as the system functionality and architecture has been clarified.

(c) The benefits in the business case need to be tested to ensure they remain deliverable by the roll-out programme.

(d) Even with a well-planned roll-out this is a complex business and behavioural change project supported by significant IT infrastructure. It will be vulnerable to cost overruns, delays and

[58] Smart Metering Equipment Technical Specification—version 2: https://www.gov.uk/government/consultations/smart-metering-equipment-technical-specifications-second-version

[59] See page 18 of the Government's December 2009 Response to the Consultation on Electricity and Gas Smart Metering: http://www.smartgrid.gov/sites/default/files/doc/files/Towards_Smarter_Future_Government_Response_To_Consultation_O_200901.pdf

[60] As stated on the gov.uk website: https://www.gov.uk/smart-meters-how-they-work

degradation of functionality unless well managed. The Committee may wish to enquire into these aspects, including the proposed management arrangements and key contract terms with suppliers.

(e) The IET is pleased that the meter specification has been developed to include functionality to enable a future smart grid, as that is where the main benefits are likely to lie. Smart grid benefits are not currently included in the business case, which means we do not have an accurate picture of smart metering costs and benefits.

(f) We are aware of significant work on end to end system security, but have not seen details as this is not in the public domain. End to end security is a property of the metering system as a whole and cannot be verified by proving that individual components of the system are secure. We recommend the Committee's enquiries include security aspects given their vital importance to public confidence and the system's role as part of the critical national infrastructure.

### Smart Meters and Smart Grid

5. The Coalition Statement in May 2010 stated "We will establish a smart grid and roll out smart meters". While there is much talk about smart grid and smart meters there is still confusion about what these terms actually mean. Smart meters are just that; our existing meters are going to be replaced by new meters that have more functionality and, most importantly, can exchange data with our electricity supplier. The smart grid is a much bigger concept in which smart meters play one part. The IET has consistently argued that the deployment programme for smart meters must be designed and implemented as part of a wider plan for smart energy grid infrastructure as part of a whole system approach to energy supply and demand.

### Ability of Meters to Facilitate Time-shifting of Demand

6. Smart meters will support a range of new energy services that are expected to emerge in the coming years, including tariffs to encourage flexible electricity load to be shifted to periods of low demand, reducing the overall costs of the electricity system.

7. Recent studies by Glasgow Media Group and Chatham House have found that the public is not motivated to change behaviour in response to *climate change* because they hear so much conflicting evidence on the subject. However, when they were introduced to the concept of threats to *energy security* (which was new to them) this had a much more significant impact on longer term behaviour. This indicates the potential for improved efficiency if customers were more knowledgeable about energy.

8. Many of the benefits will be more easily obtained, or even increased, if in-home energy management systems thrive and this will depend to quite some extent on whether the energy companies embrace the concept of variable tariffs where energy costs more when it is in high demand. Steps need to be taken to ensure that the Government's laudable aim of reducing the number of consumer tariffs does not stifle development of tariffs which reward customers who are able to shift demand away from peak demand or supply-constrained times.

9. The SMETS 2 consultation shows that DECC have taken the in-home energy management point on board and the so-called Consumer Access Device will provide historical and current consumption data for that meter (or for that consumer on that meter, as the data on the meter is deleted when a consumer moves house). What the householder used the energy for exactly is out of scope for the smart meter but could well be in scope for a home energy management system.

10. The future opportunities for more real-time integration between home/office energy management systems and the local grid in order to manage congestion locally is seriously lacking in the present approach. This could stifle future local community schemes to manage their own network assets. The Committee may wish to inquire as to how competition at the local level will be stimulated and how the use of data in real-time at a network level can be brought forward under the frameworks currently under consideration.

### Security and Inter-operability

11. Throughout the programme, the IET has repeatedly stressed that secure operation of individual components of the smart metering system, though important, cannot guarantee system security. End to end system security is critical. A new design element, the Consumer Access Device (CAD) has recently been added to the draft SMETS 2 HAN system and the repercussions of this have not yet been fully worked through. The fact that a significant change to system architecture has been added at this late stage cannot fail to ring alarm bells. The tight time constraints should not be allowed to compromise rigorous end to end security analysis and testing of the resulting system.

12. Also time is needed to develop the UK ZigBee interface for the Home Area Network (HAN). The UK requirements have doubled the length of the ZigBee specification which means that the time taken for testing the interoperability of all components has risen exponentially—now estimated by the Chair of the UK ZigBee Alliance at an additional two years. Meanwhile testing alone is not sufficient as a methodology for achieving end to end security of a large complex ICT enabled system.

13. It is likely that almost all meters will be manufactured outside the UK. While this has implications for balance of payments, it also raises concerns over system security due to embedded software contained in the meters. The Committee may wish to inquire what steps are in place to protect and ensure system security. This aspect may be particularly difficult to assess since much of the hardware is likely to be imported containing embedded software for which the source code is not readily available for inspection and assessment.

### Lessons from Previous IT-enabled Business Change Projects

14. A rushed solution to legitimate technical concerns is highly likely to lead to programme failure later down the line. Completion targets should be set according to engineering reality not political deadlines. The key principles derived from study of the causes of major IT-enabled project failure are now well documented and we recommend that DECC studies the report "*Engineering Values in IT, a joint report by the Royal Academy of Engineering, The Institution of Engineering and Technology and the British Computer Society*".[61]

15. Historically projects that involve both new, leading edge technology and operational concepts suffer large overruns on budget, even assuming design specification and objectives are met. This can be especially true for IT based systems where insufficient design verification and testing has been implemented.

16. The Committee may also wish to explore with DECC what steps they are taking to protect consumers against cost overruns by the companies responsible for IT and communications contracts.

### Cost and Value for Money

17. It is important to recognise two aspects to the assessment of value for money:

(a) the simple relationship between the costs of smart metering and scope for reducing individual bills, and

(b) the benefit to the UK as a whole of consumers, in due course, being able to time-shift their electricity use to flatten out peaks in demand (or more closely match their demand to the production of electricity from intermittent renewable generation at any given time). This would reduce the amount of new generation that needs to be built, and/or the amount of low efficiency high-carbon peaking plant that would need to be deployed during times of peak demand or low output from renewable generation. It would also reduce the need for costly and disruptive electricity transmission and distribution network reinforcement—involving for example the need for additional overhead lines in rural areas, or street excavations to lay larger capacity cables in urban areas.

18. For a long time DECC had a Smart Metering Programme which recognised cost benefit analysis of smart meters without having a strategy for a smart grid or placing any value on the contribution of smart grid infrastructure investment.

19. In terms of value to the nation, the *time of use* element of energy consumption, particularly of electricity, should be given greater prominence in public debate. This is because both the cost and the carbon intensity of electricity varies according to the supply and demand at any particular time. Overnight electricity will be plentiful and low carbon coming from nuclear and wind (in most weather conditions). At times of peak daytime demand, or low wind generation, the least environmentally friendly and most costly generation has to be pressed into service. As we move towards meeting our 2020 decarbonisation targets this will be even more the case. The electricity that comes on at the flick of a switch will be more costly to produce and be less environmentally friendly at peak times than it is during periods of low demand and it is in everyone's interest that those that can defer their use are incentivised to do so, leaving more supply available for those whose need is urgent.

*What lessons can be learned from successful smart meter implementation and usage elsewhere in the world?*

20. Caution will be required in interpreting responses received to this question as definitions of what a smart meter is and what constitutes success vary markedly around the world.

21. An additional distinction is that in most other countries the metering is provided by the distribution company, (often a vertically integrated energy supply and distribution arrangement) which makes the system required significantly less complex than the retailer-led model adopted in the UK.

22. No other country has attempted to install a system of such scale and complexity involving so many stakeholders as that being planned by the UK. Consequently this initiative will have to address many technical and business change challenges not addressed in other countries.

23. The UK's decision to make energy retailers responsible for delivery as they have the "relationship" with the customer, now looks less useful due to the extent to which retailers are mistrusted by customers and the importance of encouraging customers to switch supplier. Additional safeguards have been drawn up (The Smart

[61] Engineering Values in IT: A joint report by the Royal Academy of Engineering, The Institution of Engineering and Technology and the British Computer Society, July 2009
http://raeng.org.uk/news/publications/list/reports/Engineering_values_in_IT.pdf

Metering Installation Code of Practice) to prevent suppliers from taking advantage of that relationship for marketing purposes.

*Should vulnerable customers and the fuel-poor be first in line for smart meters so they can get the benefits sooner?*

24. No. We are of the opinion that the advantages of smart metering to these groups have been over-stated. The fuel-poor would gain far more benefit from a good standard of building insulation and modern programmable thermostats set up correctly.

25. That said, it will be important to ensure that neither vulnerable nor fuel-poor consumers are disadvantaged due to potential technical difficulties in commissioning smart meters in multi-occupancy residential buildings. Early results of trials have shown that high-rise buildings, especially those with communal (typically basement or ground floor) metering positions, will present challenges in terms both of signal penetration and communication with in-home displays. Vulnerable and fuel-poor consumers could be disadvantaged if delays in enabling smart meters in such buildings precluded the possibility of those consumers taking early advantage of new time-of-use tariffs, though we leave comment to other specialists as to whether these groups of consumers would make use of and benefit from such tariffs.

*Are consumers' concerns about privacy and health being addressed adequately?*

26. The IET's Biological Effects Policy Advisory Group chairman, Professor Tony Barker, has advised that consumers' concern regarding any health issue with the roll-out of gas and electricity smart meter infrastructure is likely to be related to the wireless technology that might be adopted. In the absence of smart meter infrastructure decisions, it is presumed that any wireless communication will be comparable in power, if not lower, than existing technologies, with a low data-rate, and is likely to use existing communications technologies such as WiFi, Bluetooth, mobile phones and others. Any ensuing health issues would therefore be covered by, for example, the latest IET Position Statement on "The Possible Harmful Biological Effects of Low-Level Electromagnetic Fields of Frequencies up to 300 GHz".[62] This concludes that the balance of scientific evidence to date does not indicate that harmful effects occur in humans due to low-level exposure to EMFs.

*Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy?*

27. The data and communications strategy cannot be described as "optimal" given the complexity inherent in the original programme design.

28. The complexity of the UK programme results from:

(a) a more fragmented energy supply industry than most other developed nations;

(b) the need to include both gas and electricity metering, whereas many other EU countries only need to consider electricity; UK consumers typically heat their homes by gas which is why smart gas meters are important in the UK but not mentioned in the EU targets; and

(c) policy design having placed responsibility for smart metering with retailers rather than with Distribution Network Operators.

29. These inherent policy obstacles to good engineering design either existed or were created before the current *Implementation Programme* was instigated and before staff with relevant technical experience were recruited, and despite IET engagement setting out the case for a regional (DNO-led) approach. The reasons for the approach adopted was to enable competition in the provision of smart metering by retailers, but this will come at the cost of not adopting engineering best practice.

30. The result is that we now have a centralised Data Communications Company (DCC) responsible for receiving and storing all data and passing it under agreed privacy conditions to:

(a) energy retailers which have a relationship with the customer at any given time (daily data for billing purposes, more granular only if access granted by the consumer);

(b) the distribution network companies which have a statutory obligation to plan and operate their distribution networks efficiently. For electricity distribution network operators in particular, the availability of half-hourly data will be critical to identifying and addressing emerging network constraints. This will become increasingly important as additional demand due to electrification of heat and transport, and the effects of reverse power flows due to growing numbers of solar PV installations, begin to erode existing distribution network capacity headroom; and

(c) new entrants to the smart energy system such as Demand Aggregators, subject to customer wishes.

[62] "The Possible Harmful Biological Effects of Low-Level Electromagnetic Fields of Frequencies up to 300 GHz", IET 2012. http://www.theiet.org/factfiles/bioeffects/index.cfm

31. The solutions to this multi-layered communications requirement are quite rightly constrained by:

(a) the requirement for a very high level of security in a system which will form part of the National Critical Infrastructure; and

(b) cost and how this is accounted for, where the benefits accrue and over what period and with what degree of certainty.

32. Smart metering is part, and only part, of a complex system. The Smart Metering Programme has always struggled in articulating its real objectives and benefits. However, the real gain will be seen when a smart grid is deployed in the future, and without a smart grid much of UK energy policy will not be readily deliverable. *Flexibility needs to be included in the DCC for future expansion as part of the overall systems approach.*

33. Much current debate around smart metering communications concerns how much pre-investment in the wide area network (WAN) should be made to protect future smart grid functionality. It is agreed that oversizing the WAN at this stage is not necessary, but *providing a clear future upgrade path for both data handling capacity and latency is critical.*

34. It is desirable to equip the distribution network for further liberalisation in the future. However, the ability for new stakeholders at a community level to access real-time data at a feeder level for innovative community-based solutions is highly constrained by the current proposals. Bandwidth and latency requirements mean that the cost of sending both transactional data (required in non-real-time) and near real-time data[63] will inevitably be higher than if only transactional data was sent to the DCC. As indicated above, this is clearly demonstrated by not being able to size the DCC WAN for the functionality that will be required in the future. Other options have previously been proposed to circumnavigate this problem both by the ENA and the IET but these have been declined in favour of a single data stream via the DCC.

### The need for a Design Authority

35. This is one of the first major inter-disciplinary infrastructure projects to cut across several Government Departments. The need for such cross-cutting technical and programme design will increase.

36. As indicated throughout this document, a whole systems approach requires that a "systems of systems" delivery is in place in order for many of the systems benefits to flow to the correct part of the supply chain. Often, those who invest are not the natural beneficiaries on their part of the fragmented supply chain. New business models need to be developed to allow the new investment to bring forward the joined-up system benefits that will only be available if different parts of the supply chain act in unison.

37. To enable this, multiple departments and regulatory bodies will need to act together to allow the market structure to evolve in a more holistic manner. In the end Government has the overriding oversight of the different market stakeholders and *it is therefore important that the technical infrastructure is designed to maximise the commercial flexibility that a whole systems approach can deliver. The IET recommends that Government considers how best to create a technical Design Authority to meet this need.*

38. Much of the promise of Smart Grids is not in singular projects (as in smart meter roll-out) but in the way all of these projects are allowed to become part of a wider plan between, for instance, heat, transport and health. This cannot be achieved with the current structures.

### Timescale

39. The IET strongly recommends that the start of mass roll-out should be pushed back rather than compromising design issues and security to meet an arbitrary political target. To move forward before having a fully stable and tested design and product could lead to the deployment of sub-optimal equipment, poor customer experience and will risk the success of the entire project.

40. Recruiting and training sufficient installers with the required technical and customer education skills is a significant challenge. There is concern that programme delays will compress the roll-out period which would stress an already challenging timetable by requiring an even greater number of installers over a shorter period. The responsible course of action is to delay the end date of roll-out in keeping with any delay in the start date.

41. EU targets require that member states install smart meters to 80% of electricity consumers by 2020. The earlier completion date in the UK is unjustified. (However, this does highlight one of the differences between the UK and most other EU countries. UK targets rightly need to include gas meters as well as electricity.)

### About the IET

42. The Institution of Engineering and Technology (IET) is one of the world's leading professional bodies for the engineering and technology community and, as a charity, is technically informed but independent of network company, equipment supplier or service provider interests. This submission has been prepared on

[63] It could never be classed as real-time due to the latency in the round trip from meter to the DCC and then back to the local point where the data is needed by the DNO, for example to avoid a power surge.

behalf of the Board of Trustees by the IET's Energy Policy Panel in collaboration with the IT Policy Panel and the Communications Policy Panel.

*February 2013*

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**Written evidence submitted by First Utility**

EXECUTIVE SUMMARY

1. First Utility is the largest independent supplier of gas and electricity in the UK domestic market, and is the UK's leading smart meter energy supplier. The company has over 180,000 customers and over 300 employees in the UK.

2. First Utility believes that the national smart meter roll out represents the greatest opportunity for the energy industry and energy consumers since liberalisation in the 1990s. Indeed, the company was founded with the vision of empowering consumers by helping them to reduce their energy usage and energy bills by means of smart technology.

3. First Utility is confident that the UK will benefit significantly from the roll out of smart meters in terms of greater consumer engagement and the attendant demand reduction. It will also create opportunities for increased competition through innovation and supplier differentiation as a result of the new products and services that widespread smart metering will create.

4. First Utility has three key areas of concern relating to the roll out of smart meters:

(a) Potential interoperability issues which might lead to stranded-asset risk and deter the necessary investment to successfully roll out smart meters;

(b) The issue of The Data and Communications Company (DCC) contract adoption; and

(c) The requirement to provide an In Home Display (IHD) to consumers without suppliers being given the opportunity to offer the ability to receive consumption information by other means.

*Are the Government's cost and timescale predictions for roll-out realistic and will it deliver value for money? What are the potential benefits of smart meters for consumers, and what barriers need to be overcome in order for consumers to realise them?*

5. First Utility believes that the projected Government timescale for full installation to be concluded in 2019 is achievable and will deliver considerable benefits to consumers in helping them to more effectively manage their energy consumption. However, we will only realise the full benefit of smart meters if we enable suppliers to offer time of use tariffs. Suppliers will not be incentivised to offer time of use tariffs unless there is significant reform of the "cash out" and settlement regime which currently penalises the behaviour we want to encourage with punitive charges for energy usage outside of the norm.

6. To retain consumer confidence the cost of the programme must be proportionate to its benefits. First Utility is concerned that there is tendency to over engineer the solution which leads to escalating cost, eg robust approach to security issues. The transfer of the SIM rather than requiring full enrolment will keep DCC adoption costs down.

7. First Utility believes that for the Government's target to be achieved, some potential barriers to achieving Government's aims must be addressed. First, DECC should examine potential interoperability issues which, in their current form, could lead to stranded asset risk. Stranded-asset risk refers to the adequate reimbursement of an incumbent supplier's funding stream in the event that a customer who has had a smart meter installed switches supplier. Where a customer with a smart meter switches during roll-out, the incoming supplier must be strongly incentivised to take the smart meter and pay any rental on the meter. Without these incentives being in place, funders and investors will withdraw the capital that small suppliers depend on in order to fund smart meters. This will block small suppliers' ability to provide smart meters and will hinder a successful UK roll out.

8. First Utility believes that further stranding risks are introduced by the approach to Comms hubs on SMETS 1 meters. Requiring replacement of the comms hub is unnecessary, will increase costs and increase stranding risk.

9. The DCC contract adoptions could be a barrier to roll out. At present, the requirement to provide an In Home Display (IHD) to consumers without suppliers being given the opportunity to offer the ability to receive consumption information by other means stifles innovation. A successful UK roll out requires confidence that those who embrace the objectives of the regime and install SMETS 1 meters will not be economically disadvantaged.

*Is there a possibility that suppliers will gain considerably more than consumers from smart meters? Is enough being done to ensure that any financial benefits accruing to suppliers will be passed on to consumers?*

10. Please see above for comments relating to time of use which could deliver tangible consumer benefits.

*Will smart meters empower customers to take greater control of their energy consumption? What are the potential obstacles to rolling out smart meters in the UK and how should these be addressed?*

11. First Utility supports the Government's view that providing consumers with direct sight of their energy usage is one of the most effective ways for them to benefit from smart metering technology. However, we do not believe there should be a requirement to provide a standalone IHD as long as a consumer who has a compliant smart meter installed is given the option of access to consumption data by other suitable means.

12. For example, data could potentially be provided to consumers by means of smart phones, web portals (such as our my:energy product, developed through our partnership with Opower and which is already available to First Utility customers with smart meters) and television feeds, to name just a few possibilities. These technologies provide richer functionality than the quite basic IHDs which are likely to be provided to consumers. These IHDs may fall short of what the customer is used to in terms of functionality and we believe that the alternative technologies listed are likely to result in a higher level of consumer engagement and thus reduction in energy consumption. Although we agree that an IHD could be retained as a fallback option where the consumer specifically requests this or is not equipped to receive consumption information by other means, we feel that the current mandation is a missed opportunity to encourage competition by means of innovation and increased consumer choice.

13. Suppliers are currently required to offer consumers a SMETS compliant smart meter fitted with a free IHD. We believe that this requirement stifles innovation and thus competition. In addition, the cost of provision of standalone IHDs will be a significant financial burden for suppliers in the Foundation stage of the roll out, particularly for smaller suppliers, and could have a significant impact on their ability to compete effectively in this area.

14. With regards to the interoperability issue, there remains a significant risk that customers might have to revert back to a dumb meter in the case that the incoming supplier cannot support the existing smart meter. Although we accept that there is a requirement on outgoing suppliers to assist incoming suppliers with supporting the functionality of an inherited smart meter, and a requirement to tell consumers of any functionality they might lose if they switch, it is still unclear as to how this will work in practice and there is still no obligation for incoming suppliers to pay a smart rental in respect of such meters. This has led to an almost complete halt in the installation of non-SMETS compliant smart meters (although installation levels will hopefully recover once these become widely available).

*Will consumers on pre-pay meters obtain the same benefits from smart meters as other consumers?*

15. With regard to pre-payment meters it seems likely that, in the future, there will be no such thing as a pre-payment meter. Rather smart meters will be able to run in both credit and pre-payment mode, thus avoiding the inconvenience of having to physically swap the meters where pre-payment is requested and extending the benefits of smart metering to consumers who pay for their energy in this manner.

*Are levels of public awareness of and support for smart meter roll-out increasing? Is enough being done to increase consumer awareness about smart meters? Could DECC's consumer engagement strategy be improved?*

16. First Utility believes that, although consumers show a certain degree of awareness in relation to smart meters, it might be appropriate for Government to fund a national campaign raising the public profile of these as well as the fact that the national roll out is now well underway.

*Are consumers' concerns about privacy and health being addressed adequately?*

17. First Utility believes that sufficiently is being done to address consumers' concerns over privacy and health.

*Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy?*

18. First Utility believes that the Data and Communications Company (DCC) should be obliged to accept all SMETS compliant smart meters rather than introducing artificial barriers regarding security arrangements and compatibility issues.

*February 2013*

**Written evidence submitted by SSE**

## 1. About SSE

1.1 SSE (formerly Scottish and Southern Energy) is a UK owned and based energy company investing £4 million a day in the UK's energy infrastructure. It is the UK's second largest supplier of electricity and gas, serving over 9.5 million customers in the UK and Ireland. SSE is also the second largest generator of electricity and has interests in both electricity and gas networks in the north of Scotland and south central England.

1.2 As the second largest energy supplier, SSE is due to install around nine million of the 53 million smart meters being installed across Great Britain within the next seven years. As a generator, supplier and distributor of electricity and gas, SSE is aware of the benefits that smart meters can bring—but is also aware of the challenges that delivering the roll-out could have on existing infrastructure.

## 2. Summary

2.1 SSE fully supports the smart meter roll-out and is currently working with DECC and the industry through EnergyUK, to ensure the roll-out proves to be a smooth customer experience. SSE is keen to engage with third parties, including consumer groups, think-tanks and academia to incorporate any learnings in to our approach to delivering the roll-out whilst maximising efficiency and minimising disruption. SSE would make the following recommendations for consideration by the Committee and, in turn, Government:

- *Clarify deadline flexibility*—Suppliers have had a delivery target introduced to their licence conditions, but this target has been put in place before all of the institutional frameworks and arrangements are in place. We would welcome clarification of the ambiguity about how "all reasonable steps" towards meeting targets is defined; otherwise there is a risk of cost escalations if there are delays outside of suppliers' control.
- *Only SMETS2 compliant smart meters should be enduring*—The full and final smart meter specification has yet to be completed (Smart Meter Equipment Technical Specifications version 2 or SMETS2). To ensure security, interoperability, minimise asset stranding and customer disruption and to realise the benefits in the impact assessment, the only enduring meters should be compliant with the final specification under SMETS2.

2.2 Other issues that SSE raise in this submission are:

- *Implications for networks need to be considered*—Smart meters are crucial for development of a smart, efficient and flexible grid. To achieve this, the views of the network businesses need to be taken account of fully to ensure that the roll-out helps realise the smart grid benefits as set out in the Government's impact assessment.
- *All suppliers must pay their share of costs*—There has been a tendency for Government to exempt small suppliers from costs of Government schemes with the intention to remove a barrier to market entry. This may be well-intended, but these exemptions have a distortionary effect on competition in the retail market and are funded by the large majority of UK consumers.
- *Co-ordinate central communications*—Given the plethora of Government policies that are being launched over the next few years, it would be an efficient use of limited resource for Government to work toward a co-ordinated communications strategy to efficiently inform consumers about smart meters, energy efficiency under Green Deal and ECO and available fuel poverty assistance.

## 3. SSE's Strategy for the Smart Meter Roll-out

3.1 SSE has consistently had a strategy of developing scalable, strategic solutions for smart metering, avoiding interim solutions and asset stranding wherever possible. SSE is actively looking at developing partnerships to gain learnings and share knowledge and ultimately improve its approach to delivering the roll-out.

3.2 The Government's original intention was that the smart meter roll-out would take place in two phases; the foundation stage and full mandated roll-out. The foundation stage would allow testing and trialling of metering systems whilst the delivery capacity of suppliers was ramped up.

3.3 The full mandated roll-out itself was anticipated to commence in 2014, once all of the institutional arrangements and frameworks were in place. There are a number of these arrangements and frameworks yet to be finalised, most notably a full and final smart meter specification and the establishment of the Data Communications Company (DCC), which will provide secure and interoperable communications between meters and suppliers and other relevant parties such as network operators. If suppliers install significant numbers of meters ahead of establishment of institutional frameworks and arrangements, it seriously risks damaging the reputation of the programme at an early stage, and its overall efficacy. This could have serious implications for suppliers' ability to deliver the roll-out and delivery of other Government policies such as Green Deal and ECO.

3.4 As part of EnergyUK, SSE has been working to develop agreement by all suppliers, network operators and consumer groups to a set of high level principles to be adopted by the programme. This agreement sets

out the required institutional frameworks and arrangements or key enablers that need to be in place before the full roll-out can begin in earnest. SSE has always maintained confidence that it can complete its proportion of the roll-out within five years of these key enablers being in place.

### 4. Potential Cost Escalations

4.1 Under the EU Third Package Member States are obliged to ensure that at least 80% of consumers should be equipped with intelligent electricity metering systems by the end of 2020. For gas, Member States are required to prepare a timetable for the implementation of intelligent metering systems within a reasonable period of time. The Government has set ambitious targets to deliver 53 million smart meters to over 30 million premises by the end of 2019, this represents an additional six million electricity smart meters a full year ahead of the national target set by the EU. SSE would also have completed the gas smart meter roll out several years ahead of any requirement.

4.2 SSE welcomes the ambition that the UK Government has shown to ensure that the benefits of smart metering will be realised as early as possible, and on balance, supports including gas smart meters in the roll-out to minimise potential further visits to homes and ensuing consumer disruption. SSE and the industry are concerned that Government have imposed a target in suppliers' licence conditions before all of the institutional frameworks and arrangements are in place. This risks creating a delivery bubble towards the end of the decade, causing unnecessary cost escalations which will ultimately be borne by consumers.

4.3 Whilst SSE welcomes the clarity over the timescales for programme delivery, it is damaging to new entry in the retail market to impose a target with significant financial implications in supply licence conditions, ahead of development of the required institutional frameworks and arrangements.

> Supply Licence Condition 39
>
> *"The licensee must take all reasonable steps to ensure that a Smart Metering System is installed on or before 31 December 2019 at each Domestic Premises or Designated Premises in respect of which it is the Relevant Electricity Supplier."*

4.4 SSE and industry's concerns over the target principally refers to the wording of the draft licence condition whereby suppliers "take all reasonable steps" to deliver their proportion the roll-out. Any clarity from Government on how "reasonable steps" are defined will alleviate concerns, and prevent the risk of cost escalations on the back of a delivery bubble in 2019, if there are unavoidable delays to key roll-out enablers. This clarification is needed as early as possible, as suppliers' are currently building up supply chains, which will see SSE alone deliver some 9,000 meters a day at the height of the roll-out.

4.5 There are a number of risks outside of suppliers' control that could impact upon on the industry's delivery of the smart meter programme, with cost and reputational implications for SSE, the wider industry and—ultimately—Government. These issues, if unmanaged, could have adverse impacts on the operating environment for the supply businesses and our abilities to deliver on the Government policies, particularly the Green Deal and ECO.

### 5. Smart Meter Benefits

5.1 SSE views that a well considered rollout with a robust end-to-end design is more likely to secure the noted consumer benefits, than attempting to roll out smart meters ahead of the key enablers required for programme delivery.

5.2 The impact assessment for the roll-out has received criticism for being heavily weighed on energy savings. This is coupled of a number of early difficulties that have not considered a number of the realities of delivering an infrastructure project on this scale and have created a number of programme cost escalations not accounted for in the impact assessment. Although the criticisms have caused an erosion of the net benefits contained within the impact assessment. SSE still views that there is a net benefit from the smart meter roll-out for GB, although its extent should not be exaggerated.

### 6. Smart Meter Savings Fed through to Consumer Bills

6.1 There is an understandable concern from consumer representatives that the costs of the roll-out will be fed through to consumers, but not the cost savings that suppliers may be expected to achieve. Ensuring that costs are kept to a minimum for all consumers is important to ensure there is a competitive retail market. To achieve this, the Government needs to avoid the temptation of exemptions of additional costs faced by some suppliers. If there are exemption for some suppliers and not others, then additional savings will not be easily visible to consumers in the market, as a lower tariff will be driven by a supplier being exempt from costs, not savings from smart meters.

6.2 As a wider point, all suppliers in the energy retail market should pay their share of mandated Government programmes. There has been a tendency for Government to exempt small suppliers from costs.[64] Whilst these interventions are obviously well intended, this has a distortionary effect on competition in the retail market (with small suppliers approaching having over £100 in avoided costs), and actually impacts potential entry

[64] Small suppliers are currently defined by DECC as having less than 250,000 customers

from larger new entrants. If the Government is looking to encourage new entrants in the retail market, it needs to address the barriers themselves, not look to introduce and prolong ad hoc exemptions to a section of the retail market.

6.3 The reality is this approach creates a situation where some consumers in the market will benefit from not paying costs that are being paid for by the majority of consumers. SSE believes that to ensure fairness for all of its customers, the costs that customers pay for their energy must be cost-reflective, not cross-subsidised.

### 7. Central Co-ordinated Communications

7.1 Suppliers are establishing a Central Delivery Body (CDB), which will look to ensure that consumers are given an independent source of information about what they can expect and the benefits they can receive from the roll-out. Ensuring the CDB is in place ahead of the full roll-out will prevent a communication gap where mis-information could appear perpetuated in the media, causing public distrust in the programme, damaging suppliers' ability to undertake the roll-out.

7.2 Given the plethora of Government policies intended to engage consumers with their energy use that are being launched over the next few years, it would be useful for Government to have a co-ordinated communications strategy to efficiently inform consumers about smart meters, energy efficiency and fuel poverty assistance available. Using the smart meter roll-out as a tool for customer engagement could have positive impacts on take-up of energy efficiency measures and installations of microgeneration.

7.3 Any central co-ordinated communications for wider policy awareness should be operated by the Government, to provide an impartial source of information that consumers can trust. If the Government choose to develop this proposal they should fund it, as it must be remembered that any costs incurred by suppliers will ultimately be paid for by consumers, who are already being asked to pay for number of Government policies through their bills.

### 8. Networks Perspective

8.1 To ensure the overall benefits identified in the impact assessment are realised, we have maintained that the impact on networks must be fully taken into account. Appropriate arrangements must be implemented to ensure network requirements are accommodated, and that proportionate and timely funding is made available under Ofgem's price control reviews. In this regard, network operators must be able to plan and manage their workload effectively, which will require industry co-ordination as some elements are currently beyond the networks' control.

*February 2013*

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## Written evidence submitted by Orsis (UK) Ltd

### I. Executive Summary

ORSIS is fully behind the rollout of a smart solution for the UK domestic market. The supply industry would benefit from accurate consumption information, which can be used for accurate billing and more sophisticated ToU tariffs and transparency. ORSIS does not agree that the current process will deliver the best value for money, as it is not consumer driven. It lacks input from the consumer, whom ultimately will pay the higher cost of the smart meter.

ORSIS also suggests that the Government should consider a change in its the strategy, as the word Smart Meter may be a misnomer. Effectively, the government needs to provide a Smart Solution, integrating the Smart Meter into the customer domain, the current process seem to be overly focused on the features of an individual smart meter, and not on a consumer solution.

### II. Responses to Questions

(a) *Are the Government's cost and timescale predictions for roll-out realistic and will it deliver value for money?*

In Italy the rollout of electricity smart metering cost less than 3 billion Euros (for an equivalent population)—for an annual benefit of 500 million Euros. The cost of the current rollout proposals currently stands at around £12 billion—a significant sum or money, and what we would question is whether a more straightforward approach utilising existing technology, and current business processes has ever been considered. One would have to ask why the UK programme is set to cost 4 times this sum—and whether all the costs of the programme can be justified.

Given the status and complexity of the Programme, ORSIS UK believes that the target completion date of December 2019 is unrealistic. There is no room for any delays in the process at any stage and in any area of the programme. In the most recent consultation, DECC announced that it did not expect DCC to be live until Q4 2014, a delay of 6 months, and this is before any development has started—this deadline will only move one way.

The SMETs meter specifications have been sent to the EU for approval, but no decision has yet been made on the HAN solution to be implemented. ORSIS UK is aware that the Zigbee protocol favoured by many may be two years away from being fully available for use in the market.

As the recent NAO report states, there is little contingency in the proposals for delays to any of the key deadlines within the prospectus. The current installation workforce will only achieve 20% of this target—therefore there is an urgent need for a skilled workforce to be developed before 2014 that are capable of safe installation of gas and electricity meters, and explaining the workings of the meters and the IHD—all for a price of £58 per household (for dual fuel—£29 electricity and £39 gas). This factor alone could delay the programme and have a detrimental effect on the achievement of the Governments targets for energy savings. In this respect we feel that the NAO report does not investigate this matter in sufficient detail, and suggest that further work is required to assess the risk and cost of failure to deliver within the 5-year period.

(b) *What are the potential benefits of smart meters for consumers, and what barriers need to be overcome in order for consumers to realise them?*

The main benefit of Smart Metering is the availability of detailed consumption data, the demand profile. ORSIS is pleased to learn that the consumer can access the demand profile data and that is can be provided to the supplier for billing purposes. ORSIS believes that accurate demand profile information is very useful to both consumers and suppliers, but security and privacy must be considered carefully.

ORSIS strongly disagree with the current focus on the In Home Display (IHD), as it does not provide enough sophistication and detail. ORSIS does agree with the NAO report that there is little evidence to support the assumption that customers will make significant and lasting changes to their energy consumption as a result of the installation of smart metering. The "gadget" effect of the IHD may not have a lasting effect, Suppliers will only support it for one year, and there is evidence that suggests once the novelty has worn off, consumers lose interest, and the device ends up in a drawer. We believe that the IHD should be one of a range of solutions offered to consumers, and that it should be an opt-in rather than an opt-out solution. The fuel poor will not necessarily benefit from the level of information provided by an IHD—but rather from timely and user-friendly advice from their Supplier on the most effective tariff for their needs. The current estimate of cost of the IHD is £15, which we feel is hugely understated, the fuel poor are already struggling, this is an additional financial burden. We do not feel that the current proposals have considered the impact—financial and in terms of successful rollout.

(c) *Is there a possibility that suppliers will gain considerably more than consumers from smart meters? Is enough being done to ensure that any financial benefits accruing to suppliers will be passed on to consumers?*

The current state of the Smart Meter (not the Smart Solution) has been largely Supplier and Industry driven, supported by OFGEM and later DECC. The process has been structured around a number of working groups, and is now in the consumer engagement phase. It is naïve to think that the vested parties have not been able to influence the process to cater for their specific requirements.

It is also a risk that the true cost of the Smart Meter will not be transparent to the consumer, each supplier may have different commercial approach to financing assets.

(d) *What lessons can be learned from successful smart meter implementation and usage elsewhere in the world?*

There is much information available on Smart Metering projects in other countries. The primary difference is the complications in the UK, where the rollout is managed in part by Government, Utilities, Equipment providers, comms providers, and the DCC. Such a diverse and fragmented approach seems overly complex.

It seems that in other countries, the smart metering rollout has been largely been managed by the distribution part of the business. UK is somewhat unique as it is a de-regulated market, and it is now a supply driven rollout.

(e) *Will smart meters empower customers to take greater control of their energy consumption?*

Yes. As stated above, access to accurate Demand Profile data allows the consumer to make informed choices. The issue is how the data is being made available and how individual consumers can be empowered to make informed decisions. Providing an IHD is not a heuristic solution to a rather complex problem; how to take advantage of accurate demand profile data. There needs to be support in place for the individual consumers interest and involvement in their demand profile.

ORSIS main business is to provide energy consumption data for various parties, we provide accurate, timely information using very simple data collection devices. The DCC can be expanded to provide similar level of service for the Domestic Market.

(f) *Will consumers on pre-pay meters obtain the same benefits from smart meters as other consumers?*

ORSIS believes that current pre-payment customers have a better understanding of their energy consumption. Smart meters will give pre-payment customers additional information which may be helpful if the demand profile is made available.

(g) *Should vulnerable customers and the fuel-poor be first in line for smart meters so they can get the benefits sooner?*

ORSIS believes that these customer may need support in terms of how they can take advantage of a Smart Meter. We suggest that a Smart Solution to include support for the different segment of consumers.

(h) *What is the best way of involving third-party trusted messengers, such as charities, consumer groups, community organisations, local authorities and housing associations in roll-out?*

ORSIS has a strong portfolio of customer which includes Housing Associations. HA in particular welcome the introduction of Smart Meters, but there is a concern that it may be difficult to integrate the Smart Meter into their sustainability processes. The government is proposing several projects, such as the Green Deal and RHI. These projects have separate metering requirements, and it is seems difficult to unify the data from the Smart Meter and the ORSIS energy management services.

Housing Associations and other social landlords would fulfill an important role in consumer engagement to ease the roll out to the most vulnerable consumers.

Orsis believe the best way to involve the social landlord would be to provide an accurate message of the benefits of the roll out to the consumer and deliver advice regarding the roll out mechanisms that can be delivered in a concise message.

(i) *What are the potential obstacles to rolling out smart meters in the UK and how should these be addressed? What pitfalls have hindered roll-out programmes elsewhere and are we doing all we can to avoid them?*

(j) *Are levels of public awareness of and support for smart meter roll-out increasing?*

ORSIS believes that the current consumer engagement process has just started. It is difficult to provide constructive feedback on the rollout as this stage.

(k) *Is enough being done to increase consumer awareness about smart meters? Could DECC's consumer engagement strategy be improved?*

ORSIS is not involved in the DECC planning process for the consumer engagement strategy, but we are looking forward to the disclosure of process, and we would appreciate the opportunity to provide feedback. We do believe that the Domestic Smart Metering project should have considered consumer requirements first, and not last.

(l) *Are consumers' concerns about privacy and health being addressed adequately?*

N/A

(m) *Is there any evidence that consumers' concerns about smart meters are declining or growing?*

N/A

(n) *Will the commercial benefits of smart meter roll-out be captured within the UK?*

N/A

(o) *Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy?*

The drive for interoperability has pushed the development down a complex path. Surely the most interoperable thing we have is the Data Transfer Network (DTN)? Any supplier can receive meter readings from any data collector via the DTN—whether that meter reading is provided in a "smart" way or via a meter reader is largely irrelevant. To that end, rather than spending millions on the DCC, and years developing and testing it, why has a continuation of the current business process arrangement not been considered?

A further way of delivering the benefits at a fraction of the cost would be to consider utilising a back office approach to data and bill management, as currently used to great effect in the mobile phone industry.

(p) *What criteria should DECC use to measure the ongoing success of roll-out?*

ORSIS suggests that the regulator (OFGEM) be involved in the auditing of the rollout. OFGEM should be consulting the consumers on the metrics required for the evaluation of the success.

*February 2013*

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**Supplementary written evidence submitted by Hans Kristiansen, Orsis (UK) LTD**

I would like to take this opportunity to thank you and the members of the committee for allowing me to present my views to you during your review process. It was useful also to hear the views of the others giving evidence.

Given the recent announcement by the Government that the roll-out has been significantly delayed, your Committee's inquiry and subsequent report will therefore play a crucial analysis on where the programme is and guidance as to what should now be done to ensure a successful roll-out. To this end I would like to take this opportunity to reiterate and elaborate my views further as you make your deliberations.

The delay in the smart metering programme only exacerbates my concerns that the current proposals are: over complex, too expensive and will not deliver the required benefits within the timescale. The latter point has already been proven because of the delay and is largely due to allow the full development of the DCC and for the technology required for the Home Area network to be developed and tested. I still have doubts that the new deadline will be achievable—a view shared by other members of the industry, since there is still a general lack of activity in the foundation stage.

The current proposals have a specified meter technology, referred to as SMETS2 which has been developed largely to meet the needs of the suppliers, rather than the consumer. There are elements within this that will not add value to the consumer, and yet they will ultimately be footing the bill.

The cost of the current proposed solution now stands at an estimated £18 billion, with anticipated benefits of c£11 billion. There remain serious concerns with the accuracy of the Impact Assessment and the figures used to calculate the costs and benefits. There are many that feel the costs used in the Impact Assessment are out of date, and understated. For example, the costs of the installation of smart electricity and gas meters is set to be £59 for a dual fuel installation—this figure is hugely optimistic based on the costs currently in the market place. There are other cost estimates that, in our opinion, require further investigation in the light of experience.

In addition to concerns regarding costs, we feel that the forecast benefits warrant further examination, and the balance of those benefits between the consumer and the Supplier. Whilst suppliers maintain that the high level of competition in the supply industry will ensure that all possible savings are passed back to consumers, there is little history to back this up, and we would urge the government to review the benefits as they are likely to impact interested parties.

The focus of the rollout has been on a "smart meter" rather than a "smart service" and the fundamental issue of what the customer really wants and needs has been lost in the lengthy consultation process. There is technology available now that will allow the consumer to receive an accurate bill, and the supplier to receive half hourly consumption data on which to formulate time of use tariffs to better reflect a consumers energy patterns. Utilising the existing business processes and systems, suppliers can receive actual meter readings via the DTN, and authorised parties can receive the half hourly consumption data in a safe and secure manner.

The foundation stage of the programme has failed to deliver significant levels of installations to date, with many suppliers choosing to wait until SMETS2 is fully specified before beginning any rollout of smart technology. Those who have installed in volume have not used technology that will be supported in the long term, and in many cases are not even SMETS1a compliant. If there is to be any progress before full rollout, then a solution which benefits all parties must be found. We recommend the use of a domestic half hourly meter, as utilised to great effect in the commercial sector; which facilitates energy management and fulfils the requirements of fiscal metering. This could be achieved with existing technology, in a cost effective and consumer friendly way, with rollout beginning immediately.

The basis of much of the saving to the consumer is that, by understanding how and when they use their energy, they will make significant and lasting changes to their consumption patterns, and that suppliers will be able to offer a more suitable tariff for their needs. The use of an IHD has been mandated in the current proposals, but we feel that: the sustained use of an IHD has yet to be proven, the sophistication of device which costs only £15 will be minimal, the fact that Suppliers are only obliged to support the device for one year, and the fact that not all consumers will have equal access to a device (ie blind or disabled consumers) means it may not deliver the benefits required. We therefore believe that the marketplace and the consumer should dictate the most appropriate method of delivery of data. An IHD should be one of the offerings, not the only one, and not the one the consumer has to have!

The recently announced delay of 12 months gives an ideal opportunity for reflection and to undertake a full review of the current proposals. I would therefore respectfully urge your Committee to make the following recommendations:

— *A full, bottom up, review of the Impact Assessment, identifying the costs and benefits associated with each level of functionality proposed within the SMETS2 specification. This would ensure that the programme delivers only what benefits the consumer, or saves the industry significant cost.*

— *An additional assessment should be undertaken, to calculate the cost benefit of existing, simpler technology utilising existing industry systems and business processes.*

— *Review the current specification in the light of what the programme is meant to deliver—ie actual meter readings, facilitation of smart grid technology, and better consumption information to the consumer. Is the current programme at risk of over-egging the pudding and leaving a rather sour taste?*

I would reiterate that the introduction of smart metering is a necessary and beneficial step for the energy industry—benefitting consumers and suppliers alike, and preparing the way for smart grids, but I am concerned that the current proposals are a step too far. I am hopeful that your inquiry has led you to a similar conclusion, and that you can urge the government to reconsider their current plans to enable a more cost effective and timely rollout to take place.

*May 2013*

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**Written evidence submitted by Department of Energy and Climate Change (DECC)**

EXECUTIVE SUMMARY

1. The Government welcomes the opportunity to contribute to the Energy and Climate Change's Committee's inquiry into the smart meter roll-out.

2. The Government's vision is for every home in Great Britain to have smart electricity and gas meters and for smaller business and public sector premises to have smart or advanced metering suited to their needs. The roll-out of smart meters will play an important role in Britain's transition to a low-carbon economy and help us deliver an affordable, secure and sustainable energy supply. The Government's Energy Efficiency Strategy[65] identifies smart metering as one of the most cost-effective measures available to reduce energy consumption.

3. Smart metering is a major programme. It aims to replace 53 million meters with smart electricity and gas meters in all domestic properties, and smart or advanced meters in smaller non-domestic sites in Great Britain, by the end of 2019, impacting approximately 30 million premises. Consumers are at the heart of the programme.

4. The Government is working collaboratively with a wide range of stakeholders to take forward the programme. Good progress is being made against the programme plan, which is published on the DECC website.[66] Mass roll-out is expected to begin in late 2014, and the Government has placed obligations on suppliers to complete roll-out by the end of 2019. Significant progress has recently been made against Programme milestones:

— Regulations setting the overall requirement to roll out smart meters, and to operate in line with a Code of Practice when installing smart meters, took effect in November;

— Regulations on monitoring and evaluation, data access and privacy, and consumer engagement were laid in Parliament in December;

— A second version of the Smart Metering Equipment Technical Specifications (SMETS) was notified to the European Commission in January; and

— Competitions for procurement of the Data Communications Company, Data Service Provider and Communication Service Providers are approaching their final stages.

5. The Government will continue to work closely with stakeholders to ensure that this momentum is maintained and that we deliver against our ambitious timetable.

6. This Memorandum is organised into the following key themes, which together address the questions in the Committee's terms of reference:

— A robust business case.

— Learning lessons from other roll-outs—putting consumers at the heart of the programme.

— Consumer engagement.

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[65] DECC, *The Energy Efficiency Strategy* http://www.decc.gov.uk/assets/decc/11/tackling-climate-change/saving-energy-co2/6928-the—energy-efficiency-strategy-statistical-strat.pdf (November 2012)

[66] DECC, *Smart Meters Programme Plan* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/65687/7365-smart-meters-programme-plan-.pdf (December 2012)

— Commercial model—the Data and Communications Company.

— Monitoring progress to ensure success.

## A Robust Business Case

7. DECC's Impact Assessments have been developed and updated over the last four years, supported by extensive analysis, consultation and detailed discussion with stakeholders. They are a robust assessment of the costs and benefits of the roll-out of smart meters and demonstrate a strong, positive business case. The latest updated Impact Assessment,[67] published in January 2013, estimates a positive net present benefit of £6.7 billion over the period to 2030, by delivering total benefits of around £18.8 billion and costs of around £12.1 billion.

8. The consumer energy savings assumed in the Impact Assessment are conservative, falling at the lower end of the range of findings from pilots and large-scale trials observed internationally and in Great Britain. In addition to the direct consumer benefits, energy suppliers, generators, and network operators will realise efficiency savings of around £11 billion.[68] We expect suppliers to minimise the costs and maximise the efficiency savings from the roll-out. Given the competitive pressures in the retail market and the action the Government and Ofgem are taking to promote competition, we expect both costs and efficiency savings to be passed through to customers. Overall, and taking into account all costs and benefits, we expect the average dual fuel household to realise an annual bill saving of around £24 by 2020, in comparison to a situation without a smart meter roll-out. For non-domestic dual fuel customers, we expect annual bill savings of £164 by 2020.

### *Ensuring that all consumers will benefit*

9. To help consumers realise benefits, the Government is requiring energy suppliers to offer in-home displays (IHD). IHDs will give consumers easy access to information on their energy consumption in pounds and pence that will help them manage and control their energy use. This requirement was informed by evidence that provision of real-time information is important in delivering energy savings.[69]

10. Consumers will also be able to see the impact of energy saving measures, such as those introduced under the Green Deal. Smart meters will bring an end to estimated billing, helping consumers to budget better, and will make switching between suppliers smoother and faster.

11. The Government will monitor the smart meter roll-out to ensure that all consumers benefit and that no one group is left behind. In the results from the Energy Demand Research Project (EDRP), all types of consumers were shown to benefit, including groups in areas of fuel poverty and consumers with prepayment meters.[70] A separate in-depth qualitative study shows a broadly positive picture of vulnerable and low income consumers' experience of the installation of smart meters and their subsequent use of the IHD to control their energy use.[71] However, some vulnerable consumers potentially face additional barriers in accessing the benefits from smart meters and IHDs, such as those with visual or other impairments that make it difficult for them to understand the IHD or communications from suppliers about the installation process. The Installation Code of Practice and the Consumer Engagement Strategy therefore include requirements to ensure that the needs of vulnerable consumers are recognised and met throughout installation and in wider communications. The Smart Metering Equipment Technical Specifications (SMETS) include a requirement to ensure that the design of the IHD is easily accessible to as many consumers as possible.

12. Smart metering has the potential to bring significant benefits to pre-payment customers, including improvements to the service that pre-payment customers receive. Every smart meter will enable quick and easy switching between credit and pre-payment modes. There will be a range of more convenient ways for pre-payment customers to top up, such as through mobile phones, cash points and the internet. The IHD will be capable of displaying information about outstanding debt to help consumers manage repayment. All pre-payment meters will have capacity for emergency credit and will support the configuration of non-disconnection periods to prevent customers losing supply when sales outlets are closed.

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[67] DECC, *Impact Assessment (IA): Smart meter roll-out for the domestic and small and medium non-domestic sectors (GB)* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/68903/impact_assessment_for_smart_meters_equipment_technical_spec_2_gov_response.pdf (January 2013)

[68] The expected efficiency savings to the energy industry include avoided site visits for manual meter reads, a more streamlined transfer process when consumers switch suppliers, reduced call centre traffic and improved debt management.

[69] A review of 57 feedback studies in nine different countries by the American Council for an Energy Efficient Economy (ACEEE) found that on average feedback reduced energy consumption between 4–12%, with higher (9%) savings associated with real-time feedback (Erhardt-Martinez, Donnelly, Laitner, *Advanced Metering Initiatives and Residential Feedback Programs: A Meta-Review for Household Electricity-Saving Opportunities* (June 2010)). The importance of the IHD was also confirmed by the Government's *Energy Demand Research Project* (final report 2011).

[70] AECOM for Ofgem, *Energy Demand Research Project: Final Analysis* http://www.ofgem.gov.uk/Sustainability/EDRP/Documents1/Energy%20Demand%20Research%20Project%20Final%20Analysis.pdf (June 2011)

[71] National Energy Action (NEA) and RS Consulting for DECC and Consumer Focus, *Smart for All: Understanding consumer vulnerability during the experience of smart meter installation* http://www.consumerfocus.org.uk/files/2012/11/Smart-for-All-Understanding-consumer-vulnerability-during-the-experience-of-smart-meter-installation.pdf (November 2012)

13. The question of whether certain groups of consumers should be prioritised was considered in the consultation on the Smart Metering Implementation Programme Prospectus in 2010.[72] Consumer groups pointed out that prioritising fuel poor and vulnerable consumers would potentially expose them to a disproportionate extent to teething problems that might be associated with the early stages of the roll-out. Early targeting of such consumers would also make it less likely that they could benefit from support of neighbours and relatives who have experience of smart meters.

*Wider benefits*

14. Smart metering is expected to create new, UK-based employment opportunities. The National Skills Academy for Power (NSAP) has estimated that by 2017 at least 6,000 meter installers will be required. However, the final peak requirement for the roll-out may reach 10,000 people (three times existing levels), including extra support staff (for example on distribution networks).

15. The roll-out of smart meters is also expected to provide a platform for the development of smart grids and the wider energy services market. For example, smart meters may enable the growth of the high-value energy services market, whereby companies provide energy-monitoring equipment and/or services to households and businesses which help them to improve their energy efficiency. In support of a smarter grid, the smart metering system will be able transmit voltage and power data at premises level to network operators—on a programmed or on-demand basis—which will give much greater visibility of network conditions. The full benefits of these types of development are yet to be quantified.

## Learning Lessons from other Roll-outs—Putting Consumers at the Heart of the Programme

16. Many countries are installing, or planning to install, smart metering equipment, and individual states in the US, Canada and Australia have their own roll-out programmes. Lessons from international experience point in particular towards the importance of putting consumers at the heart of the roll-out from the outset. Ahead of mass roll-out in Great Britain, the Government is establishing policy and regulatory frameworks to address potential barriers to consumer acceptance, protect consumers, and ensure that consumers are able to realise the benefits of smart metering.

17. Concerns about privacy and data access played a key part in the consumer backlash against smart metering in the Netherlands, and an expectation has been set at EU level that all countries should seek to address these issues before implementation. The Government is undertaking "privacy by design", meaning that privacy issues are considered and embedded into the programme from an early stage. Building on international experience, evidence provided through a Call for Evidence and public consultation, a set of regulations has been put in place to govern smart metering data access and privacy.[73] The core principle is that consumers will have control over their energy consumption data, apart from where this is required for billing or other regulated duties. Energy suppliers are working with consumer groups to develop a Privacy Charter to explain in clear, simple, standard terms what consumers' rights and choices are.

18. Some groups and individuals have raised concerns that the radio waves from smart meters may affect their health. The Health Protection Agency (HPA) has advised that the evidence to date suggests that exposures to the radio waves produced by smart meters do not pose a risk to health. Smart meters are covered by UK and EU product safety legislation. Equipment is assessed and, if necessary, tested against agreed EU standards. DECC is working with consumer groups, suppliers, the HPA and Department of Health to ensure that clear and easily understood information on the evidence relating to smart meters and health is available to all consumers. However, we recognise that there will be a small number of consumers who will continue to have concerns about receiving a smart meter, including people with concerns about electro-sensitivity. As the programme develops, we will be considering further, together with the energy companies who will be responsible for the roll-out, how best to respond to individual consumer concerns. We will continue to monitor progress in addressing this issue in other countries, which could provide lessons that are transferable to Great Britain.

19. The installation visit offers an important opportunity to provide consumers with advice on how to use their smart meter and IHD to improve their energy efficiency. At the same time, it is essential that inconvenience to consumers is minimised. The Government is therefore requiring suppliers to develop and comply with an Installation Code of Practice.[74] Amongst other things, the Code requires suppliers to

[72] DECC, *Smart Metering Implementation Programme: Prospectus* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42718/220-smart-metering-prospectus-condoc.pdf (July 2010)

[73] DECC, *Smart Metering Implementation Programme: Data access and privacy—Government response to consultation* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/43046/7225-gov-resp-sm-data-access-privacy.pdf (December 2012)

[74] DECC, *Licence conditions for a code of practice for the installation of smart electricity and gas meters—Government response to consultation* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/43112/4841-government-response-to-licence-conditions-for-inst.pdf (April 2012)

demonstrate the smart metering system and offer energy efficiency advice, but, in order to protect consumers from being hassled and from mis-selling of goods and services, suppliers must obtain prior consumer consent to carry out face-to-face marketing at domestic installation visits, and suppliers will not be allowed to conclude sales at the visit itself. In addition, suppliers must not charge their domestic customers any upfront or separate costs for standard smart metering equipment, including the in-home display.

20. Meter installations need to be undertaken with due regard to safety. Although the types of safety risk associated with smart meter installation are essentially the same as those for any other meter installation, the scale of activity during the smart meter roll-out warrants some additional actions. Energy suppliers are embedding new practices ahead of mass roll-out and are exploring opportunities for meter installers to raise consumer awareness of more general safety issues, such as by completing a visual inspection of electrical equipment and fixing warning labels about fire risks, where appropriate.

*Consumer engagement*

21. A key lesson from international (especially North American) experience is the importance of consumer engagement in overcoming potential barriers to delivering benefits of smart metering, by building consumer acceptance. Consumer engagement is particularly important in Great Britain because we are aiming to deliver significant benefits direct to consumers by enabling behaviour change.[75]

22. Levels of awareness about smart metering in Great Britain have remained static since April 2012, with around half of energy bill-payers having heard of smart meters.[76] This is about the level of awareness that we would expect at this stage of the programme, given that mass roll-out does not start until 2014. Indeed, in undertaking engagement activities prior to mass roll-out, the Government has been mindful of the need to strike the right balance between increasing awareness and controlling demand ahead of all suppliers being ready to deploy smart meters.

23. Encouragingly, evidence gathered to date also shows that the more respondents felt they knew about smart meters, the more likely they were to support the roll-out. The perceived benefits of having a smart meter installed include: being able to budget better; help avoiding waste; and a greater accuracy of billing. The evidence also reveals low levels of consumer concern about issues such as privacy.

*Consumer Engagement Strategy*

24. The Government has produced a Consumer Engagement Strategy[77] to direct work to raise levels of consumer awareness and support for smart metering as well as to enable energy saving-behaviour change. The Strategy was developed in close consultation with stakeholders and has been informed by a range of UK and international evidence.[78] Its strategic aims are:

- Building consumer support for the roll-out by building confidence in benefits and by providing reassurance on areas of consumer concern;
- Delivering cost-effective energy savings by helping all consumers to use smart metering to better manage their energy consumption and expenditure; and
- Ensuring that vulnerable and low-income consumers can benefit from the roll-out.

25. The first part of the Strategy is dedicated to explaining current understanding of what constitutes effective engagement in the context of smart metering and what further learning the Programme intends to undertake in this area. For example, it identifies four main engagement levers to deliver energy-saving behaviour change:

- Direct feedback in near real time (through an In-Home Display);
- Indirect feedback (aggregated or non-real time data, eg comparative information on bills);
- Advice and guidance on energy and energy reduction; and
- Motivational campaigns designed to raise energy literacy and motivation to reduce consumption.

[75] Roll-outs in other countries have tended to focus less on direct benefits to consumers, and IHDs are not generally provided, although following sustained consumer criticism and a wide-ranging review, provision of in-home displays has now been built in to the roll-out in Victoria, Australia

[76] Ipsos MORI for DECC, *Quantitative Research into Public Awareness, Attitudes and Experience of Smart Meters (Wave 1 of 3)* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48505/6194-quantitative-research-into-public-awareness-attit.pdf (August 2012). Wave 2 is due to be published at the end of February 2013.

[77] DECC, *Smart Metering Implementation Programme: Government Response to the Consultation on the Consumer Engagement Strategy* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/43042/7224-gov-resp-sm-consumer-engagement.pdf (December 2012)

[78] For example the Empower Demand review of 100 smart meter roll-outs affecting 450,000 consumers shows a link between effective engagement and changed behaviour, and suggests that multiple interventions delivered by different parties over time have significant potential to change behaviour. (VaasaETT for ESMIG, *Empower Demand—The Potential of Smart Meter Enabled Programs to Increase Energy and Systems Efficiency: A Mass Pilot Comparison* http://www.esmig.eu/press/filestor/empower-demand-report.pdf (2011))

26. Suppliers will have the primary consumer engagement role as the main interface with their customers before, during and after installation. Supplier engagement will be supported by a programme of centralised engagement undertaken by a Central Delivery Body (CDB). The CDB will be funded by larger energy suppliers, with smaller suppliers contributing to fixed operating costs. Larger suppliers will be required to set up the CDB by June 2013 and will be accountable for ensuring that it delivers its objectives (which broadly align with the aims of the Consumer Engagement Strategy). The body will have an independent Chair and consumer groups will be represented on the board of directors.

27. Trusted third parties, such as charities, consumer groups, community organisations, local authorities and housing associations will also have an important role to play in delivering effective consumer engagement. Many of these groups will not have the resources to work with each individual supplier. It is therefore expected that the CDB will facilitate and coordinate their involvement by producing materials for them to use when engaging consumers or potentially by working with them to undertake localised engagement campaigns. The Government will help prepare third party organisations to work with the CDB. This support could take the form of training, advice, the provision of physical materials or brokering of relationships.

28. The Government will have an ongoing role in engaging consumers and is currently working with key stakeholders to raise levels of consumer awareness and support in the run up to mass roll-out. A key element of this work is ensuring that accurate information on smart meters is easily accessible for consumers on the Government website. The Government also welcomes Energy UK's efforts in advance of the CDB being operational to seek wider media engagement and monitor and respond to social network activity on smart metering. It is anticipated that this work will continue until such time as the CDB is able actively to engage consumers.

### Commercial Model—The Data and Communications Company

The Programme's commercial model will put in place the necessary shared infrastructure to deliver the Programme's benefits in a way that allows consumers to switch energy supplier without changing meters or communications equipment.

29. This infrastructure will provide a wide area communications network connecting the business systems of users of the DCC to smart meters via a common data handling system. DECC is conducting a competition to put in place a licensed Data and Communications Company (DCC) which will be responsible for managing this service. DECC is also undertaking the procurement of a Data Services Provider and up to three regional Communications Service Providers on behalf of the DCC that will deliver the data handling system and wide area communications network.

30. All three of these competitions are well advanced. The procurements of both the Data Service Provider and Communication Service Providers are approaching the final tender stage and will conclude this June. DECC has received initial proposals from applicants for the DCC Licence and will evaluate these before negotiating improvements and inviting final proposals with a view to awarding the licence in July. The Department has worked with future service users to develop service and technical requirements and to establish evaluation criteria designed to select reliable, secure and flexible solutions which provide good value for money.

31. A range of communications technologies has been proposed for the wide area network including cellular, mesh radio and long range radio. Regardless of the technology we will be requiring CSPs to commit to eventual coverage levels of at least 97.5% of properties across Great Britain in line with our aim of maximising benefits.

32. The selected Communication Service Provider or Providers (CSPs) will also provide a communications hub for each premise which will establish a home area network connecting the electricity and gas meter to the wide area network and enabling an in-home display of energy consumption. In due course this will permit consumers to connect smart appliances and electric vehicles to their electricity meter to respond automatically to time of use tariffs and to benefit from other in-home innovations led by the market.

33. Bids for the data application state that the solutions proposed will also achieve the security, reliability and scalability that we seek. The single Data Service Provider (DSP) will not store smart metering data but will have the central role in integrating the flows of data between smart meters and the business systems of service users as well as linking to the wider industry systems necessary to permit effective switching. We have worked with government security advisers and energy industry counterparties to put in place a robust security and privacy model to protect consumers' data.

34. The Data and Communications Company will sit above the CSP(s) and DSP and will ensure that collectively they provide an effective service. We recognise that consumers, energy suppliers and energy service companies will find new ways to use smart metering data and the DCC will be responsible for meeting these needs. The DCC will be regulated by Ofgem to ensure that it meets its licence obligations and provides an economic and efficient service.

### Monitoring Progress to Ensure Success

35. The Government holds overall accountability for delivery of the Smart Metering Programme business case. Monitoring and evaluation of the roll-out will provide an essential feedback loop to inform decisions by

the Government and other parties on smart metering implementation and benefits realisation. The Programme's Monitoring and Evaluation Strategy, published in May 2012, set out four core objectives:[79]

- To ensure that sufficient evidence about consumer impacts and the effectiveness of different approaches to consumer engagement is available, to inform the ongoing development of the approach to consumer engagement including an early review before the end of the Foundation Stage;[80]
- To report on the full range of costs and benefits attributable to the Programme and inform actions to optimise benefits realisation;
- To monitor the capability and readiness of industry participants to meet their roll-out obligations; and
- To track progress towards completion.

36. In addition, two broader objectives were set out:

- To publish sufficient information on the Programme's progress and benefits, to enable Parliament and other stakeholders to scrutinise and engage with the Programme; and
- To carry out a comprehensive evaluation of the overall success of the Programme in delivering its objectives, to inform future policy development.

37. The Government will be monitoring progress in delivering the roll-out and in each of the key areas of benefits identified in the Programme's Impact Assessment. The key delivery indicator for domestic premises is the number of smart meters installed, and for non-domestic premises the number of smart and advanced meters installed. The broader indicators for the overall success of the Programme will look at the extent to which it has enabled benefits to be realised. For example, we are establishing evaluation processes that will allow us to monitor the direct consumer benefits arising from reductions in energy use and improved customer experience. We will also be collecting information directly from energy suppliers throughout roll-out to allow us to monitor expected efficiency savings in back office support functions and meter management, and the costs of delivery.

38. Where the monitoring and evaluation activity identifies risks to benefits realisation, or opportunities to enhance benefits, the Government could pursue a range of actions. These may include: encouraging stakeholders to take certain actions; amending the regulatory framework that governs the smart meter roll-out, where the Government retains powers until the end of 2018; or adjusting wider DECC policies, such as on energy efficiency obligations.

39. To enable stakeholders to scrutinise and engage with the roll-out of smart metering, the Government will regularly publish information on progress. A first annual report was published in December 2012[81] and we plan to publish quarterly statistical updates in 2013 as well as research and other evaluation outputs.

*February 2013*

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**Supplementary written evidence submitted by Baroness Verma, DECC**

Further to my letter of 10 June 2013, you asked for some further detail on the issues raised by the Committee.

In relation to additional extra functionality, SMETS2 will make provision for:

- registers in electricity meters to record the maximum demand (the highest demand value in a given period of time and used by distribution network operators to help plan and manage load on the network);
- variant electricity meters which reflect the non-standard arrangements currently used by nearly 5 million premises (eg those on Economy 7 tariffs); and
- randomisation offset capabilities, which allow meter switching times between tariffs to be randomised over a short period of time (c.f. switching all at once) to help avoid risks of power surges.

In relation to SMETS 1 meters you asked about compatibility with future smart appliances and demand response technology. SMETS1 does not specify detailed Home Area Network (HAN) requirements, but it does mandate the use of open standards for the HAN. This means that appliance manufacturers have full access to any SMETS1 standards when designing their products or other demand response technology. Information provided by industry stakeholders indicates that the majority of meter manufacturers have employed a single set of standards.

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[79] DECC, *Smart Meters Programme: Strategy and consultation on information requirements for monitoring and evaluation* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/66634/5454-strategy-cons-smart-meters-monitor-eval.pdf (May 2012)

[80] The Foundation Stage began in April 2011 and will end when mass roll-out starts.

[81] DECC, *Smart Metering Implementation Programme: First Annual Progress Report on the Roll-out of Smart Meters* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/68973/7348-first-ann-prog-rpt-rollout-smart-meters.pdf (December 2012)

You asked whether it cost suppliers more to operate pre-SMETS 2 smart meters when they take them over from other suppliers than it will cost them to operate SMETS 2 meters when they take these over. We believe that there are important benefits from being able to enrol SMETS1 equipment into the DCC. We are currently consulting on the approach to allocating costs for that enrolment. Where SMETS1 meters are not enrolled in the DCC, the unit costs will depend on the contractual arrangements between the relevant suppliers, their service and meter asset providers. We are also consulting on the change of supplier arrangements that should apply during the Foundation period.

Finally, you asked about the situation for customers where the In Home Device (IHD) may not work properly due to problems with HAN connectivity, including the around 30% of properties which may not be served by the 2.4Ghz solution. Development work is underway on an 868MHz solution which is expected to provide HAN connectivity options for the large majority of the remaining properties. Work is also taking place on alternative HAN options for more challenging properties such as, in particular, some high rise flats. This includes solutions where signals will be passed along existing wiring in buildings.

*June 2013*

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**Supplementary written evidence submitted by Baroness Verma, DECC**

Thank you for the opportunity to provide evidence to the Committee on 4 June with regards to the Smart Meter roll-out. At that evidence session I agreed to write to the Committee on three issues.

Firstly, you asked me to look into an issue with regards to the DECC website, whereby it did not provide for a complete summary of Ministerial portfolios. I am pleased to inform the Committee that this has been corrected and the website has been updated. You can find the relevant pages here: https://www.gov.uk/government/organisations/department-of-energy-climate-change

Secondly, the Committee asked about the value of energy suppliers installing SMETS 1 meters ahead of SMETS 2 meters being available. SMETS 1 provides a sound basis for suppliers to deploy smart meters during foundation, bringing forward important consumer benefits and supporting companies' preparations for their full scale roll-out in a way that best suits their own strategies. SMETS 1 enables suppliers to replace traditional "dumb" meters now (when they have reached the end of their lives) with smart meters and to count these against their roll-out targets—SMETS 1 meters will not need to be replaced before the end of the roll-out. This helps suppliers avoid the cost of having to revisit the premises for a further meter replacement before the end of the roll-out and optimise the operational requirements of their roll-out over a longer timeframe.

SMETS 2 includes some additions over SMETS 1, for example functionality to benefit network operators as well as communication standards to further facilitate interoperability. We have proposed that governance of amendments to the equipment technical specifications should be industry driven in future, allowing them to reflect the latest technological and communication innovations, where evidenced and cost effective to do so.

Overall on central assumptions there is a broadly neutral/marginally positive economic benefit in permitting SMETS 1 deployments. Of course this does not take account of the qualitative non-monetised benefits stemming from suppliers preparation of their full scale roll-out.

Thirdly, the Committee raised the issue of back-billing. Back-billing issues arise where suppliers have not secured regular meter readings. Ofgem has already directed (1 July 2007 onwards) the industry not to back-bill domestic customers for periods greater than 12 months, where the supplier is at fault. One of the key benefits of smart metering is that suppliers will be able to take remote meter readings and so the issue of back-billing should no longer arise.

I hope that this letter will address the Committee's concerns on these matters.

*June 2013*

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**Written evidence submitted by EDF Energy**

EXECUTIVE SUMMARY

— Smart metering is right for Great Britain and it will deliver benefits for customers. But this is a complex programme with significant risks, which should not be underestimated. The rollout of Smart Meters will result in a net cost to energy suppliers who will need to recover this from their customers, as recognised by DECC's Impact Assessment. Industry. The Government should therefore endeavour to minimise the costs involved in the rollout in order to prevent unnecessary cost being passed on to customers It is therefore necessary to design and deliver smart metering "right first time".

— The GB rollout is technically challenging, covering both gas and electricity, the provision of an In Home Display (IHD) and the creation of a Data Communication Company (DCC). The GB timescale is also ambitious, requiring 100% installation of smart meters by the end of 2019, compared with the EU requirement to install smart meters in 80% of homes by 2020.

— There is recognition amongst all Suppliers and Energy UK that there are key enablers that need to be delivered to ensure a successful smart metering rollout; these include a competitive supply of robustly tested, secure and interoperable GB specification meters, and national, reliable, end to end communication arrangements. Without these key enablers the cost to the consumer will increase, service is likely to be impacted and unnecessary risks will be introduced to the programme. It is clear that, since the publication of the original Impact Assessment, the delivery dates for these key enablers have been delayed by between nine and 18 months, and yet the end date has remained fixed.

— As the 2019 completion date is a Licence Condition, Suppliers have two choices: either to start the rollout ahead of the delivery of the key enablers, or delay rollout and compress the delivery period. Both choices are likely to increase the costs to consumers, deliver a sub-optimal customer experience and introduce unnecessary risk to the GB programme and the delivery of the expected benefits.

— The Smart Meter rollout represents one of the largest and most complex, technical and logistical challenge that GB has ever undertaken, requiring the installation of new technology into every home across the country. In light of the practical delivery challenges and resultant delays to key deliverables which Government and Industry are facing, EDF Energy strongly recommends that Government changes the mandated completion date from 2019 to 2020. Furthermore, to manage future challenges in an efficient and cost effective manner Government should consider adopting an 80% by 2020 target in line with EU requirements, as opposed to 100% with "all reasonable steps" (which are as yet undefined), with the remainder being installed as customer acceptance and technical and delivery challenges are overcome.

## EDF Energy's Response to your Questions

### Evidence on any or all of the following Terms of Reference

*Are the Government's cost and timescale predictions for roll-out realistic and will it deliver value for money?*

1. EDF Energy believes that smart metering will deliver benefits for customers. This is a far-reaching programme using new technology and it is imperative that it is delivered *right first time* to avoid unnecessary complexity and cost being passed onto the consumer.

2. There is broad agreement between energy Suppliers and Energy UK that there are a number of key enablers that need to be in place for the efficient and effective delivery of smart metering in GB. The success of the smart metering rollout is dependent on the delivery of these key enablers, without which, costs will escalate, benefits may not be delivered and the customer experience will initially be poor. EDF Energy believes that these key enablers need to be in place before the commencement of the "mass rollout" of smart meters, the most important of which are listed below:

— Service provided by the Data and Communications Company (DCC) and Service Providers are fully tested and available in line with supplier rollout projections.

— SMETS2b Meters, In Home Displays (IHDs) and Communication Service Provider (CSP) Communications Hub devices are tested and available in line with supplier rollout projections.

— Sufficient Wide Area Network (WAN) and Home Area Network (HAN) coverage is in place.

— Supplier systems and infrastructure are tested and ready.

— Network Operators are ready with operational IT systems and workforce to enable meter point defect rectification.

— Existence of proven enrolment/adoption regime and early enrolment of SMETS meters that meet appropriate criteria, including data security.

3. EDF Energy is concerned about aspects of the policy framework and the cost and timescale predictions in the current Impact Assessment. In particular, EDF Energy is concerned that there have been significant delays to the key enablers while at the same time the completion date has been brought forward from 2020 to 2019.

4. Given the accelerated completion date, suppliers must decide whether to rollout meters before the key enablers are in place, or to compress their rollout into a shorter time period. EDF Energy believes a period of at least five years is required to deliver the rollout of smart meters. Either option is likely to result in increased cost to customers, unnecessary risk and a potentially sub-optimal customer experience. EDF Energy does not believe that these additional costs and risks are currently reflected in the Impact Assessment:

Our high-level analysis, based on the April 2012 Impact Assessment, indicates that:

— Early rollout of smart meters, in addition to the extra costs identified by DECC in their most recent Impact Assessment, and ahead of the key enablers, could result in additional costs to GB in the order of £500 million.

— Compression of the rollout caused by delays to the start date and a fixed completion date of 2019, could result in delivery risks and further additional costs in the order of £180 million.

5. EDF Energy recommends therefore that Government changes the mandated completion date from 2019 to 2020.

- EDF Energy further considers that the current DECC plan does not allow for the fact that:
  - further delays to key milestones are likely (eg DCC Go Live and the bulk availability of compliant meters);
  - significant uncertainties remain in respect of "difficult-to-reach" customers (eg WAN coverage); and
  - customer acceptance and adoption remains an area of significant uncertainty with the potential to impact ultimate deployment volumes and rollout efficiency.

6. In order to address the practical delivery risks highlighted above, EDF Energy recommends that Government should consider adopting an 80% by 2020 target in line with the EU requirements as opposed to 100% with "all reasonable steps" (as yet undefined), with the remainder being installed as customer acceptance technical and delivery challenges are overcome.

*What are the potential benefits of smart meters for consumers, and what barriers need to be overcome in order for consumers to realise them?*

7. DECC's Impact Assessment indicates that benefits are expected for consumers (through reduced energy usage), suppliers, network operators, generators and GB as a whole (primarily in terms of reduced carbon emissions). EDF Energy broadly agrees with the categories of costs and benefits identified within the Impact Assessment.

8. The Impact Assessment assumes that all costs and benefits are passed through to consumers, given competitive pressures on suppliers. The retail energy market in GB is highly competitive, and among the most competitive in Europe and we would welcome clarity regarding the framework that will be used to ensure that network operators deliver the expected benefits and how these are passed to consumers.

9. Customer behaviour change is vital to the delivery of benefits as customer benefits comprise c. 30% of total expected benefits. However, customers have the right to refuse the installation of a smart meter if they so wish.

10. EDF Energy remains committed to the rollout of smart meters to customers so that they can realise the benefits associated with improved understanding of their energy consumption and to re-build trust with our customers by putting them in control of their energy usage. However, there are a number of challenges that need to be overcome in order for consumers to realise the benefits of smart metering, including:

- Trust—all parties, need to work together to increase consumers' trust in energy companies. Greater trust will lead to increased engagement by consumers and a higher willingness to make the required behavioural changes to realise the benefits smart meters will bring.
- Consumer Apathy—Government and other stakeholders must increase interest in, and awareness of, carbon reduction and energy efficiency in order for Customer benefits to be realised.
- Access—The Industry needs to engage with customers so they are willing to be available and make time for the installation.
- Benefits—Suppliers, Government and the Central Delivery Body will need to engage with customers to encourage them to make small changes to both habits and purchases in order to realise the overall benefits.
- We acknowledge that suppliers (along with media, Government and others) have a role to play in facilitating consumer engagement and increasing interest in, and awareness of, carbon reduction and energy efficiency and the need to create a Central Delivery Body (CDB) to help manage these issues.

11. EDF Energy continues to undertake a series of trials with its customers to assess the potential impact of the challenges indicated above, although it is still too early to provide quantifiable evidence which correlates with mass roll-out on a National basis using the DCC infrastructure. However, there are indications that these challenges will be significant and that further work is needed by the Government programme and Industry to ensure that target benefits are delivered.

*Is there a possibility that suppliers will gain considerably more than consumers from smart meters? Is enough being done to ensure that any financial benefits accruing to suppliers will be passed on to consumers?*

12. The GB retail energy market is among the most competitive in Europe where customers can switch to competitive products from multiple suppliers. An example being that EDF Energy has signed up over 1 million customers to its "Blue" energy product, launched in 2012. A further example is that two smaller suppliers are expected to exceed the 250,000 customer exemption from the Energy Company Obligation. We believe these points demonstrate that competition in the market remains strong and that competitive pressure will ensure benefits arising from smart meters will be passed on to consumers.

13. It is important to recognise that the rollout of smart metering in GB is expected to result in a net increase in costs for suppliers, as the costs associated with procuring and installing a smart meter along with consequential system changes and supporting infrastructure outweigh the benefits. DECC's April 2012 Impact Assessment provides the following aggregate supplier costs and benefits (for both domestic and SME sectors):

| *Category* | *£bn* |
|---|---|
| Supplier Direct Costs | (11.5) |
| Supplier Benefits | 8.9 |
| Supplier Net Benefit | (2.6) |

14. Therefore, DECC's own figures demonstrate that the rollout of smart meters will impose a net cost to suppliers of c£2.6 billion. Suppliers will therefore not gain considerably from the rollout of smart meters but instead will face a net increase in costs. EDF Energy's internal investment case aligns with this view. Customers should benefit from reduced energy consumption and avoided infrastructure investment associated with smart grids.

*What lessons can be learned from successful smart meter implementation and usage elsewhere in the world?*

15. The GB smart meter rollout is supplier led and therefore differs in many respects from rollouts in other countries.

16. Important lessons can be learnt from both the similarities and differences between the GB smart metering programme and that of other countries:

Consumers must be engaged with the purpose and benefits of smart metering

17. In Ontario for instance a clear message was communicated to customers as to why smart metering was being rolled out and the related benefits. The GB rollout needs a similar approach engaging customers on the direct benefits and the wider and longer term impacts.

Large scale testing and trialling creates more certainty over costs and technical challenges

18. The French smart metering programme undertook a large-scale regional trial of smart meters (c. 300,000) ahead of the national rollout, enabling a greater level of certainty in respect of the costs and benefits as well as the technical challenges. A similar approach in GB could help prove technical and consumer readiness ahead of any large scale deployment.

Agreement on key objectives and the technical specifications of systems in advance of mass rollout is essential

19. Experience from Sweden demonstrates that robust and universally agreed specifications are a key enabler for a mass rollout, and are critical in avoiding stranded investments and cost inefficiency. The second round of smart metering deployment in Sweden benefited from improved understanding of costs and operational issues derived from the first round.

There are significant benefits in having a coordinated approach

20. In almost all other jurisdictions, the rollout has been led by a single, regional entity. The GB rollout is unique in placing responsibility for delivery on multiple competing companies. It is therefore even more important for the Government to ensure that Data Communications Company (DCC) services become available as soon as possible to enable the required coordination.

*Will smart meters empower customers to take greater control of their energy consumption?*

21. Smart meters should help empower customers to take greater control of their energy consumption and help to rebuild trust in energy companies.

22. However, since mandating that all consumers must be offered the provision of an In Home Display (IHD), technology has moved on so customers are able to access this data through other means, for example the large scale take-up of tablet devices, smart phones and smart televisions. Consideration should therefore be given as to whether the obligation to provide an IHD in all properties, particularly in those buildings that require additional infrastructure to be developed and installed to support IHD installations, should be amended.

*Will consumers on pre-pay meters obtain the same benefits from smart meters as other consumers?*

23. Customers on pre-payment meters already have a greater level of understanding about their consumption compared to credit customers so the potential for energy behaviour change may be less.

24. Smart meters can operate in either credit or prepayment mode thus helping to reduce the costs involved in supporting legacy pre-payment infrastructure where different meters were required.

25. Pre-payment in a "smart world" is likely to be replaced with "Pay As You Go" (PAYG) similar to that used for mobile telephones. This has the additional benefit of removing the stigma associated with pre-payment and making PAYG a payment method of choice for both existing pre-payment and some cash payment customers.

*Should vulnerable customers and the fuel poor be first in line for smart meters so they can get the benefits sooner?*

26. EDF Energy remains committed to the rollout of smart meters once the key enablers are in place in order to avoid an initially poor customer experience. We do not believe it would be appropriate to prioritise the installation of smart meters for vulnerable customers with immature technology and unproven processes. Vulnerable customers are not a group that should prioritised until the technology, processes and delivery mechanism are stable and proven.

*What is the best way of involving third-party trusted messengers, such as charities, consumer groups, community organisations, local authorities and housing associations in roll-out?*

27. Involving trusted third parties will be a key aspect of the consumer engagement strategy to publically support the smart meter rollout and deliver a consistent message to consumers. We regard the continued support of Government in conjunction with the operation of the Central Delivery Body as essential in identifying and gaining the support of these key third parties.

*What are the potential obstacles to rolling out smart meters in the UK and how should these be addressed? What pitfalls have hindered roll-out programmes elsewhere and are we doing all we can to avoid them?*

28. The GB rollout is technically challenging and ambitious. Suppliers and Energy UK are all agreed on the key enablers that are required to be delivered to ensure that the rollout of smart meters does not result in unnecessary cost, risk or a sub-optimal customer experience. At the same time the end date for the completion of the rollout of smart meters is set in the Supply Licence and the timetable set out by DECC is challenging. Government should focus on managing the cost and quality of this ambitious rollout as opposed to prioritising speed of delivery.

29. In France significant effort was spent ensuring that meter technology was mature, secure and interoperable in advance of large volumes being deployed.

30. Experience from California and the Netherlands has shown it is vital to get customer engagement right and to have a communications programme in place for the whole rollout and for all customer segments. Small groups of people, empowered by the internet and social networking can create abnormal disruption to a smart meter rollout, as experienced in California.

31. Customers need to accept the benefits of smart metering for them and whenever possible messages should be consistent and come from trusted organisations. Suppliers and network operators should be open and honest about the benefits created by the rollout and the technology being deployed to allay fears.

*Are levels of public awareness of and support for smart meter roll-out increasing?*

32. Recent research does suggest that public awareness of smart meters is increasing with the latest research from DECC showing this to be at around 50%. However, we would urge caution as many consumers remain confused about smart metering.

*Is enough being done to increase consumer awareness about smart meters? Could DECC's consumer engagement strategy be improved?*

33. Consumer engagement must be handled carefully, particularly during the Foundation phase. Collectively, we must not inflate demand to a level that cannot be managed as this will cause damage to the programme.

34. During Foundation, when different technologies and engagement approaches are being trialled, we believe that general awareness and education of smart meters should be the focus. DECC must take a leading role in rebuffing inaccurate or misleading reporting, supported by energy suppliers, the CDB, consumer groups and the Health Protection Agency.

*Are consumers' concerns about privacy and health being addressed adequately?*

35. Privacy and health are two critical areas that could cause significant impacts to the rollout of smart meters if consumer concerns are not adequately addressed in a timely fashion.

36. Work in this area needs to continue over the coming months but we are encouraged by the work that the Health Protection Agency has recently done and the advice posted on its website in relation to smart meters supports this.

*Is there any evidence that consumers' concerns about smart meters are declining or growing?*

37. Negativity towards smart meters is at a low level at the moment with campaigns aimed at stopping the rollout receiving only a small number of signatories (a petition received approximately 1,000 signatories on the House of Commons website and a website proposing that the smart metering rollout is halted has received 592 signatories to date). We would point to the experience gained from international rollouts that have seen significant challenges.

*Will the commercial benefits of smart meter roll-out be captured within the UK?*

38. The rollout of smart meters will require significant manpower to be deployed in GB in order to deliver meter installations and associated activities including customer services and IT systems development. Millions of meters and other products will be required, but it is currently unclear as to how much of this will be manufactured or assembled in GB.

*Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy?*

39. The DCC is a critical enabler for the rollout of smart meters supported by suppliers, network operators and Government. The DCC is the right model for the UK, providing national communications and a "hub" that can effectively support the high levels of customer switching seen in the GB market. It is therefore vital that the DCC is delivered and robust end-to-end testing completed prior to commencing the mass rollout of smart meters.

*What criteria should DECC use to measure the ongoing success of roll-out?*

40. EDF Energy believes that there should be a transparent and reasonable framework to measure the success of the smart meter rollout.

41. The Government has already put in place an extensive framework to monitor and evaluate suppliers against interim, and annual rollout targets. Suppliers will be required to provide information on smart meter penetration (ie the number of smart meters rolled out compared to total installed meters, aborted installations and IHD take-up). We believe that meter failure information should also be provided and that the provision of this information to the Government will enable them to assess the rollout against any criteria that it ultimately chooses to adopt. Government will also need to monitor the overall performance of the smart metering delivery process including those elements delivered by the DCC, Network Operators and the wider supply chain.

*February 2013*

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**Supplementary written evidence submitted by EDF Energy**

EDF Energy is one of the UK's largest energy companies with activities throughout the energy chain. Our interests include nuclear, coal and gas-fired electricity generation, renewables, combined heat and power plants, and energy supply to end users. We have over five million electricity and gas customer accounts in the UK, including both residential and business users.

Following my appearance before the Energy and Climate Change Committee on 14 May 2013 to discuss the *Smart Meter Roll-out*, I am writing to provide full details of the key enablers needed for optimal roll out, as promised during the session, which are appended to this letter. I also wanted to provide some more information on EDF Energy's current view to the roll out to support your inquiry.

### This is a Complex Programme and the Focus should be on Simplification & Cost Minimisation

EDF Energy remains committed to the Smart Metering programme and delivering smart meters to our consumers. We believe smart metering is right for GB and should deliver consumer benefits through improved consumer experience and reduced energy consumption. However, the current GB design, specification and market model is complex which increases cost and the risk of failure. DECC recognise that the rollout of smart metering is a net cost to Suppliers which will be passed on to consumers. Therefore industry and the Government should endeavour to minimise the costs in the programme. This could include a co-ordinated rollout, centralised procurement and removing the mandated provision of an IHD provision. EDF Energy's objective has always been to deliver this programme successfully but ensuring the cost to the consumer is minimised and consumer trust is improved. We believe in a right first time approach.

### We must Deliver what Consumers want

We welcome the decision by DECC to put the programme back on a credible timetable. This provides the opportunity to ensure that the programme takes the right decisions for consumers and not the quick decisions. Our enduring priority should be delivering what consumers want as simply and cost effectively as possible.

### The Foundation Stage should be used to Develop Capability and Solutions

The challenge for the GB rollout should not be underestimated. The equipment, technology and infrastructure are all new and as a result immature. Representative testing and trialling in the foundation stage will help to de-risk the programme and give confidence the benefits will be delivered. The foundation stage provides a one off opportunity to set this rollout up for success and therefore the focus must be on proving capability rather than installing in volume. It is far better to discover problems with thousands and not millions of meters installed.

### SMETS 1 Meters are not Appropriate for Mass Roll

With regards the meters we believe the SMETS 1 asset is appropriate for testing and trialling but not mass rollout. Although they can deliver some of the benefits, SMETS 1 meters also have some fundamental limitations. In our opinion the SMETS 1 meter will not meet the enduring security standards, it will not work with other metering equipment in the home, it will not operate effectively in many property types, it will not deliver the expected network operator benefits and prior to the availability of the DCC it will result in poor consumer experience when moving home or on change of supply.

### The Key Enablers Provide the Building Blocks for a Successful Roll Out

All Suppliers and Energy UK have recognised that there are key enablers that need to be delivered to ensure that the rollout of smart meters is optimal. If these key enablers are not delivered the cost of the rollout will increase, the quality of service will be impacted and unnecessary risks introduced. For EDF Energy the key enablers will help to ensure that we can deliver the right kit, at the right cost, to an engaged consumer and with a positive consumer experience. We need to get these basic building blocks in place upfront to ensure smart meters deliver benefits for consumers. We are a responsible company that wants to avoid the costs and consumer impact of having to revisit properties to replace non-compliant or unreliable early meters prior to the end of the roll out. We are committed to delivering the roll out right first time.

### The DCC is Essential for Mass Roll out of Smart Meters to begin

The DCC is a critical element of the national smart architecture needed to enable communication with smart meters, consumer switching, privacy and security. All stakeholders support the need for a DCC in this critical central role. Given this criticality it is difficult to imagine how the roll out could commence without it. EDF Energy firmly believes that large scale deployment of smart meters must not commence until the DCC is operational.

### Clarity is Required on what is Expected of all Reasonable Steps

We believe that the installation target for smart meters is one area that is introducing unnecessary ambiguity. Currently the target for Suppliers is to take "all reasonable steps" to attempt to install a smart meter for 100% of consumers. Suppliers have no guidance of what constitutes "all reasonable steps" and will need to individually interpret this so as to design and build processes and systems. We recognise that there will also be consumer segments that will be dis-engaged, dis-interested or actively resisting smart meters. Suppliers need a clear understanding of what is expected from "all reasonable steps" or a more pragmatic and transparent target introduced. Without this it is analogous to starting a running race without knowing what distance has to be covered.

I hope the above is of assistance to you in your inquiry. If you have any further questions for me on this subject, please do not hesitate to get in touch and I will be happy to help.

*June 2013*

## APPENDIX 1

### LIST OF KEY ENABLERS

— *Firm Design Baseline delivered for E2E Architecture, recognising that this will develop in detail over time*—All parts of the smart infrastructure need to understand how the initial end to end process will work so that they can develop systems and processes to support this.

— *Data Communication Company (DCC) & Service Providers fully tested and available in line with supplier roll-out projections*—Suppliers need to be able to communicate with smart meters using a single, secure, interoperable interface.

— *SMETS2 Meters, In Home Displays (IHDs) and CSP Comms Hubs tested & available in line with supplier roll-out projections*—Suppliers need smart meters to install.

— *Proven enrolment/adoption regime and early enrolment of SMETS meters that meet appropriate criteria, including security*—Suppliers need to understand what the DCC will support to inform their purchases.

— *WAN coverage that allows suppliers to optimise roll-out*—Suppliers need to be able to communicate with smart meters, update tariff details, retrieve meter readings and configure the meter to meet the consumer requirements.

— *HAN coverage that allows suppliers to optimise roll-out and minimise customer dissatisfaction*—Suppliers need a system that works in high rise buildings and in many property types.

— *Central Delivery Body (CDB) operational & delivering objectives*—the CDB is required to engage with consumers so that they understand smart metering and the benefits that could be realised increasing the uptake of smart meters.

— *Supplier systems and infrastructure tested and ready*—Suppliers need sufficient time to build and develop their systems so that they can interface with the DCC.

— *Network Operators ready with operational IT systems and workforce to enable meter point defect rectification*—Network operators need to be ready to resolve network issues identified by the smart roll out and ensure a positive consumer experience.

— *Commercially Interoperable Smart CoS arrangements, subject to the outcome of the Foundation Smart Market consultation*—to deliver a positive customer experience.

— *Sufficient trained installation resource available nationally to support roll-out*—Suppliers need to have a trained workforce to ensure that the installation is conducted safely, professionally and meets consumer protection requirements.

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**Written evidence submitted by SmartReach**

This is the response of SmartReach, a collaboration of Arqiva, BT, BAE Systems Detica and Sensus for smart metering communications in Great Britain, to the call for written evidence for the Energy and Climate Change Committee inquiry on the Smart Metering Roll-Out.

## Executive Summary

*Risks and benefits associated with smart metering communications*

— There is a strong case for the nationwide roll-out of smart metering, which is expected to bring £billions in cost and energy savings for utilities and consumers. To realise these benefits it is essential that the roll-out progresses on time and within budget; and delivers a smooth change-over and high quality service for consumers.

— The choice of smart metering communications technology will have a major impact on the success of the programme and the confidence with which benefits can be realised. Smart meters rely on the two way communication of data, yet, especially in Great Britain meters are often located deep inside buildings in positions that existing public networks find difficult to reach.

— Using communications technology with poor or uncertain coverage makes it harder to connect meters. During mass roll-out, this could make smart meter installation slower, more complicated and less convenient for millions of households. The resultant, unbudgeted costs would hit utilities and their customers and adversely impact the business case for smart metering as well as risking programme delays, consumer dissatisfaction and negative media coverage.

— These risks can be minimised by learning from international experience, where the overwhelming majority of implementations have used dedicated networks that are purpose designed to connect to smart meters and grid devices.

— At the same time, it is also important to ensure that the selected communications technology is proven to be suitable for British conditions. Recent trials have shown that a dedicated communication network, using a single long-range radio technology, can connect to over 99% of meters with one installation visit, which could lead to lower costs and a better consumer experience if repeated at scale during mass roll-out.

— Using a single smart metering communications technology nationwide should also generate economies of scale; simplify the training of smart meter installers and ease integration with data services. Whereas, more complex solutions, that rely on multiple communications technologies, will lead to technical complexity, varying installation rates and quality of service for different parts of the country.

— Technologies that use fewer communications sites, will minimise the environmental impact and avoid the planning delays that could result from choosing a communications technology that would rely on a large number of new sites.

— Given its vital importance in securing a sustainable energy future, the smart metering communications network should be viewed as part of our Critical National Infrastructure (CNI). It must be resilient and designed to be always available. Confidence in the roll-out can therefore be increased if the smart metering communications network is delivered by organisations with a strong CNI heritage.

— A dedicated, flexible and resilient communications network is also better suited to meet potential smart grid and smart water metering requirements, increasing the long-term value it can deliver.

*Consumer engagement*

— International implementations, as well as the experience from major national critical infrastructure programmes like the TV Digital Switch Over (DSO), have shown the vital importance of early, concerted consumer engagement. We welcome the government's planned established of a Central Delivery Body (CDB) and the willingness shown to apply lessons learned from the DSO.

— Providing practical information on smart metering, and carefully addressing any concerns, will be an important part of building consumer backing for the installation of smart meters in people's homes. An ongoing consumer engagement programme, extending for some time after installation, will also be essential to deliver the anticipated benefits of smart metering during and beyond the roll-out period. The more informed consumers are about smart meters, the better placed they will be to continue to realise energy savings over time.

## Responses to Questions

1. *Are the government's cost and timescale predictions for roll-out realistic and will it deliver value for money?*

1. *The choice of smart metering communications technology will have a major impact on roll-out timelines and potential benefits*.

2. Using a single, proven Wide-Area Network (WAN) communications technology that connects to over 99% of meters with one visit to each home should mean that more installations can be completed each day and roll-out timescales more readily achieved. The use of a single technology across all three communications service provider (CSP) regions nationwide should also generate economies of scale and would simplify the integration of data and communications services.

3. *The use of an unproven technology, or one not fit for purpose in the UK, could lead to additional costs and delays in connecting smart meters in each home.* Consumers who faced the inconvenience of additional engineer appointments or poor service quality could be turned off from using smart meters. Such negative sentiment could adversely impact access rates for appointments and, in turn, further delay installation in each home.

4. *Choosing an unproven technology creates a real risk that the benefits from smart meters would be delayed or, at worst, fail to be realised.*

5. Looking ahead, a communications infrastructure deployed to support smart meters will provide even greater long-term value where it also has the potential to support smart grids and smart water meters. Smart water meters in underground pits would struggle to connect to the energy Home Area Network (HAN) so a communications solution that will connect direct to meters is required.

6. Completing the smart metering roll-out by 2019 will also require a high degree of coordination between organisations with a strong track record of successfully delivering large scale infrastructure programmes.

2. *What are the potential benefits of smart meters for consumers, and what barriers need to be overcome in order for consumers to realise them?*

7. Consumers stand to gain directly by being able to monitor their energy consumption and make informed decisions on energy use.

8. However maximising the consumer benefits will depend both on delivering a consistently high quality smart metering service for *all* consumers and on an effective consumer engagement programme being in place in advance of deployment and continuing for some time afterwards.

9. However, there are significant differences in the ability of competing communications technologies to reach smart meters in all locations, which requires connectivity to the actual location of indoor meters, not just the premises. This creates a risk that, with some technology choices, the availability and quality of smart metering services could vary according to where people live, and what type of building they live in.

10. The higher the frequency used by the procured communications networks, the harder it will be to connect to all smart meters including in rural locations and deep inside buildings (eg meters in basements).

11. Some of the public (or "shared") network communications technologies used during the current "Foundation" period have tried to get around this problem by careful selection of customer location—an approach that cannot be sustained for a nationwide rollout. We also doubt that attaching antennas or satellite dishes to homes in order to extend coverage would appeal to many consumers. Conversely, a dedicated long range radio communications network (specifically designed to meet the needs of smart metering) has been proven to be ideally suited to connect to meters in Great Britain *wherever* they are located.

12. A HAN within each home will connect meters with In-Home Displays (IHDs) so that consumers can easily understand their energy consumption. DECC is establishing standards for the way that the HAN needs to work, however some of the proposed communications solutions would use similar frequencies for the HAN and the WAN, leading to the risk of conflict and compromised quality of service.

13. *Consumer benefits will also depend upon a high quality, well-resourced, programme of consumer engagement. We are pleased that the government has moved to put in place a Central Delivery Body to build consumer support for smart meters. It is especially welcome that they are applying the key lessons from the highly successful TV Digital Switch-Over.*

3. *Is there a possibility that suppliers will gain considerably more than consumers from smart meters? Is enough being done to ensure that any financial benefits accruing to suppliers will be passed on to consumers?*

SmartReach has no comment to make on this question.

4. *What lessons can be learned from successful smart meter implementation and usage elsewhere in the world?*

14. A key point to note from successful implementations worldwide is that the utilities industry has overwhelmingly opted for *dedicated* smart metering communications networks rather than sharing existing public networks. Powerline Carrier (PLC) technology is widely used across mainland Europe, but is only suitable for programmes led by electricity network businesses. In North America, radio based communications solutions are prevalent.

15. This is a reflection of the fact that dedicated networks are purpose designed to meet the specific needs of smart metering and grids. Conversely, on public networks, smart meter data needs to compete for space with other voice and data traffic. Such public networks were also not designed to provide coverage at the meter location or a defined quality of service.

16. Dedicated networks using Long-Range Radio (LRR) have successfully connected over 12 million smart metering and grid devices. The area covered already exceeds three times the size of Great Britain, including extremely challenging terrain.

17. International implementations are increasingly driven by the expected benefits of smart grids. It will be important to select WAN communications technologies that offer the flexibility and resilience to cover potential smart grids and smart water metering requirements as well as smart energy metering.

18. At the same time, it is important to consider the suitability of different communications technologies for conditions in Great Britain. Mesh-style networks normally operate at higher power levels than are permitted in Great Britain and do have to penetrate our typical housing stock. They also rely on a large number of access points mounted on the utility power poles and may struggle in Great Britain where utility cables are typically buried underground and it is harder to find suitable communications sites. This could delay the planning and rollout of the communications service.

19. International implementations have also shown the crucial importance of getting consumer engagement right from the start. This means carefully addressing any concerns as well as stimulating interest in the use of smart meters and the data they provide in order to encourage energy saving. Otherwise, concerns can grow into public opposition that can delay roll-out, as has previously happened in countries like the Netherlands. Consumer engagement, and a positive consumer experience of smart metering, will be even more important for the GB smart metering programme because of its greater emphasis on achieving benefits for retailers and households.

5. *Will smart meters empower customers to take greater control of their energy consumption?*

Please see our response to (2) above.

6. *Will consumers on pre-pay meters obtain the same benefits from smart meters as other consumers?*

SmartReach has no comment to make on this question.

7. *Should vulnerable customers and the fuel-poor be first in line for smart meters so they can get the benefits sooner?*

20. Whenever smart meters are installed in the homes of vulnerable and fuel poor consumers, it will be important to have appropriately tailored, comprehensive information and support mechanisms in place.

21. There are important lessons to be learnt from the TV Digital Switch-Over (DSO) which, alongside targeted communications, created a help scheme to provide practical support before—and after—the installation of equipment in people's homes.

8. *What is the best way of involving third-party trusted messengers, such as charities, consumer groups, community organisations, local authorities and housing associations in roll-out?*

22. We strongly support the use of third party messengers, such as charities, consumer groups, community organisations, local authorities and housing associations. We welcome the inclusion of this approach in the government's plan for the establishment of a Central Delivery Body. This has been shown to be effective in the past, a good example being the "Digital Outreach" programme run by Digital UK.

23. Consumer groups, working together with the Central Delivery Body, will be best placed to provide advice on the details of how to involve such third-party organisations in the roll-out.

9. *What are the potential obstacles to rolling out smart meters in the UK and how should these be addressed? What pitfalls have hindered roll-out programmes elsewhere and are we doing all we can to avoid them?*

24. Installing smart meters in place of existing traditional meters, in the same location, will minimise disruption for households. However, this creates a challenge for public communications networks which were not designed to provide complete indoor coverage. A dedicated network which has been *proven* to work in British conditions is essential to enable a successful roll-out and ongoing operation of smart meters.

25. Technical complexity and uncertainty is another potential obstacle. Using a single WAN communications technology nationwide, that can connect to nearly all meters with one installation visit to each home, can simplify smart metering roll-out. The benefits are increased if this technology can support the remote connection of smart meters after communications hubs have been installed—it obviates the need to return to the home.

26. Whereas, communications solutions that rely on "infill" solution to close coverage gaps are likely to be more complicated to install, requiring more visits to each home and leading to greater disruption and inconvenience for consumers.

27. Please see our response to (4) above for lessons learned from programmes elsewhere.

10. *Are levels of public awareness of and support for smart meter roll-out increasing?*

SmartReach has no comment to make on this question.

11. *Is enough being done to increase consumer awareness about smart meters? Could DECC's consumer engagement strategy be improved?*

28. Having consistently argued for a consumer engagement programme to be established well in advance of smart meter deployment (this is a key learning from the TV Digital Switch-Over), we are pleased that the government has moved to put in place a Central Delivery Body to build consumer support for smart meters. However, DECC's public opinion research shows that public awareness of smart meters is still low.

12. *Are consumers' concerns about privacy and health being addressed adequately?*

29. We believe that consumer concerns about privacy and health are being properly addressed. As we move closer to the mass roll-out of smart meters it will be important to continue to build on the work done so far.

30. A dedicated communications network, used for smart metering and grid communications only, with security designed in from the outset, will support data privacy.

31. In respect of health concerns, the Health Protection Agency have found that, *"The evidence to date suggests exposures to the radio waves produced by smart meters do not pose a risk to health".*[82]

32. SmartReach's dedicated, low power communications network falls well within the guidelines published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Numerous studies in the USA have also found that smart meter networks pose *no* risk to public health.

13. *Is there any evidence that consumers' concerns about smart meters are declining or growing?*

SmartReach has no comment to make on this question.

14. *Will the commercial benefits of smart meter roll-out be captured within the UK?*

33. Maximising the commercial benefits of smart metering will depend in part on the level of success of the roll-out. The greater the number of homes where smart metering services are available, the higher will be the total benefit for the GB economy.

[82] http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/UnderstandingRadiationTopics/ElectromagneticFields/SmartMeters/

34. The reliable communication of smart metering data will also support more sophisticated energy saving services—such as demand management—and help underpin a wider set of green economy activities, including some envisaged through the Green Deal.

35. A communications network that is also flexible and robust enough to meet potential smart grid and smart water metering requirements would deliver greater long-term value for money for the GB economy.

15. *Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy?*

36. The establishment of a central data and communications service should lead to a consistently high quality of service, and at the same time avoid the duplicated costs that would arise with a more devolved approach.

16. *What criteria should DECC use to measure the ongoing success of roll-out?*

37. Measurement criteria should reflect the timescales and objectives of the programme.

38. The utilities industry will need to install 10,000's of smart meters per day to achieve the programme's important and ambitious goals. WAN coverage, will need to be achieved in line with agreed milestones. Key metrics will include the number and percentage of communications hubs that can connect to the WAN network with a single installation visit and the read interval success rate of meters during their operational life.

39. To create confidence that milestones and KPIs can be achieved it will be important to select a smart metering WAN communications solution that is proven and delivered by organisations with a strong track record in Critical National Infrastructure.

*About the SmartReach partners*

*Arqiva*, the communications infrastructure and media services company, operates at the heart of the broadcast, satellite and mobile communications markets. The company is at the forefront of network solutions and services in the digital world. Arqiva provides much of the infrastructure behind television, radio, satellite and wireless communications in the UK and has a significant presence in Ireland, mainland Europe and the USA.

*BT* is one of the world's leading communications services companies, serving the needs of customers in the UK and in more than 170 countries worldwide. Its main activities are the provision of fixed telephony lines and calls, broadband, mobile and TV products and services as well as managed networked IT services.

*BAE Systems Detica* delivers information intelligence solutions to government and commercial customers. Services include cyber security, managing risk and compliance, data analytics, systems integration and managed services, strategy and business change and the development of innovative software and hardware technologies. It also develops solutions to strengthen national security and resilience.

*Detica* is part of BAE Systems, a global defence and security company with approximately 100,000 employees worldwide. BAE Systems delivers a full range of products and services for air, land and naval forces, as well as advanced electronics, security, information technology solutions and customer support services.

*Sensus* is a leading utility infrastructure company offering smart meters, communication systems, software and services for the electric, gas, and water industries. Sensus technology helps utilities drive operational efficiency and customer engagement with applications that include advanced meter reading, data acquisition, demand response, distribution automation, home area networking and outdoor lighting control. Customers worldwide trust the innovation, quality and reliability of Sensus solutions for the intelligent use and conservation of energy and water.

*February 2013*

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**Written evidence submitted by British Gas**

EXECUTIVE SUMMARY

*British Gas and smart meters*

1. British Gas has led the industry in our mobilisation for the deployment of smart meters, and has already installed over 800,000 meters in UK homes and businesses.

2. British Gas agrees with the Committee that smart meters and smart grids have the potential to bring significant benefits to both the UK energy industry and consumers, and we are strongly behind the smart meter roll-out. Working together, smart meters and smart grids can make a valuable contribution to reducing energy bills for domestic and business consumers, to cutting carbon emissions, and to delivering a more competitive economy.

3. We have been preparing for the smart meter roll-out for a number of years and, having insourced our metering operations in 2010, we now have 1,200 engineers in the field, 120 field managers, and 500 staff in

our dedicated Smart Energy Centre in Leeds. We have trained 800 engineers in our British Gas Academy and will train a further 70 apprentices this year.

4. Our apprentices go through a rigorous training programme, after which they are not only equipped to install smart meters and engage consumers, but also ready to progress down a range of possible long-term career paths with British Gas. These include in our servicing, central heating installations and renewable technologies businesses, and also into supervisory and management posts.

5. We have also led the way in helping consumers understand the benefits of smart meters, and our British Gas smart customers have been overwhelmingly positive about their experiences. British Gas will shortly be launching a major new initiative to drive sustained consumer engagement in the residential sector. Personalised Smart Energy Reports will soon be available to our smart meter customers and will provide insight, for the first time, on their patterns of consumption by time period and appliance type. These free reports will be invaluable in helping our customers both to reduce their energy use, and to reschedule it to take advantage of cheaper prices through time-of-use tariffs.

6. In this context, we are concerned that Ofgem's Retail Market Review proposals, which will limit the number of tariffs suppliers can offer, may prevent time-of-use tariffs being available, thereby undermining both the consumer benefits and the impact this technology can make on demand reduction. However we are pleased at the emerging consensus that customers with smart meters should be allowed greater flexibility through an ability to choose from four time-of-use tariffs (based on mode of operation) as well as four "dumb" tariffs. Our view remains that smart tariffs should be exempt from tariff reform proposals to allow maximum innovation in this emerging segment.

7. We are also working to deliver smart benefits to our business customers. Smart meters are essential to increase understanding of energy use by businesses. They give certainty of energy costs by eliminating estimated bills and provide a reference point to measure consumption against.

8. British Gas has developed a web-based energy analytics dashboard (Business Energy Insight) for our SME customers that enables them to access the half-hourly data from the meter and view it in easily understandable charts and graphs. The service allows businesses to see their consumption and track it over time.

9. In addition, we have trained 100 of our account managers in energy efficiency so that business customers can discuss how to reduce their consumption through their behaviour. Active use of the data from smart meters is expected to save customers up to 10% on their energy bills, around £15,000 annually for our average medium sized business.

10. For larger corporate customers we provide a more sophisticated automated monitoring and targeting (am&t) service that allows businesses to compare performance of their buildings and interrogate the data in conjunction with degree day analysis and other useful performance metrics.

11. Smart meters will also benefit suppliers by delivering a lower consumer cost to serve, thus strengthening the business case for deployment. In a competitive market, with amongst the lowest prices in Europe, any benefits enjoyed by suppliers will quickly feed through to consumers.

*Smart meter benefits*

12. Whilst the benefits are potentially significant, we recognise that the scale of the investment required to deliver the smart roll-out, estimated at around £12bn, demands that close attention is given to deploying in a cost-effective way. Many of the benefits, meanwhile, will only be fully realised if consumers are appropriately engaged, and once all suppliers are fully behind the roll-out.

13. A recent report for British Gas by Oxford Economics calculated that Britain will be nearly £14 billion better off due to the introduction of smart meters. Smart meters mean that, for the first time, customers can easily understand what energy they are using and what it costs. This offers a route to meaningful consumption savings—a key long-term mitigation for rising unit energy prices, and particularly if smart meters are accompanied by a package of tailored advice and support

14. British Gas has seen our customers reduce their energy bills by an average of 1.6% following a smart meter installation, supporting DECC's IA, and expect this to increase further when we launch our Personalised Smart Energy Reports. Recent trials of time-of-use tariffs have shown customers can reduce their peak demand by around 7% and their overall consumption by 2.5%.

15. We therefore welcome that the draft Smart Meter Installation Code of Practice (SMICoP) specifies that energy efficiency guidance must be offered at installation. However, we are deeply concerned that, as currently drafted, suppliers will not be allowed to promote the Green Deal at install without explicit customer consent, and believe this will be a barrier to Green Deal take-up.

16. The potential of smart roll-out to support, and be supported by, the Green Deal should be recognised. Both programmes currently have low public engagement and are facing negative media coverage. A more aligned government narrative and approach would help both programmes. As customers are increasingly able to understand their energy use through smart meters, the Green Deal offers access to finance to deliver energy efficiency and saving measures, maximising the consumer benefits of smart. The smart roll-out itself, which

will see every home and business in Britain visited over the coming years, is a unique opportunity to promote the Government's Green Deal programme. British Gas will therefore be responding to Ofgem's SMICoP consultation and proposing that Green Deal promotion should be allowed at smart install without prior customer consent.

17. Smart will bring further important consumer benefits. We note that Which? research has highlighted that accuracy and transparency of billing is the number one concern of customers. Smart meters will lead to bespoke tariffs, faster switching and an end to pedestrian meter readings.

18. Our smart metered customers have high levels of satisfaction, with Net Promoter Scores (a widely accepted service measure) tracking at 59, 40% higher than our standard customer base. One in three customer bills are currently estimated. British Gas has already seen how, over time, the removal of estimated bills delivers a significant reduction in customer contact rates. We have also found that customers with smart meters complain around 40% less. .

19. Beyond giving essential transparency to the market, smart meters are a transformational technology. They are the foundation to a smart home and smart grid, better managing supply and demand across the UK via innovative technologies such as decentralised energy, home automation and electric cars.

*Smart deployment*

20. British Gas fully supports DECC's approach to the deployment of smart meters. A robust infrastructure and governance regime is critical to a successful roll-out, and we welcome that DECC has engaged and is working closely with suppliers through every part of this process. Given the complexity of the programme, political support is crucial, and we would urge the smart roll-out to be given political priority in the coming years.

21. We believe that an appropriate roll-out framework has been established and in particular welcome:

(a) The priority given to the standardisation of the meter specification (SMETS 1 and SMETS 2), removing infrastructure dependencies and creating the path for progress to be made on a replacing 58 million meters by 2019;

(b) The recognition that metering and communications technological development will continue, and that specifications should continue to evolve through planned releases;

(c) Limiting the scope of the Data Communications Company to the services that are required for interoperability, avoiding many of the risks inherent in major IT programmes;

(d) A DCC procurement process and commercial structure that is designed to deliver value for stakeholders.

22. Despite these critical elements being put in place, however, progress in delivery has stalled as a result of two key challenges—programme complexity, and the failure of other suppliers to deploy in a meaningful way in the Foundation stage.

23. The finalisation of the technical design has proved more complex than initially envisaged. There have been extended technical debates (such as the choice of HAN and WAN, and the approach to security) that have taken a long time to conclude.

24. We do not believe it would be helpful to prioritise fuel poor or vulnerable customers in the deployment. To do so would add further complexity and cost to a programme that is already highly complex and logistically challenging. Adding new constraints and targets will undermine suppliers' pursuit of efficiency in their deployment. Furthermore, there are installation scenarios for which no agreed technical solution is yet in place, for example to high rise buildings. Prioritising one customer segment or housing type would perpetuate technical debates, further delaying progress and postponing consumer benefits for the majority.

25. We recognise that fuel-poor customers would benefit from the general introduction of smart prepayment meters, as there is a higher proportion of lower-income customers on prepayment meters. Prepayment customers are already very engaged in their energy use, but smart metering will bring a transformation in vending convenience and choice for anyone with a bank account (cash vending over the counter will continue for anyone without). Prepayment customers will have access to the full range of tariff choices so will be able to access suppliers' best deals. Credit customers in payment difficulty can switch to prepayment before large arrears have been accrued. It may also be possible (subject to privacy constraints) to monitor levels of self-disconnection to identify those in severe hardship and in need of extra help.

26. The technical challenges of the smart roll-out for credit customers are extensive. Prepayment is more complex, and relies on more external parties for delivery. Nonetheless, smart prepayment offers major benefits to consumers and to suppliers. British Gas is the only supplier looking to deliver prepayment in the Foundation stage of the smart roll-out, and we are working hard to offer this to customers as soon as we can.

27. Other suppliers are not making as much progress as British Gas in the smart roll-out during the crucial Foundation stage to 2014. Valid, but resolvable, concerns about some elements of the roll-out, including interoperability, security, and technical specifications, have been used as a reason to postpone embracing the roll-out. As a consequence, with only six years now remaining until the end of the programme, there is industry

risk around the successful national deployment by 2019, in itself an ambitious target given the complexity and scale of the programme.

28. The failure of some other suppliers to deploy in line with more active participants, such as British Gas, has undermined confidence in the agreed UK equipment specifications and introduced commercial risk around the longevity of hardware. In hindsight, a clear and early obligation on all suppliers to participate in the Foundation stage would have helped the industry's level of preparedness and removed much risk from the programme. Instead, the smart roll-out framework was originally established with only an end target and optionality around deploying in the first Foundation stage.

29. The relatively low level of industry participation to date has meant that orders for metering equipment have been lower than anticipated, keeping costs higher in the short-term. This has penalised the early movers and sustained the reluctance of other parties to commit.

30. Suppliers will experience a lengthy time lag between their investment in the smart roll-out and the realisation of benefits. All the costs are early, tangible and up-front; many of the supplier and consumer benefits are dependent on "tipping points" being reached, which will only come about as a result of mass participation involving all suppliers, and will only be realised nearer the end of the roll-out.

31. We therefore welcome the recent licence condition on suppliers to set by the end of this year annual deployment targets to 2019, and to achieve at least 95% success against those targets. We believe that these targets should provide a clear and achievable trajectory to the end of the programme, and that penalties for failing to meet these interim targets must be greater than the cost of deployment, in order to provide the right incentives and encourage action.

32. We would also encourage DECC to consider the scope for incentives to support engagement in the Foundation stage. In particular, encouragement for suppliers to adopt Foundation stage smart meters would be welcome. To facilitate this, we believe DECC should monitor the proportion of meters adopted at change of supplier, and to analyse whether SMETS-compliant smart meters are being removed. Such action would reverse progress to 2019, disengage customers, increase costs and is wholly unjustifiable.

*Consumer engagement*

33. As the Committee recognises, customer awareness and engagement are crucial to a successful roll-out. Both are currently very low. The supplier-funded Central Delivery Body (CDB), which is being established as the primary centralised vehicle to deliver a programme of consumer engagement activities to tackle concerns and encourage consumers to embrace the technology, will not be operational until January 2014.

34. The possibility of triggering excess consumer demand that cannot be met if consumer awareness is driven too early has often been used as a reason not to begin a sustained consumer engagement drive. However, heightened consumer awareness will not in itself necessarily lead to increased demand, and to suggest otherwise fails to recognise the current low level of consumer interest.

35. In this context, we note the experience of the recent digital switchover as a national campaign with a similar reach. The company responsible for switchover communications was established over three years ahead of implementation and began its major customer communications campaigns in 2006, fully 30 months before the first switchover. We believe a similarly early approach to smart consumer engagement would have been helpful, although we recognise and welcome ministerial support for the establishment of the CDB.

36. In addition to the CDB, British Gas supports the involvement of a broad range of voices in promoting the benefits of smart meters. We therefore welcome the involvement of trusted third parties as a route to engage consumers, including those based in local communities and the third sector who we believe can play an important role.

37. We have concerns that the framework on data access is unduly restrictive and will impact engagement. DECC's own research indicates that very few customers have any concerns over data access. Despite this, suppliers are able to have access only to monthly data without customer consent, to daily data only if a clear opportunity is given for the customer to opt-out, and to half-hourly data only with explicit consumer consent.

38. Default access to half-hourly data is needed for maximum understanding and management of energy use. Without this data, tailored bills are difficult, appliance-by-appliance level analysis over how to cut bills is impossible, and time of use tariffs are ruled out. Asking customers to opt-in to this data is likely to be a huge behavioural barrier and we therefore would support default access to half-hourly data. Furthermore we believe the level of information and choice suppliers are required to provide as part of the installation process is bewildering and potentially disengaging.

*Measuring success*

39. British Gas believes a successful roll-out should be assessed primarily against the extent to which the DECC Impact Assessment (IA) is achieved. We believe the monitoring an evaluation approach being progressed by DECC aligns closely to the business case set out in the IA. There are further qualitative measures that should be considered, however. These include a redefinition of consumers' relationship with their supplier

and the providers of energy services. Energy suppliers should be seen to be working for consumers' benefit by providing choice, empowerment, control and high satisfaction. Smart metering alone cannot deliver this but the technology does provide a springboard from which visionary companies can transform themselves into providers of services that customers actively choose rather than simply need.

40. Given the complexity and scale of the roll-out, the important potential benefits, and the need fully to engage consumers, British Gas welcomes the Energy and Climate Change Committee's scrutiny of the smart roll-out and is pleased to respond to the specific questions raised by the inquiry.

Question 1. *Are the Government's cost and timescale predictions for roll-out realistic and will it deliver value for money?*

1.1 We believe that the Government's cost and timescale predictions for roll-out are challenging given the current uncertainty in the programme.

1.2 In particular, we note that costs for the establishment and operation of the DCC are currently unknown, and subject to a procurement process that has not yet concluded. However we believe that the procurement process is being run professionally, and we see no current reason why an efficient and cost-effective service will not be delivered.

1.3 We fully support the approach DECC has taken on the industry architecture for smart metering as a DCC will provide full interoperability—essential for the UK competitive energy market—whilst avoiding the risks often associated with the creation of large IT projects. Suppliers are able to deploy smart meters in advance of the appointment of the communications and data service providers and the establishment of the DCC. Without this ability we do not believe the target of 2019 could be achievable.

1.4 We believe that DECC created the right framework for the completion of roll-out by 2019. A clear and early obligation on all suppliers to participate in the Foundation stage, however, would have helped the industry's level of preparedness and removed much risk from the programme.

1.5 We support Ofgem's stance on enforcement, that the sanctions for underachievement of the roll-out obligation must exceed the costs of fulfilling it.

1.6 Some suppliers have indicated a reluctance to maintain smart functionality in the Foundation stage following a change of supplier, which we believe is to the detriment of consumers.

1.7 The Impact Assessment (IA) assumes that the cost for metering equipment will drop markedly once mass roll-out commences and large orders are placed. British Gas will be installing around one third of all smart metering systems in the UK so, by committing now to smart metering, we have done more than anyone to establish supply chains and use volume to drive down the cost of equipment. We could reasonably expect to realise these volume benefits earlier than some other suppliers but there is still a significant gap between our costs and those anticipated in the IA.

Question 2. *What are the potential benefits of smart meters for consumers, and what barriers need to be overcome in order for consumers to realise them?*

2.1 British Gas strongly believes that smart metering has the potential to deliver significant benefits to consumers and transform customer relationship with energy and energy suppliers. A recent report for British Gas by Oxford Economics calculated that Britain will be nearly £14 billion better off due to the introduction of smart meters.

2.2 Smart meters mean that, for the first time, customers can easily understand what energy they are using and what it costs, opening the door to consumption savings—a key long-term mitigation for rising unit energy prices. Information on usage and expenditure is available instantly and can be scrutinised, reviewed, and compared over different time periods. British Gas smart meter customers can also compare their usage with similar properties and households, providing an opportunity to highlight differences and identify energy-saving measures that may be appropriate.

2.3 Other key benefits include:

- an end to estimated bills;
- no more "bill shocks" (through lack of visibility on usage, occasionally compounded by billing problems such as successive estimates);
- no need to provide access to meter readers;
- simple transfers between credit and pay-as-you-go;
- faster switching;
- the option to choose monthly billing and time-of-use tariffs.

2.4 In time, there will also be significant benefits for pre-payment customers (described in our answer to Question 6)

2.5 Smart meters are also the foundation to a smart home and smart grid, better managing supply and demand across the UK via innovative technologies such as decentralised energy, home automation and electric cars.

2.6 Suppliers will also benefit through achieving a lower consumer cost to serve. In a competitive market, with amongst the lowest prices in Europe, these supplier benefits will quickly feed through to consumers.

2.7 Many of these benefits, however, will only be achieved once there is mass roll-out, itself dependent on all suppliers fully embracing the smart programme. Furthermore, consumers must be given the support to take action, particularly in understanding how to make their homes and businesses more efficient. British Gas welcomes and supports the Green Deal as a key route to finance and believes Green Deal promotion should be allowed at smart install without prior customer consent. We believe this will also help encourage uptake of the Green Deal.

2.8 A lack of positive consumer engagement on smart is also a current barrier. Consumer awareness levels are low, there is confusion about the benefits, and press coverage has, at time, been negative. The supplier-funded Central Delivery Body (CDB) will be critical in supporting and providing context for the engagement initiatives undertaken by suppliers. The single most important contribution the CDB can make is to educate, stimulate interest and encourage customers to agree appointments and open their doors to installers. The logistical challenge of visiting every home and small business in the UK to replace their meters is unprecedented and should not be underestimated.

2.9 We are also concerned that the framework on data access is unduly restrictive and will impact engagement. Access to half-hourly data is important to deliver personalised energy saving advice. Without this data, tailored bills are difficult, appliance-by-appliance level analysis over how to cut bills is impossible, and time of use tariffs are ruled out. DECC's own research indicates that few customers have concerns over data access. Despite this, suppliers are only able to have access to half-hourly data only with explicit consumer consent. Our views on this area are expanded in our response to Question 12.

Question 3. *Is there a possibility that suppliers will gain considerably more than consumers from smart meters? Is enough being done to ensure that any financial benefits accruing to suppliers will be passed on to consumers?*

3.1 Smart meters benefit suppliers by delivering a lower consumer cost to serve.

3.2 In a competitive market, where all energy suppliers are focused on cost management in order to stay competitive, any benefits enjoyed by suppliers will quickly feed through to consumers. Any failure to reflect cost-saving in tariffs would make a supplier uncompetitive and quickly drive customers to competitors. We do not therefore believe that it is possible for a supplier to gain "more" benefits than consumers.

3.3 The economic case for suppliers is complex as it relies on a large up-front expenditure on equipment, infrastructure and personnel to encourage consumers to use less of the commodity on which the profitability of the business has traditionally relied. The benefits are more esoteric than the costs, and many will come later when the majority of customers have been switched over to a smart meter. They will come from improved efficiencies in service delivery, such as reduced meter-reading costs, fewer billing queries, no more estimates, more effective debt management and theft detection, fewer callouts to attend meter faults, more effective industry processes, better data quality to support change of supplier, and avoided meter replacements for changes between credit and pre-payment.

3.4 British Gas has committed to a large smart metering deployment programme in the Foundation stage of the Programme. This is a significant investment in capability that has now been running for five years but without which we do not believe we—or the supply chain we have supported—could have been ready for mass roll-out. As a result of our go-early strategy, our metering costs will be higher than those who follow later in the Programme.

3.5 Our decision to press ahead with deployment more aggressively than our competitors has been premised on realising an earlier return on our investment. We are passionate about being competitive on price, delivering the best customer service and the most attractive range of propositions. We believe we will accrue reputational benefits from industry leadership, outstanding service and compelling smart-enabled customer propositions. We would expect these to feed through to improved customer acquisition and retention and a deepening of the customer relationship through the purchase of additional energy-related products and services.

Question 4. *What lessons can be learned from successful smart meter implementation and usage elsewhere in the world?*

4.1 Lessons from abroad show that the critical component for success is the timing and extent of customer communication.

4.2 In Ontario, Canada, a communication programme was led by the IESO (Independent Electricity System Operator), similar in role to National Grid but set up on a not-for-profit basis. Electricity suppliers frequently referenced IESO communications in their own engagement activities and materials, whilst retaining competitive differentiation. The core messages were tied to energy conservation and job creation and resonated well with consumers. There were no significant trust issues and time-of-use tariffs are viewed by consumers as having

had a neutral or favourable impact. Peak consumption has reduced by nearly 3%.[83] This clear alignment with core messages and the strong communication push well ahead of the roll-out are generally accepted to have contributed significantly to a successful deployment.

4.3 In Italy, the approach was based on openly declared cost savings for Enel SpA, (wholly state-owned at the time), energy efficiency and customer empowerment.

4.4 94% of Italian homes now have smart electricity metering, the quality of service has improved (measured in supply interruptions) and operating costs are 40% lower than in 2001 (due primarily to efficiencies in load management and technician costs, and improved revenue protection). The investment was recouped in around four years. The delivery of empowerment and energy efficiency messages has been secondary to the cost reduction and service improvement, but these are benefits that have passed through to consumers.[84]

4.5 The deployment in Italy had a different emphasis to that in the UK, where there is a primary focus on consumer benefits and energy efficiency, underwritten by the financial benefits of operating efficiencies and the opportunities for industry simplification. British Gas supports Government's aspiration that customers should be at the heart of the UK smart meter roll-out. The UK is unique in mandating the offer of an IHD, a wholly consumer benefit.

4.6 The key lesson for the UK is on the importance of early engagement. We believe the Central Delivery Body will be able to implement an effective centralised campaign. It would be hugely advantageous if suppliers were able to build their own communications on the back of this, but the CDP will not be operational until 2014. As a result, customer awareness of, and interest in, smart metering is low, making deployment in the Foundation period more challenging.

Question 5. *Will smart meters empower customers to take greater control of their energy consumption?*

5.1 We believe that smart meters can empower customers to take greater control of their energy consumption, but only if they are engaged with the technology.

5.2 British Gas evidence from our smart customers indicates that most are taking greater control of their energy and reducing their consumption as a result.

5.3 We are confident that smart metering will bring energy into the digital age and allow services and products to emerge that will further change customers' attitudes and expectations of their suppliers. Information is empowering: it allows better decisions and choices to be made and should support the industry's pressing need for simplicity and speed.

Question 6. *Will consumers on pre-pay meters obtain the same benefits from smart meters as other consumers?*

6.1 Smart meters will give credit customers accurate bills, more frequent billing, and feedback on energy usage and cost. Prepayment customers already have these benefits and the benefits of smart will therefore be lower.

6.2 Once switched to smart metering, however, prepayment customers will enjoy a step change in convenience and we anticipate the following benefits:

- A transformational step forward in vending convenience and choice. New payment channels will allow anyone with a bank account to top up from home. It is expected that automated top-ups will be introduced.
- Greater protection for vulnerable customers, through non-disconnect periods for both fuels and the ability to apply credits in times of difficulty, almost instantaneously.
- Access to a wider range of tariff choices (including fixed-term contracts), equivalent to credit.

[83] The Effects of Time of Use Rates on Residential Electricity Consumption, Newmarket Tay Power Distribution 2010

[84] http://www.euractiv.com/climate-environment/enel-italy-reaping-first-mover-benefits-smart-meters, http://www.businessweek.com/globalbiz/content/nov2009/gb20091116_319929.htm, AMM Drivers in Italy or "Why to become smart",

6.3 Prepayment customers have a higher understanding of the cost of energy than credit customers, and reductions in usage are therefore expected to be lower. However consumption savings in this segment are achievable. British Gas undertook a smart pre-payment trial in 2012. Customer research showed that the presentation of consumption information through an improved interface (IHD) in a more visible location may deliver consumption reduction. The research findings were as follows:

| | | |
|---|---|---|
| Number of respondents | 100% | |
| My Smart Meter makes it easier for me to understand how much energy I use | | |
| Agree strongly | 76.1% | |
| Agree slightly | 16.9% | |
| Neither agree nor disagree | 4.2% | |
| Disagree slightly | 1.4% | |
| Disagree strongly | 1.4% | |
| Number of respondents | 100.0% | |
| My Smart Meter makes no difference to me | | |
| Agree strongly | 4.2% | |
| Agree slightly | 9.9% | |
| Neither agree nor disagree | 9.9% | |
| Disagree slightly | 21.1% | |
| Disagree strongly | 53.5% | |
| *Question not answered* | 1.4% | |
| Number of respondents | 100.0% | |
| My Smart Meter has allowed me to reduce my energy costs | | |
| Agree strongly | 36.6% | |
| Agree slightly | 31.05 | |
| Neither agree nor disagree | 22.5% | |
| Disagree slightly | 5.65 | |
| Disagree strongly | 4.2% | |
| Number of respondents | 100.0% | |

Question 7. *Should vulnerable customers and the fuel-poor be first in line for smart meters so they can get the benefits sooner?*

7.1 British Gas does not support the mandated prioritisation of any particular customer segment in the smart deployment. We believe that this would add unnecessary complexity, inefficiencies and cost to the roll-out.

7.2 Suppliers are already incentivised to deploy smart metering in the most efficient way they can, and the Smart Meter Installation Code of Practice provides the assurance that vulnerable customers will be given appropriate attention, care and service.

7.3 A significant proportion of fuel-poor customers will have prepayment meters, currently an expensive segment to service: the infrastructure required to support physical payment devices is expensive, hardware costs are high (comparable to smart meters), reliability is lower, and call volumes are disproportionately high. Given the supplier benefits smart prepayment meters will bring, it is likely that suppliers will be keen to focus on this segment without mandation. British Gas is committed to rolling out smart prepayment meters as quickly as possible and the small-scale trial reference in our answer to Question 6 has been invaluable in helping us to scope the task.

7.4 However it should be noted that smart prepayment meters are technically complex, and are not ready to be deployed en masse. Furthermore, before the costly infrastructure for conventional prepayment metering can be dismantled the appointed Communications Service Providers will need to be near 100% coverage, and all suppliers will need to delivering smart prepayment meters to their customers. We therefore do not expect there to be any significant movement in this segment until the DCC is fully operational

7.5 For other vulnerable groups, particularly those with some form of impairment, we believe deployment should be delayed until an appropriate technical solution is found to these specific needs. As an example, there is currently no IHD that is suitable for customers with a sight impairment, and, where this is known, British Gas is currently deferring the installation of smart meters. Nor is there yet a technical solution for customers occupying high-rise buildings where we would expect overlap with those in fuel poverty

Question 8. *What is the best way of involving third-party trusted messengers, such as charities, consumer groups, community organisations, local authorities and housing associations in roll-out?*

8.1 British Gas supports the involvement of a broad range of voices in promoting the benefits of smart meters. We therefore welcome the involvement of trusted third parties as a route to engage consumers, including those based in local communities and the third sector who we believe can play an important role.

8.2 We are enthusiastic about engaging other trusted parties as advocates of smart metering but have been disappointed by messages from some stakeholders when public statements have included a subtext on the risks and drawbacks, seeding a negative perception overall. For smart metering to succeed, engage and transform consumers' relationship with energy, it would be helpful for all stakeholders to recognise and promote the benefits.

8.3 British Gas has run some limited trials with the National Housing Federation. These were small scale due to the current technical constraints relating to difficult installations and the absence of a scalable pre-payment solution. Housing Associations conducted awareness and engagement campaigns to identify customers wishing to opt-in for smart meters, resulting in increased access rates and kept appointments.

8.4 Parallels have been drawn with Digital UK, who enjoyed considerable success in their engagement of local communities and third parties. There is certainly some valuable learning to be taken from their approach—notably the period of time ahead of switchover over which they elevated awareness—but there are also some significant differences:

- — Customers were already interested in watching TV.
- — There were consequences of doing nothing.
- — The benefits of additional channels were easily understood.
- — There was a specific event on which to hang communications and call for action.
- — There was no need to visit every home in the UK.
- — The broadcasters did not concentrate resources on debating delivery of switchover. Competition was wholly related to content.
- — There were no significant challenges from consumer groups over whether Digital switchover was a good idea.

8.5 We are aware of interest from some quarters in the concept of a "smart town", a co-ordinated deployment and engagement activity involving multiple agencies and all suppliers. British Gas believes there may be merit in stimulating interest and raising awareness in this way. However given the need to have all suppliers and the relevant network operators engaged to support this we do not believe this kind of initiative will be practical before 2014.

Question 9. *What are the potential obstacles to rolling out smart meters in the UK and how should these be addressed? What pitfalls have hindered roll-out programmes elsewhere and are we doing all we can to avoid them?*

9.1 The principal obstacles to the *successful* roll-out of smart meters are low awareness by customers, and a lack of interest in the technology. The clear message from international deployments is that without a full explanation to customers of what is happening, why and when, customers will not engage. Communication is vital and its absence stokes suspicion.

9.2 The roll-out of smart metering in Victoria, Australia is a good example of the potential consequences of inadequate consumer engagement. The roll-out was distributor-led and insufficient attention was initially given to explaining the context and benefits of smart meters. It prefaced significant price increases for energy and the introduction of penal time-of-use tariffs. From a consumer perspective, smart metering was therefore not something that had been requested, it was not fully explained and the impacts that followed were negative. There was a major consumer backlash, deployment stalled and time-of-use tariffs were halted.

9.3 There are also technical challenges associated with the roll-out, particularly in light of the aspiration for smart meters to be available to 100% of homes and small businesses.

9.4 Mobilising an industry to replace 58 million meters in six years is a phenomenal logistical challenge impacting on recruitment, training, systems, processes, procurement, business organisation, data and technology, and finance. Each of these areas contains challenges that must be overcome.

9.5 British Gas does not believe that any of these areas contains insurmountable challenges and waiting to solve them all should not be an excuse for inactivity.

Question 10. *Are levels of public awareness of and support for smart meter roll-out increasing?*

10.1 We do not believe that levels of public awareness of and support for smart meter roll-out are increasing. All research on this topic indicates that there is consumer confusion about what a smart meter is, and does. The number of customers who believe they have had one installed suggests that many believe the term is applicable to any meter with a clip-on electricity monitor. When arranging smart metering installations (most

usually as a result of a need to replace an ageing meter) the majority of customers need an explanation about what a smart meter is and what benefits it can provide.

10.2 As the most active of the large suppliers, British Gas has undertaken numerous initiatives to try to raise awareness. These have included media activity, and a high profile multi-media campaign in summer 2012 on smart-connected homes, which scored high recognition levels, , but overall awareness and interest in smart metering remains low.

Question 11. *Is enough being done to increase consumer awareness about smart meters? Could DECC's consumer engagement strategy be improved?*

11.1 The experiences from other deployments around the world strongly suggests that it is the communication with customers that exerts the greatest impact on the success or failure of an implementation. A failure fully to explain the purposes and benefits of smart metering leaves customers open to the influence of small but vocal anti-smart lobby groups. In hindsight, therefore, we believe it would have been helpful to establish the CDP earlier.

11.2 We believe DECC's approach to consumer engagement is appropriate, although we believe there would have been merit in establishing the supplier-funded Central Delivery Body (CDP) earlier

11.3 We also note that our industry body, Energy UK, is developing a comprehensive engagement plan around smart, an initiative we fully support.

Question 12. *Are consumers' concerns about privacy and health being addressed adequately?*

12.1 British Gas recognises that some customers will have data and privacy concerns related to the installation of smart meters. Our own customer research, however, clearly shows that these concerns are held by a very small minority of consumers. DECC's own research indicates that very few customers have any concerns over data access.

12.2 We have concerns that the framework on data access is unduly restrictive and will impact engagement. Suppliers are able to have access only to monthly data without customer consent, to daily data only if a clear opportunity is given for the customer to opt-out, and to half-hourly data only with explicit consumer consent. We believe this will be a barrier to consumer engagement.

12.3 Default access to half-hourly data is needed for maximum understanding and management of energy use. Without this data, tailored bills are difficult, appliance-by-appliance level analysis over how to cut bills is impossible, and time-of-use tariffs are ruled out. Asking customers to opt-in to this data is likely to be a huge behavioural barrier and we therefore would support default access to half-hourly data.

12.4 Concerns about health are extremely low in volume but we accept are strongly held. British Gas would not support any technology which we believed posed a health risks to our customers. We support the ability for any customer to refuse a smart meter which should ensure that individual concerns are satisfied.

12.5 We welcome the involvement of the Health Protection Agency (HPA) in this issue, the impartial science-based approach they take, and evidence-based statements that they do not believe smart meters pose a health risk. We welcome the on-going HPA research project, which we expect to go some way to further allay concerns.

12.6 We believe that allaying consumer concerns on privacy and health issues should be a priority for the CDB.

Question 13. *Is there any evidence that consumers' concerns about smart meters are declining or growing?*

13.1 We have seen no perceptible change in customers' concerns about smart meters. Energy UK now tracks the volume and "sentiment" (whether negative, neutral or supportive) of smart metering references in social media. This has confirmed that the traffic is low and the sentiment fairly static (mostly neutral).

Question 14. *Will the commercial benefits of smart meter roll-out be captured within the UK?*

14.1 We expect the smart roll-out programme to deliver commercial benefits to the UK, most notably through the jobs created by the deployment and resultant expected heightened customer demand for energy efficiency.

14.2 British Gas now has 1,200 smart engineers in the field, 120 field managers and 500 staff in our dedicated Smart Centre in Leeds. We have trained 800 smart engineers in our Academy and will train a further 70 apprentices this year. Further jobs will be created in the supply chain (including meters, uniforms, tools and vehicles) and areas such as warehousing and logistics.

14.3 In time, smart meters should also be a catalyst for investment in energy efficiency and that there will be market opportunities created for new products and energy services.

14.4 We therefore welcome that the draft Smart Meter Installation Code of Practice (SMICoP) specifies that energy efficiency guidance must be offered at installation. However, we are deeply concerned that, as currently

drafted, suppliers will not be allowed to promote the Green Deal at install without explicit customer consent, and believe this will be a barrier to Green Deal take-up.

14.5 The potential of Smart roll-out to support, and be supported by, the Green Deal should be recognised. Both programmes currently have low public engagement and are facing negative media coverage. A more aligned government narrative and approach would help both programmes. As customers are increasingly able to understand their energy use through smart meters, the Green Deal offers access to finance to deliver energy efficiency and saving measures, maximising the consumer benefits of smart. The smart roll-out itself, which will see every home and business in Britain visited over the coming years, is a unique opportunity to promote the Government's Green Deal programme. British Gas will therefore be responding to Ofgem's SMICoP consultation and proposing that Green Deal promotion should be allowed at smart install without prior customer consent.

Question 15. *Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy?*

15.1 We believe that DECC's current approach to the roll-out is appropriate and in particular welcome:

- The priority given to the standardisation of the meter specification (SMETS 1 and SMETS 2), removing infrastructure dependencies and creating the path for progress to be made on a replacing 58 million meters by 2019;
- The recognition that metering and communications technological development will continue, and that specifications should continue to evolve through planned releases;
- Limiting the scope of the Data Communications Company to the services that are required for interoperability, avoiding many of the risks inherent in major IT programmes;
- A DCC procurement process and commercial structure that is designed to deliver value for stakeholders.

15.2 In particular we welcome the prioritisation of technical specification work, and the pragmatic approach to the evolution of the technical specifications which has allowed deployment in advance of the establishment of the DCC.

15.3 Further action is now required to ensure a cost-effective programme is implemented. Most notably, we believe that a non-discretionary, effective smart metering change of supplier process ahead of the DCC is urgently needed.

15.4 Without this, progress made by active suppliers including British Gas could be reversed if other suppliers with a lower level of readiness for smart either change the meter to a conventional ("dumb") operation or, removes it and installs cheaper conventional metering in its place.

15.5 For smart metering change of supplier to become standard practice, suppliers must adopt SMETS-compliant smart meters and pay a market rate in asset rental to the Meter Asset Provider (MAP). By paying for the additional functionality, the incentives to use it and deliver the benefits are strengthened and the customer experience is protected. Installing suppliers are already obligated to offer smart metering services to gaining suppliers, so the requirement on gaining suppliers to use them (even if only automated reads, for example) need not be unduly onerous.

15.6 We have some concerns over the time set aside for testing, which is challenging for a programme of this scale. That said, we believe the strategy and approach to testing are well drafted within the context of the time constraints available to the Programme.

Question 16. *What criteria should DECC use to measure the ongoing success of roll-out?*

16.1 We are satisfied the criteria identified by DECC for benefits tracking, tied to the IA, are appropriate. These are set out in the template for annual reporting by suppliers and include data on costs, benefits, and timeliness. Ultimately, the achievement of the IA should be the measure of success.

1.2 Over and above the IA, there are qualitative criteria that should also be part of the definition of success. These include a robust security framework, the development of the smart grid to the benefit of all energy users, the adoption of time-of-use tariffs and delivery of load-shifting, and an expansion of the green economy. Most importantly there should be a legacy of sustained consumption reduction.

1.3 Reduction in energy consumption by volume requires a cultural change in attitude and an end to profligacy. It should also redefine consumers' relationship with their supplier and the providers of energy services. Our definition of success would include a new and deeper relationship with customers, in which British Gas is not simply a necessary utility, but a company that is seen to be working for consumers' benefit by providing choice, empowerment, control and high satisfaction. Smart metering cannot deliver this but it provides a springboard from which visionary companies can transform themselves into providers of services that customers actively choose rather than simply need.

*February 2013*

## Written evidence submitted by ScottishPower

### Introduction and Summary

1. ScottishPower is fully supportive of the implementation of smart metering. We are convinced of the long-term strategic business case that is facilitated by smart meters both in terms of enabling better, more efficient customer service and helping customers to engage better with energy efficiency. We welcome the UK Government's significant commitment to the UK roll-out.

2. It should be recognised that the GB roll-out is different from others worldwide, in that the task is being undertaken by energy retail companies and not energy distribution companies. This brings its own opportunities (increased customer engagement) but also its own challenges including a unique systems architecture and a lower ability to gain from experience in other jurisdictions.

3. Our views can be summarised by the following 4 core principles:

*A stable design is necessary for creating a robust smart meter infrastructure for GB*

4. The smart metering deployment is core strategic infrastructure for GB which will last for a minimum of 30 years. It is therefore vital that the key design elements (meter design, communications design, home interface design, security design etc) are all stable and baselined to allow suppliers to build the relevant systems and processes ahead of mass deployment.

5. DECC has been working hard to conclude on these topics and, over the last 18 months, has made strong progress. However, there are some elements that have taken longer than expected due to complexity (eg, the SMETS meter specification is two years later than the original plan) and some elements that are still to be resolved (eg, end to end architecture, fully defined enrolment and adoption criteria). This has inevitably delayed companies commencing mass roll-out and, some recent changes (eg, security design changes) have added significantly to supplier costs.

*A simple design will still deliver the benefits while minimising the rollout cost*

6. As the smart meter roll-out is led by the energy retail sector, the UK deployment is more complex compared to other global smart meter deployments. Nevertheless, it is important that DECC works hard to keep the design of the overall GB smart meter infrastructure and associated industry processes as simple as possible as this will have the benefit of reducing cost and accelerating deployment.

*An integrated approach is the only way to ensure strong consumer engagement*

7. Customer engagement with smart meters is crucial to meet Programme objectives. Iberdrola experience from the USA shows that an integrated effort from Government, energy suppliers, regulators and, in the UK's case, the Central Delivery Body is needed to provide consistent information and educate customers about the installation of smart meters. DECC and the industry have been strong in co-ordinating the approach to customer engagement and this needs to continue through the deployment. In particular, we would like further consideration of:

- DECC commissioning expert third party evidence in sensitive generic areas such as data privacy, safety and health concerns;
- DECC reviewing the approach to customer opt-out. The level of opt-out could be as high as 8% of customers—a level which seriously damages the overall business case because of the need to maintain expensive legacy processes at scale. International experience indicates that additional charges for opt-out which reflect these costs help achieve a more efficient outcome with much lower opt out levels, thereby protecting long-term strategic benefits of the investment.

*Timescales are secondary to creating a robust design*

8. Delivering the smart meter business case necessitates full roll-out to the entire country. As stated earlier, in order to protect this investment, a stable design needs to be in place prior to mass roll-out. Once this design is in place, energy suppliers need to install the meters as quickly as possible to achieve the benefits.

9. Realistically, we believe the end date for smart meter deployment is likely to be five years after the start of unconstrained mass roll out (ie from when smart metering equipment is available in the marketplace at volume; full end to end testing and trialling has taken place and is accepted by participants; and that an industry agreed plan for HAN and WAN roll out is in place). However we believe that meeting particular end date targets set early in the preparatory work should be secondary to ensuring the establishment of a robust platform for deployment of smart meters which will ensure that the potential benefits of the Programme can be captured.

## Response to the Committee's Questions

*Are the Government's cost and timescale predictions for roll-out realistic and will it deliver value for money?*

### Cost and Timescale Predictions

10. We accept that the Government's predictions for roll out on costs and timescales are based on estimates and that there are still many unknowns. However, we would highlight three key areas that could impact achieving the Government's predictions:

- Increased complexity in the design of both meter specification and end to end processes compared to other deployments. As an example, the recent and significant change that has had to be made to the security design has added complexity to the GB smart metering end to end architecture, and has already contributed to increased costs and delivery timescales for suppliers and meter manufacturers;
- Delays to key programme milestones—In particular, the delivery of the technical specification for SMETS 2 meters has been delayed which we believe will impact the timescales for mass deployment given the uncertainty as to whether SMETS 1 meters will be fully adoptable into the DCC and/or upgradeable to the new security requirements. There could also be an impact on cost if this delays the availability of sufficient volumes of compliant meters to the market; and
- The availability of HAN and WAN coverage being below 100%, as this will lead to increased costs as alternative solutions are implemented.

11. In addition to the points highlighted the current uncertainties around achieving a stable baseline architecture need to be resolved as soon as possible to ensure that additional costs or delays to the Programme are not encountered.

12. We believe that the complexity involved in the issues we have highlighted increase the risks within the smart meter programme and will make it significantly more challenging to meet the final 2019 deployment date. We believe that the end date for smart meter deployment should be 5 years after the start of unconstrained mass roll out ie from the time when:

- Smart metering equipment is available in the marketplace at volume;
- Full end to end testing and trialling has taken place and is accepted by participants; and
- An industry agreed plan for HAN and WAN roll out, in line with Suppliers' roll out projections, has been agreed.

### Value for Money

13. We are fully convinced of the long-term strategic business case that is facilitated by smart meters both in terms of enabling better, more efficient customer service and helping customers to engage better with energy efficiency. We welcome the UK Government's significant commitment to the UK roll-out.

14. However delivering the benefits is dependent on ensuring that substantially all GB consumers have a smart meter installed and that the consumer uses the smart meter to improve energy efficiency as set out in the Impact Assessment. This will be dependent on engaging effectively with consumers to ensure they understand the benefits that smart meters can offer them.

*What are the potential benefits of smart meters for consumers, and what barriers need to be overcome in order for consumers to realise them?*

### Potential Benefits for Customers

15. Smart metering will offer the following potential benefits to consumers:

- Provision to customers of accurate information on their energy consumption which will enable the customer to make decisions about how they use energy and could reduce their bills;
- Significantly reduce the level of estimated bills;
- Greater scope for customers to self serve providing additional convenience and saving time;
- Allow energy companies to create and offer innovative products and services to consumers which will encourage competition in the market;
- Reduce the amount suppliers need to include in bills for "cost to serve" by reducing the level of field visits, inbound call and bad debt write off;
- Faster and more accurate identification and notification of power outages, and the potential for quicker resolution of outages; and
- Will enable the active management of the smart distribution grid which will support the increasing level of domestic low carbon technologies

16. Capturing these benefits will depend on the technical capability of the smart metering systems rolled out, customers consenting to having a smart meter in their home and allowing suppliers access to their consumption data, subject to the data access and privacy framework.

Barriers that Need to be Overcome

17. To capture the benefits of smart metering systems, we will need to have public acceptance of smart meters. Customers must consent to having a smart metering system installed in their home; without such consent, none of the benefits will be realised. Our experience from our USA deployment suggests that an opt-out response strategy is needed before deployment begins.

18. We would also stress the importance of customers granting suppliers, and authorised third parties, consent to access more granular data; the more granular the data that is made available, the more specific the information and its format that can be given to customers on energy efficiency actions, appropriate products and tariffs.

19. We also believe further work is needed to fully test the complex change of supplier security credentials process, such that the multiple points of failure we perceive within this process can be managed and mitigated.

*Is there a possibility that suppliers will gain considerably more than consumers from smart meters? Is enough being done to ensure that any financial benefits accruing to suppliers will be passed on to consumers?*

20. The GB energy supply market is highly competitive and supply business profitability is accordingly low as demonstrated in the industry's segmental accounts. Ofgem's and the Government's proposed reforms to the retail market are intended to sharpen competition further. Competition between suppliers will ensure that any net financial benefits accruing to suppliers from smart meter rollout will in due course be passed on to consumers through lower prices. Any steps that the Government can take to promote efficient rollout and reduce suppliers' costs should therefore benefit consumers.

21. Initially, it is likely that costs will accrue to suppliers more quickly than the savings, which will tend to build up towards the end of the programme when existing inefficient manual processes can be curtailed. The impact on pricing to consumers is likely to follow a similar profile.

22. It is possible that, as a result of changes in system design, additional costs to suppliers will be incurred that have yet to be identified and/or quantified. For example, additional complexity is having to be introduced to the end to end processes through revised security requirements.

23. DECC is introducing a comprehensive reporting and monitoring regime, which should provide a valuable resource for future *ex post* evaluation of the benefits of smart metering and the extent to which suppliers and consumers have benefited.

*What lessons can be learned from successful smart meter implementation and usage elsewhere in the world?*

24. In general, global deployments of smart meters have been led by the distribution network operator. We have detailed experience of a major smart meter implementation in the US State of Maine, through our sister company Central Maine Power (CMP). CMP's Distribution business recently completed the installation of more than 600k electricity smart meters covering all of their domestic and business customers. This project took 18 months to complete, but in a much simpler environment than GB. For example, access to premises was not required for 96% of the installations.

25. From our experience in the US, we would highlight that deployment is best undertaken by starting small, then testing and learning with each step as deployment expands. The CMP smart metering deployment experienced issues that required

- Upgrades to the firmware (often to update security), requiring site visits in around 5% of cases, resulting in increased costs and reduced consumer experience;
- A regulatory opt out mechanism can increase consumer engagement and maximise benefits. CMP had regulatory approval to charge customers for opting out. Customers could opt out of smart metering and retain their existing mechanical meter, provided they paid a $12 per month charge towards the associated costs of manual meter readings and legacy system support. The current opt out rate is c.1.5% and falling. Prior to introducing this opt out charging mechanism, however, CMP was experiencing an opt out rate of c.8%.

*Will smart meters empower customers to take greater control of their energy consumption?*

26. Smart meters should provide the information to consumers that will allow them to take greater control of their consumption. However it will require more than smart meters alone. To achieve this will require proactive and consistent engagement from the Central Delivery Body, Suppliers, Authorised Third Parties, Consumer Groups, Government, the Regulator and other parties to demonstrate the benefits that controlling energy consumption can bring such as reduced bills, matching tariffs to customers' needs and proactive self servicing through on-line services.

*Will consumers on pre-pay meters obtain the same benefits from smart meters as other consumers?*

27. Prepayment customers are acknowledged to have a greater understanding of their current energy consumption due to the need for them to "top-up" their energy credit on a regular basis. Therefore it may be assumed that a portion of prepayment customers, particularly those on low incomes, will already take steps to manage the efficiency of their energy consumption. However smart meters will enable pre-payment customers to gain a better understanding of their consumption profile, as well as potentially benefitting from the ability to purchase credit from home, rather than having to visit a prepayment outlet.

28. However, there is still significant work required to determine the final architecture to support this and ensure prepayment customers benefit from smart meters, and we believe the end to end infrastructure, including the smart metering system, needs to be proven to be stable before introducing further complexity such as prepayment services.

*Should vulnerable customers and the fuel-poor be first in line for smart meters so they can get the benefits sooner?*

29. We are committed to ensuring vulnerable and fuel-poor customers continue to receive appropriate help and support throughout the roll-out process and beyond. As to targeting vulnerable and fuel poor customers first with smart meters, we would have reservations. These may not be the best customers to deal with any teething problems as the industry gains experience of how customers interact with smart meters, and there are cost implications. Identifying these customer groups can be challenging and may itself incur additional costs, but the main risk is that targeting these customers specifically could make the roll out of smart meters less efficient and therefore more costly. We will consider what impacts the roll out of smart meters might have on vulnerable and fuel-poor customers as the Programme plans evolve.

*What is the best way of involving third-party trusted messengers, such as charities, consumer groups, community organisations, local authorities and housing associations in roll-out?*

30. We believe the main way of involving third party trusted messengers in the roll-out should be through their engagement with the Central Delivery Body (CDB). To make the most of their potential, the CDB should:

- provide them with consistent, reliable information;
- ensure they understand the benefits of smart meters and can help explain the benefits to consumers; and
- provide them with an escalation point for queries of a complex nature.

31. ScottishPower already has strong links with all of these trusted messengers and we will also seek to engage with them throughout the deployment period.

*What are the potential obstacles to rolling out smart meters in the UK and how should these be addressed? What pitfalls have hindered roll-out programmes elsewhere and are we doing all we can to avoid them?*

32. One important potential obstacle is customer acceptance. Customers can opt out of having a smart meter installed and opt out rates could be significant if health or privacy scares go unchallenged, or if customers who opt out do not have to pay their share of the costs of maintaining legacy systems at scale. As noted above, Iberdrola's experience in Maine (US) showed that customer acceptance has a significant bearing on the success of a smart metering roll out. To mitigate this, an opt out charging mechanism was developed which reflected the costs involved and significantly reduced the number of customers refusing to have a smart meter installed.

33. Other unforeseen obstacles may arise as a result of the sheer complexity of the UK smart meter rollout compared to other deployments around the world. For example, unlike many other rollouts, electricity and gas smart meters will be deployed simultaneously; if the customer has different suppliers for gas and electricity, the installation may be by more than one supplier; and the roll-out will be reliant on new technologies and techniques that require full interoperability. This complexity is added to by the competitive nature of the GB market, and the need to accommodate change of supplier processes. Given this complexity, we believe the timescales for deployment are particularly, challenging with around 53 million smart meters to be deployed within the relatively short timeframe of around 5 years.

34. To address these challenges, we would suggest that the end date for smart meter deployment should be five years after the start of unconstrained mass roll out. We also believe that an agreed stable baseline end-to-end architecture should be in place as early as possible which will bring certainty over costs, allow the manufacture of sufficient volumes of compliant smart metering systems, and ensure that minimal non-compliant smart metering systems are deployed in the market that could increase costs and bring additional complexity.

*Are levels of public awareness of and support for smart meter roll-out increasing?*

35. We are aware of various independent research findings that indicate that a large number of energy customers are still unaware of smart meters, and many more mistake the In-Home Display for the smart meter. Considerable effort is still required from DECC, energy suppliers, the CDB and other third parties to educate customers about the installation of smart meters and of their potential benefits.

*Is enough being done to increase consumer awareness about smart meters? Could DECC's consumer engagement strategy be improved?*

36. We believe it is important to strike a balance here; while it is crucial to the success of the roll out that customers are engaged, and fully understand the benefits and uses of smart meters, there seems little point in bombarding them with information until shortly before installation actually takes place and they can take steps to realise these benefits.

37. We welcomed the Government's proposal for the CDB, and believe that the CDB should produce a communication plan for consumer awareness. However, prior to the CDB being established, we believe that DECC should be pro-active in promoting the benefits of smart meters to consumers, as well as putting in place robust measures to mitigate and where necessary manage instances of negative media activity.

*Are consumers' concerns about privacy and health being addressed adequately?*

38. The Government rightly recognised the potential for threat to consumer privacy from the outset of the Programme. Stakeholders representing consumers, energy suppliers, and other businesses and privacy groups have all engaged in thorough discussions and consultations, resulting in DECC's proposed regulatory restrictions on data use. At the same time, energy suppliers have committed themselves to the development of a Data Privacy Charter for smart metering.

39. Different views have been put forward about the degree to which consumers are, or should be, concerned about the risks to privacy as a result of the GB smart metering roll out. However, the Government has taken account of the negative impact in other jurisdictions when privacy has not been adequately factored into smart metering programmes and considered this alongside the data protection and privacy rights already enshrined in UK law. It also recognised that privacy concerns are not necessarily static and could grow with public awareness of smart metering. We believe that the approach taken to date has ensured that any concerns have been, and will continue to be, adequately addressed.

40. We believe information on the health implications of smart meters should be based on independent research. For example the Health Protection Agency, which is responsible for setting standards in this area, already provides advice and information on any health implications of smart meters, and could draw on existing global studies in related fields such as telecommunications. Any concerns from consumers should be addressed centrally by DECC and the Central Delivery Body.

*Is there any evidence that consumers' concerns about smart meters are declining or growing?*

41. Currently we have no evidence that consumers' concerns about smart meters are either declining or growing.

*Will the commercial benefits of smart meter roll-out be captured within the UK?*

42. As noted above, deployment of smart metering will lead to significant commercial benefits in terms of reduced supplier operational costs and improved customer service. These benefits will all be captured in the UK and will, by the operation of competition, be transmitted to consumers; however any increase in the costs of the roll-out could impact the level of benefits captured.

The installation programme and creation of DCC infrastructure should also create significant employment opportunities for the UK. We are unable to say how much of the manufacturing and systems development work will remain in the UK.

*Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy?*

43. We are in broad agreement with DECC's approach to procurement and establishment of a central Data and Communications Company (DCC). The DCC procurement process is still at an early stage and we have limited visibility of the procurement rules, but we are hopeful that it will deliver a cost-effective data and communications strategy. . We expect to be able to answer this question more fully after the service providers have been appointed during Q3 2013.

*What criteria should DECC use to measure the ongoing success of roll-out?*

44. DECC is seeking to assess the success of the smart metering Programme through the introduction of transparent and prescriptive reporting and monitoring requirements. The roll out should be assessed against the Government's Impact Assessment including, the number of meters rolled out, the level of customer opt out, and the level of energy reductions achieved.

*February 2013*

**Written evidence submitted by Consumer Focus**

## About Consumer Focus

Consumer Focus is a statutory consumer group established by the 2007 Consumers, Estate Agents and Redress Consumer Focus is the statutory consumer champion for England, Wales, Scotland and (for postal consumers) Northern Ireland.

We operate across the whole of the economy, persuading businesses, public services and policy makers to put consumers at the heart of what they do.

Consumer Focus tackles the issues that matter to consumers, and aims to give people a stronger voice. We don't just draw attention to problems—we work with consumers and with a range of organisations to champion creative solutions that make a difference to consumers' lives.

## Executive Summary

- Positive steps have been taken in the domestic sector to help safeguard consumers against potential risks caused by roll-out and new technology. These include new protections around remote disconnection, switching to prepayment, and load limiting; the introduction of an Installation Code of Practice, and a new data privacy framework. Security concerns are also high on the Government's agenda. Monitoring the effectiveness of new measures will be essential. Also some of these protections still need to be extended to micro-business customers and domestic consumers who share a supply with a business.
- There are significant *potential* benefits to consumers from roll-out. Government needs to thoroughly map these opportunities—taking care to capture not just monetised benefits such as energy savings, but also harder to quantify benefits such as improvements in service for different customer segments. Success should be measured against the delivery of this complete picture.
- The installation of smart meters alone will not in itself guarantee customer benefit. Energy savings will require sustained behaviour change by consumers, while problems with suppliers' back office systems and unreliable communications need to be overcome if we are to get accurate bills. Further action is also needed to ensure customers can easily access data and maximise its use. This is particularly the case for micro-businesses.
- Trialling of new technologies at scale is essential. However, suppliers rolling out smart meters more widely, prior to full interoperability and a finalised meter specification, presents particular challenges. Interoperability problems can cause barriers to switching, resulting in increased customer inconvenience, additional waste and higher costs. Government and Ofgem have introduced a number of measures to address issues, but we doubt that these will be sufficient to solve all problems. It is also unclear if these problems will be enduring for some customers.
- Smart technology could help revolutionise the prepay energy market, addressing historic problems in this market, reducing costs to serve and improving customer service. However, we are not on track to deliver these benefits. Prepayment customers may be one of the last groups to get smart meters and in practice face increased costs and a decline in service unless the needs of this customer group are prioritised.
- The Government has made significant progress on its consumer engagement strategy in the last couple of years. However, success or failure will be largely dependent on the effectiveness of the Central Delivery Body. It remains to be seen if the regulatory framework is robust enough to ensure this supplier-funded and predominantly industry-led Body will meet the challenge. Work on small business engagement, while now under way, has also been slower to progress.
- It is essential that all customers, especially those who are vulnerable or on low incomes benefit from roll-out. DECC has taken some positive steps in this regard. This includes requiring, under licence condition, the CDB to support vulnerable, low income customers and in home displays to be designed in a way that makes them easy to use for as many customers as possible.
- An extra help scheme should also be introduced. This could provide a package of social and environmental measures, during or alongside the installation visit to those most in need. Indeed steps should be taken to link smart meters with wider fuel poverty and sustainability programmes such as the Energy Company Obligation programme. In Home Displays should also have an accurate account balance to help customers budget more easily and back billing rules up-dated.
- We continue to advocate that a distributional impact assessment of smart meter roll-out is undertaken to fully understand who will be the winners and losers from smart metering and likely market developments. This must consider the impact on a range of consumer segments including, by income, household make-up, payment type, location, fuels used, and dwelling type. Government promised this more than a year ago.
- We strongly welcome DECC's decision to produce an Annual Progress Report on the costs and benefits of roll-out to consumers and quarterly statistical updates. Also the proposed reporting and monitoring framework. These should help improve transparency.

— However, Consumer Focus remains to be convinced that roll-out model adopted will deliver smart metering at lowest cost, minimal hassle and maximum benefit to consumers. In particular, there is no mechanism in place to limit the financial risk to consumers if costs start to rise. The competitive market is not sufficient to keep the costs in check. We believe there are significant savings and efficiencies that could be delivered from a more co-ordinated approach to supplier activity.

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1. *Are the Government's cost and timescale predictions for roll-out realistic and will it deliver value for money?*

Timescales

1.1 The Government's aim that all homes will have smart meters installed by December 2019, is incredibly challenging. We doubt that mass roll-out will commence at the end of 2014 given the complexities of the programme, current position of the procurement exercise, the maturity of standards for manufacturers to develop compliant products and the readiness of the utility companies to deploy meters at scale.

1.2 At present more than 623,200 smart-type have been installed in the domestic sector. The overwhelming majority of these will have to be replaced by 2019 because they are non-compliant.[85]

1.3 Similarly 100% coverage is not expected to be achieved—while suppliers have to take "all reasonable steps" to install equipment, it may not be technically possible or cost-effective to do so for some households.

1.4 The final minimum standards for smart metering equipment (Smart Meter Equipment Technical Specifications—SMETS 2) have yet to be approved. It's estimated that around two million SMETS 1 meters could be installed prior to end 2014. But to ensure security, effective switching and inter-changeability of smart-related products and services, minimise asset stranding and customer disruption, and to maximise the consumer benefit, SMETS 2 meters are preferable.

1.5 Appropriate time will also be needed for end to end testing to ensure that new systems are robust and provide reliable service.

1.6 This is a complex programme—the focus should be on getting it right and maximising the consumer benefits. Tight timescales could result in pressure on installers to get in and out of the home as quickly was possible, potentially at the expense of a high-quality installation experience including a proper demonstration of the display and new equipment, good-quality energy efficiency advice and appropriate support for vulnerable, prepayment and low income customers. Customers will probably not remember when the smart meter deployment started, but they will certainly remember if it worked or not.

Costs

1.7 We remain to be convinced that the shape of the current roll-out will deliver smart metering at lowest cost, minimal hassle and maximum benefit to consumers.

1.8 There is no mechanism in place to limit the financial risk to consumers should costs start to rise.

1.9 We are one of just a handful of countries in the world to have a supplier-led roll-out. The norm is distribution network led roll-out model—this allows for a greater degree of financial oversight via price controls.

1.10 We don't believe that relying on the competitive market is enough to keep the costs in check. We are sceptical that suppliers will pass on benefits in full to consumers, given their track record on prepayment and the failures of suppliers to reduce retail prices promptly when wholesale energy costs have fallen. This is a view shared by the Public Accounts Committee in its report on the *Preparations for the roll-out of smart meters*.[86]

1.11 Certain costs do not appear to have been captured in the Impact Assessment (IA) while other cost savings may be over-estimated. For example: there may be new costs associated with additional home visits due to wireless communication problems and costs associated with the transition from the current prepayment infrastructure to smart wireless prepay.

1.12 The IA projects total net benefits for the non-domestic sector of £2.3 billion, of which £1.75 billion are expected to come from energy saving. There is little evidence as to how these energy saving benefits will be delivered.

1.13 Trust in suppliers is low—it will be a real challenge to get people to open their door and then engage with the new technology to achieve the consumer energy savings identified in the IA. Government steps to establish a consumer engagement strategy and a Central Delivery Body to help with this are very positive but delivering behaviour change is notoriously challenging and will be dependent on how effective this supplier-led Body is.

[85] First Annual Progress Report on the roll-out of smart meters. Figures as of 30 September 2012 shows 623,000 non-compliant meters had been installed and 300 SMETS1 meters. http://bit.ly/X4wN2Q

[86] http://bit.ly/WhhmpM

Billion pound benefits that could result from greater supplier co-ordination risk being missed

1.14 There is currently no requirement on suppliers to coordinate installations whether on a regional or community level—this is a missed opportunity to reduce costs and engage customers.

1.15 Frontier Economics' (former Government consultant) research implies that a more coordinated approach could result in billion pound savings.[87] Although their assessment is based on analysis of a network-led roll-out, much of the rational such as reduced travel costs and increased consumer engagement that could result from more coordinated approaches still applies. The DECC IA estimates a conservative £10 efficiency saving per household if gas and electricity are installed at the same time. This is due to reduced travel time between visits, and time saved from connectivity testing and wider checks only having to be carried out once. We believe the actual figure is likely to be higher.

1.16 The current proposition is for suppliers to deliver their own programmes and to develop their own solutions to problems, but a more coordinated policy from Government would provide solutions at a reduced cost with savings passed on to the customer.

1.17 Competition rules are often cited as a reason why suppliers cannot work together even where there are cost savings that could be delivered for customers and tax payers. The legal boundaries of competition law and the potential role for the CDB need to be properly explored.

1.18 The Energy Networks Association estimates that 22% of installations will be non -standard, potentially requiring network support and the possibility of at least one additional visit. Small scale community based approaches and greater information sharing between companies could arguably facilitate the networks to have "floating help teams" with fewer visits for the customer and quicker resolution of problems.

1.19 Siemens estimate that 19% of all households live in multiple dwelling units—defined as high rise, low rise and converted buildings. These kinds of properties may require additional technology due to communication challenges. Under the current approach suppliers will select and install their own communications equipment and meters at different times, dependent on their roll-out schedules. This is likely to result in increased costs from parallel and duplicate equipment being installed by different companies; greater inconvenience to customers and landlords from multiple visits; restrict the ability to properly test the system; make it harder to identify who is responsible and what the problem is when things go wrong as no one has overall control of all the technology in the building; and increase the chance of interference with customers appliances and equipment.

1.20 Around a third of customers do not have dual fuel contracts. A coordinated approach would help minimise disruption and inconvenience to customers caused by the need for two visits. In practice it will be hard for customers to arrange both visits on the same day if they have two separate suppliers. If customers have their gas meter installed first this also may result in additional cost and inconvenience.

1.21 According the TOA UK Cost of Waiting Survey, waiting in for the meter man results in loss of earnings, disproportionately impacting those on low incomes who are paid by the hour; results in days taken off sick—a cost to the economy, and inconvenience and annoyance for customers.[88]

1.22 Experience of the Low Carbon Network Fund Pilots and Warm Zones indicates that suppliers don't naturally work together even when there are benefits and cost savings that could be delivered to consumers/ tax payers.

1.23 In the then Energy Retail Association (ERA) Newsletter *Smart Comment* July 2009 Issue 4 companies stated "It is difficult to envisage how suppliers alone could lead any form of co-ordination under what is fundamentally a competitive meter installation approach."

1.24 Consumer Focus believes that the Central Delivery Body should have a coordination role. Community pilots also need to be carried out as a matter of urgency so that there are clear bench marks against which the efficiency of the supplier-led approach can be measured. The Central Delivery Body should have an explicit objective to carry out community trials and to help meet Government's stated purpose *"to deliver consumer engagement activities which contribute to a cost-effective smart metering roll-out and the realisation of consumer benefits, particularly those related to reducing energy consumption"*.[89]

1.25 We also remain to be convinced that Government has fully explored the potential cost savings that could be achieved from synergies with smart water meter roll-out, the digital inclusion agenda and local and national energy efficiency and fuel poverty programmes.

2. *What are the potential benefits of smart meters for consumers, and what barriers need to be overcome in order for consumers to realise them?*

2.1 There are significant *potential* benefits for consumers. However Consumer Focus continues to have concerns, that opportunities to deliver benefits will be missed and that not all consumers will be able access the advantages that smart metering could bring.

[87] Less is more? How to Optimise the Smart meter Roll-out. Frontier Economics. January 2008. http://bit.ly/cIiQ5S
[88] http://bit.ly/YnK1Ic
[89] Government Response to the Consultation on Consumer Engagement 2012. P. 37

2.2 Accurate bills and ending back billing

Smart meters are expected to end estimate and inaccurate billing, which is a major source of consumer complaints.[90] However:

- Calls to Consumer Direct/Citizens Advice consumer service indicate that some customers are not getting accurate bills after their smart meters are installed. This can be a problem with one or both fuels, many months after installation.
- Failure to get an accurate bill causes particular detriment when the customer receives a back-bill for usage they thought they had paid for. Shock bills can push customers into debt or overdraft with resultant additional charges and knock-on effects.
- This is equally problem for small businesses, where surprise bills of thousands of pounds have reportedly pushed some companies out of business. As well as the detriment to customers, it risks undermining confidence in roll-out.
- Suppliers report that this is primarily due to problems with legacy billing systems and unreliable communications.
- Under current protections, domestic customers can be back-billed, for up to a year's worth of usage, where the supplier has been at fault in undercharging. While progress has been made to address back-billing for small businesses following the Committees intervention, we do not yet have parity.
- In response to concerns DECC introduced a new licence condition. This will require suppliers to take "all reasonable steps" to establish and maintain a connection between the meter and the Wider Area Network to help ensure that a meter read can be taken. This is very welcome, but for it to be effective Guidance is needed to define "reasonable steps".[91] For example, if suppliers are doing everything they can with their legacy systems but have failed to make the investment in appropriate billing systems, is that action enough? If the supplier has pinged the meter for a reading three times and the communication has failed does that suffice?
- In addition, Consumer Focus proposes that once a smart meter is installed suppliers should not be allowed to back-bill customers, as consumers expect to get an accurate bill. Ending back-billing, where it's not the customer's fault, after a smart meter is installed, will incentivise early resolution of problems by energy companies and investment in new systems. Suppliers also need to manage customer expectations during early roll-out where there are teething problems. Rules should apply to both domestic and non-domestic companies. Ofgem should consider setting a Guaranteed Standard around billing accuracy.

EXAMPLE CALLS TO CONSUMER DIRECT/CITIZENS ADVICE CONSUMER SERVICE
SWITCHING AND MORE CHOICE

*"I was advised to get smart meters installed to avoid estimated bills as I had lost my job and needed to manage my accounts. I received electricity bills but no gas bills. I had only paid £250 since it was installed. Then the company back billed me for £700 which they took directly from my account. This resulted in bank charges and extra charges on other accounts due to unpaid bills."*

*"The supplier fitted smart meters five months ago but have now told the consumer that there is a problem with all smart meters in the area which means that the consumer will not be able to get a bill. Consumer already has an outstanding debt and doesn't want this to grow."*

2.3 Easier switching and customer choice

It is proposed that smart metering will make switching easier, more efficient and faster for consumers but there are a number of challenges to this:

- In practice the physical process of switching supplier is unlikely to be easier or faster until interoperability issues have been fully resolved. Full interoperability will not be in place until the DCC is operational—expected earliest end 2014. At present if a customer switches supplier they could loose smart functionality, have to have their meter replaced, or in the worst cases be prevented from switching to a particular offer.
- DECC and Ofgem have introduced new regulation to try and address problems. While the measures are very welcome we are sceptical that they will be sufficient to resolve all problems and are unclear of the cost implications.

[90] Issues with billing are the most common reason why people contact front-line advice agency Citizens Advice Consumer Service (previously Consumer Direct).

[91] http://bit.ly/Z7fYuf

— More than 2.6 million meters could be installed during Foundation.[92] SMETS 2 meters are not expected to be widely available before end 2014. As non-compliant and SMETS 1 meters do not have be enrolled in the DCC—customers with these types of meters may continue to face problems post 2014. Customers who have non-compliant or SMETS 1 meters and who purchase enhanced energy displays, or appliances such as a smart fridge or heating system may find that these do not work fully or are not supported if they move property or change supplier.

— Similarly, customers living in properties with non-compliant or SMETS 1 systems may find they are not able to access new products and services which become available in the market without incurring the cost and inconvenience of having their system upgraded or exchanged.

— There are no simple solutions to these problems. Barriers are largely a product of the Government's decision to encourage early roll-out before minimum standards for equipment had been fully agreed and the Data Communications Company (DCC) is operational. While we recognise that pilots at scale are needed, consideration should be given as to whether numbers of non-compliant or SMETS 1 meters should be limited to minimise any potential detriment. Certainly Ofgem will need to monitor the effectiveness of new licence conditions around effective switching to ensure that customers who receive meters early make an informed decision as to whether they opt to have a smart meter before full interoperability is delivered.

— Further work is needed on small supplier interoperability in particular. Calls to Consumer Direct/Citizens Advice consumer service suggest that some customers with advanced meters (ADMs) are facing barriers to switching including suppliers not accepting them as they have an advanced meter; tariff choice being restricted and customers ending up on more expensive tariffs as a result of problems. Consumer Focus is carrying out research into microbusinesses' experiences of having advanced and smart meters. We will be happy to share this when the findings are available.

— Interoperability problems are likely to result in increased customer inconvenience, additional waste and higher costs for consumers. In addition negative customer experiences during Foundation risk undermining engagement in wider smart meter roll-out which could increase costs and result in missed benefits for consumers.

EXAMPLE CASE STUDIES FROM CONSUMER DIRECT/CITIZENS ADVICE CONSUMER SERVICE

*Consumer is a small supplier H customer and has a smart meter in prepay mode. He is trying to change supplier and has approached big supplier A and big supplier E but neither can take him on because he has an electricity smart meter. He's asked supplier H to change it back to a normal credit meter but they say they cannot do this.*

*In May consumer had a smart meter fitted. The consumer is now trying to switch to supplier A but they refuse to take him on because of his smart meter. Consumer is a pensioner on a limited income and A currently offer the best tariff and he wants to take advantage of it.*

*Consumer had an economy 7 meter and was advised to change to a smart meter which they did. The consumer is now trying to switch supplier but new supplier say they can't take a dual rate smart meter. Old supplier has said this shouldn't be a problem as the consumer is on a single rate tariff now but have offered to change the meter to a "dumb" single-rate one for £62.*

In addition:

— If suppliers chose to differentiate by providing enhanced displays or energy efficiency packages alongside their smart meter we could see a rise in long-term contracts that lock-in consumers to recoup costs over a period of months, or even years, as was the case with mobile phones. New safeguards may be needed as in the mobile phone sector.

2.4 Energy reductions/bill savings

The overwhelming majority of consumer benefits identified in the Impact Assessment for both domestic and non-domestic roll-outs are expected to come from customers using up to date and more detailed information on their gas and electricity consumption to identify where they can reduce energy use and save money on their bills. DECC estimates that domestic customers will reduce their energy consumption by on average 0.3–4% a year, or an estimated £25 a year for a duel fuel customer by 2020.[93] This level of reduction is achievable but not guaranteed. In the non-domestic IA, energy savings make up £1.75 billion of the estimated £1.76 billion consumer benefits. DECC project that this equates to average customer savings of £191 by 2020. We are unclear how realistic this is given the lack of evidence in both GB and internationally. There are also significant barriers to delivering energy savings. See also Question 5.

[92] Based on figures provided by suppliers. These are very rough estimates and include a number of assumptions such as meter availability.

[93] http://bit.ly/Xyg1bC

2.5 Budgeting—accurate account balance

The in-home display will provide customers with information on their energy use in pounds and pence, but this will only be an estimated or "indicative" figure, not an accurate one. This is a missed opportunity.

- Face-to-face Omnibus research carried out for Consumer Focus in May 2011 showed that 93% of consumers would be interested in having an accurate account balance on their IHD that showed how much their electricity and gas had cost, and how much they owed their energy supplier, since their last energy bill. This interest was consistent across social classes.[94]
- In early smart metering trials of the 1980s an up-to-date account balance for electricity consumption was the most accessed function via the in-home display at that time. The trial report states that; "There is no doubt that customers appear to have tremendous enthusiasm for such a device, the prime motivation being that of up-to-date information on their indebtedness."[95]
- Cost is the bottom line for consumers. Focus group research showed that consumers consider there is too much information on bills; all they really wanted to know was how much they owe.[96] Consumer Focus research has also shown that 35% of consumers find both gas and electricity bills hard to understand.[97] An accurate account balance on the IHD would provide consumers with immediate access to their account balance, and provide greater choice of ways in which consumers can easily access and understand their bill and see how much they owe and potentially a more convenient and accessible option.
- Customers may expect this basic account information from a so-called "smart" meter and it could cause confusion or problems if the figure on their bill is different from that showing on the energy display. Research carried out recently by Consumer Focus, DECC and NEA[98] looking at the experience of vulnerable consumers with a smart meter, showed that some were assuming that the IHD showed them how much money they were spending on their gas and electricity, and were budgeting accordingly. As the figure on the IHD may not include any debt, Green Deal charge or standing charge it could be significantly lower than their actual bill.

The full arguments to support accurate account information on the IHD are outlined in our Open Letter to DECC of July 2011. This is supported by the Fuel Poverty Advisory Group, Age UK and Sustainability First.[99]

2.6 Energy demand shifting and reduction

The facilitation of more complex demand side response (DSR) is seen to be a major benefit of smart technology, potentially bringing considerable financial savings which may be passed onto customers. Smart metering is expected to facilitate a range of new tariffs which could incentivise energy reduction or the shifting of energy from peak times to off-peak times. Subject to Ofgem's tariff proposals and wider regulatory change, this could result in a number new offers—for example, multiple rate time of use tariffs, critical peak pricing, energy efficiency packages, remote control of appliances, more localised pricing and single energy tariffs amongst them.

Analysis commissioned by DECC from Redpoint and Element, suggests that demand side response from domestic households could save between £60 million and £500 million a year by 2030.

If all of these savings were shared equally among all consumers, the analysis says, this could translate to £5-£15 a year per household, or up to £90 per household if the savings were passed only to those on DSR tariffs.[100] However, not all customers will benefit from likely new offers and further research is needed to understand the real potential and who the winners and losers of any likely new tariffs will be:

- Not all customers will necessarily have discretionary load they can shift which enables them to benefit from new offers.
- Not all customers will be able to shift load to off-peak times due to lifestyle considerations. Eg low income working households may have to use energy at peak times after work/school; long-term sick could be reliant on continuous access to appliances for health and wellbeing.
- Customers may not be willing to shift their usage. Sustainability First states "there could be a limited match in the household sector between what contributes to morning and evening peak...and what households may be willing to shift"—this may be a particular problem in reducing the winter evening peak.[101]

[94] May 2011 face to face survey of 1,964 adults in Great Britain. Carried out by TNS RI on behalf of Consumer Focus.
[95] Full document available on request.
[96] *Informing Choices. Consumer Views on Energy Bills.* Consumer Focus 2010.
[97] March 2010 online omnibus survey of 2048 consumers aged over 18. Conducted by ICM on behalf of Consumer Focus.
[98] Consumer Focus and NEA research: *Vulnerable consumers' experience of smart metering installation*. The research was jointly funded by DECC and Consumer Focus, and carried out by NEA and RS Consulting. The final report is expected to be published in November 2012.
[99] http://bit.ly/LFRgrk
[100] Redpoint and Element Energy (2012) *Electricity Systems Analysis—future system benefits from selected DSR scenarios* for DECC
[101] Sustainability First (2012) *GB Electricity Demand Paper 3: What demand side services could household customers offer?*

— Currently an estimated 19% of domestic consumers in GB have a meter capable of demand side response, and may be on a time of use (TOU) tariff.[102] In its 2012 Smart Metering Impact Assessment, DECC estimates that by 2030 an additional 20% of consumers will be on a static time of use tariff. In practice customers may be unwilling to take up new deals—a particular concern when these are likely to be the most competitively priced.

— The figure of 20% of small businesses being on time-of-use tariffs in the DECC Impact Assessment (IA) seems particularly high. Who are these businesses and how will they be equipped to deal with complex TOU tariffs and make savings?

— There is the potential for new tariffs to increase complexity. It will be harder for customers to compare offers to identify which is the most appropriate one for them and also to predict energy spend. Any new deals must be comparable and customer risk limited or made apparent eg limiting the number of time bands for time of use tariffs or requiring suppliers to provide customers with a projected energy spend based on actual energy consumption over multiple seasons before signing them up to an offer. Ofgem needs to ensure customers have tools to compare more complex deals in a timely way. eg switching sites do not currently support multiple rate TOU. Customers will need free access to data on not just how much energy they use but also when they use it. This needs to be available in appropriate formats—MiData is only making limited progress.

— Even if customers who are able and willing to sign up to new deals they may not see the savings if they don't understand how to benefit from them. Consumer Focus research on customer experience of using current very basic time of use tariffs suggests that nearly 40% of consumers on TOU tariffs may not be getting any benefit from them at all because of their use of heating and appliances.[103]

— In the IA, DECC recognises "Even though this shift will likely result in bill reductions for those taking up TOU tariffs, bill savings for some customers may be offset by bill increases for other customers, as the existing cross-subsidy across time of use unwinds". Government needs to properly understand the implications of smart tariffs and review the protections framework accordingly.

### 2.7 Smart grids

A move towards an electricity "smart" grid is seen to be a vital part of helping us to reach the Government's carbon reduction targets. Recent work by the DECC/Ofgem Smart Grid Forum has suggested that smart solutions could save £10 billion–£19 billion to 2050, over conventional grid upgrades.[104] The key potential benefits to consumers from smart grids are:

— Cost reduction, which should translate to lower energy bills for some consumers.

— Carbon reduction, and cleaner air in our cities.

— Improved customer service eg less time off-supply due to improved fault resolution and new ways to manage outages, quality and reliability of supply.

However, we are unclear if the current technology and framework will effectively facilitate the introduction of smart grids in practice and how and if cost savings will be passed onto customers.

### 2.8 Prepayment

It is clear that the introduction of smart technologies could offer substantial benefits to customers currently using a prepayment meter, and generate wider customer interest and choice in prepay energy offerings for customers currently using alternative payment options. However, we are not on track to deliver benefits—prepayment customers may be the last to get smart meters in practice customers could face a decline in service and new problems (see Question 6 below for more detail).

### 2.9 Vulnerable and low income customers

The Government has a legally binding target to eradicate fuel poverty by 2016.[105] The Government's own estimate indicates that in 2012 there are 3.9 million households in England in fuel poverty[106] though other estimates with the 2011 energy price rises suggest this could now be as high as six million.[107] According to FPAG almost 50% are pensioners and overall some 80% can be categorised as vulnerable.

[102] Consumer Focus (2012) *From Devotees to the Disengaged—A summary of research into energy consumers' experiences of time of use tariffs.* This statistic was calculated using metering data provided to Consumer Focus by Elexon; in a poll commissioned by us of 5914 consumers only 13% of consumers said they were on time of use tariffs; one reason for this may be that not all consumers are aware that they have a TOU tariff. http://bit.ly/11axJHG

[103] Ibid

[104] Frontier Economics/EA Technology (2012) *A Framework for the Evaluation of Smart Grids*, for the DECC/Ofgem Smart Grid Forum

[105] UK Fuel Poverty Strategy 2001

[106] Annual Report on Fuel Poverty Statistics 2012

[107] NEA estimate November 2012

We continue to have concerns that low income and vulnerable consumers in particular will not get value for money from the smart meter roll-out and that opportunities to deliver benefits will be missed. DECC has taken a number of very welcome and positive steps to address concerns but more needs to be done:

- It is unclear if vulnerable or low income consumers will achieve comparable energy savings to other groups. They may already be more energy efficient due to budgetary constraints; less likely to plug in their IHD because of lack of available plug sockets; or face greater barriers to engaging with new technology, for example.[108] Further research is needed in this area.
- Government states that Energy Demand Research Project trials (EDRP) produced evidence that consumers from areas of high concentrations of low income households were not only able to achieve savings comparable to other areas, but that savings increased over time. However, such savings were reportedly achieved with a significant amount of handholding including regular customer contact, advice and personal budget setting. As the IA states, the EDRP did not include an assessment as to *how* the savings were achieved yet this this is the critical factor. More work is needed on what additional support is needed to help ensure all customers can benefit.
- Consumer Focus strongly advocates that as a first step all suppliers set up a dedicated pathway for vulnerable customers, pre, during and post installation. This should include: improved methods to identify and understand a customers' vulnerability; additional time for installation when extra help may be needed; tailored communications and a follow-up call or visit to answer questions that may have arisen since the installation. This should be delivered by appropriately trained installers.[109] DECC and Ofgem should incentivise such an approach as part of their reporting framework.
- As a next step to above, action is needed to develop and trial an extra help scheme for low income and vulnerable customers. Smart meter roll-out provides a valuable opportunity to improve the delivery of existing fuel poverty programmes. We propose that a package of assistance is developed for low income and vulnerable consumers which is delivered alongside the installation of a smart meter—either by the supplier, a third party carrying out complementary activity, or the Central Delivery Body. Such a scheme could use existing resources more efficiently and cost effectively to help those in need.
- A package of measures might include energy efficiency products and services, which are currently offered as part of the proposed new Energy Company Obligation, and debt advice, benefits maximisation checks or social tariffs which suppliers already offer. For example, Groundwork has been working with Southern Water to deliver energy and water audits, benefits entitlement checks and install small measures (eg water efficiency measures) as part of its water metering programme.[110] Consumer Focus hopes to work with DECC, Ofgem and a number of suppliers to trial different approaches.
- Consumer Focus research found strong public support for some kind of extra help scheme, with 81% of people thinking it is a good idea for those who are eligible.[111]
- We welcome protections that have been introduced to help prevent suppliers from misusing the ability to remotely disconnect customers or switch people to prepayment without their consent or appropriate checks for vulnerability. However these safeguards only extend to domestic customers and not those who share supply with a business eg people living above shops, churches, pubs etc.
- Smart technology could be used to help customers budget more easily eg by providing an accurate account balance on the IHD, or texting reminders to customers if they are likely to go over an agreed budget limit. It is unclear if there are sufficient incentives in place for suppliers to offer these services free of charge to those that would most benefit.
- The National Audit Office report suggested that low income customers may be less likely to engage in the market to be able to access the cheaper deals which smart will facilitate. This could result in the costs and benefits being unevenly distributed.[112] We share this concern. In Victoria, Australia, concerns have been raised that certain groups of consumers such as low income working families would not be able to use their energy at off-peak times and have little discretionary load. Also that they would not be able to afford appliances required to access cheaper deals that require automation.[113]

[108] *Smart for All—understanding consumer vulnerability during the smart meter installation* (November 2011). NEA report jointly funded by DECC and Consumer Focus. Research highlighted that these issues may be barriers to energy reduction. http://bit.ly/UUv7qY

[109] http://bit.ly/UUv7qY

[110] http://bit.ly/e4k2Sd

[111] Face-to-face survey carried out by GfK NOP on behalf of Consumer Focus. GfK spoke to 1460 UK bill payers between 29 March–3 April 2012.

[112] National Audit Office report—Preparations for the roll-out of smart meters (June 2011) http://bit.ly/uVXXvM

[113] New meters, new protections. A National Report on Customer Protections and Smart Meters February 2010—St Vincent de Paul Society. http://bit.ly/X4xLw6

— While analysis by the Brattle Group in the US is quoted in the IA as potential evidence that low income customers benefit more than average from time of use tariffs—we have little confidence that this research based in sunshine states with a very different climate and energy needs is comparable. Further research is needed in the GB context.

— As we understand it, Treasury Green Book guidelines suggest that a distributional analysis[114] of smart meter roll-out should take place. The only impact assessment that appears to do this and considers fuel poverty was in 2007. We would question why a similar assessment has still not taken place as part in any of the seven subsequent impact assessments. This is particularly the case given public commitments by DECC in 2011 and Ofgem to do so.[115]

— We continue to advocate that a distributional impact assessment of smart meter roll-out is undertaken to fully understand who will be the winners and losers from this programme. This must consider the impact on a range of consumer segments including, by income, household make-up, payment type, fuels used, rurality and dwelling type.

— We continue to advocate that Government develop a strategy and roadmap which outlines how fuel poor, prepayment and vulnerable customers will benefit from smart metering. The Annual Progress Report on smart metering should report on the contribution roll-out makes to meeting fuel poverty targets.

2.10 Access to data

There are significant potential benefits to customers from greater access to data. New tools and applications could help people better manage their energy use; budget more easily and make more informed switching and purchasing decisions. There are also opportunities to hold companies to account to improve quality of service. For example, consumers who have had smart meters installed report that they were able to identify faulty appliances which are costing them unnecessary money, and energy meters which needed to be fixed.

However there are a number of challenges to customers accessing benefits and we are unclear how consumers will respond to new offers. These include but are not limited to:

— How do you ensure data is available to customers in a timely and secure way?

— How can you ensure that all customers including those who do not use or have access to the internet can access information? The MiData programme for example is very focussed on technology-friendly customers.

— DECC has taken welcome steps maximise the potential customer benefit from IHDs. This includes setting minimum standards for information and around usability. But monitoring is needed to understand how effective these are in practice.

— How much will access to products and services which use data cost? Who will pay and how? Processing data costs money. What will be free and what will customers be charged for?

— How do you ensure that data is in a format that customers can use?

— None of the arrangements appear to enable customers to access information related to quality of supply. Voltage quality information could be available to consumers in a format that allows them to a) assess if they are getting the quality of supply outlined in their terms and conditions b) monitor outages c) use as evidence to seek redress and compensation. We would welcome DECC exploring what advantages it might have for customers who frequently suffer flickering lights, outages, or power surges that can break electrical equipment. This is likely to be particularly important in a world of automation.

— More work is needed on the information requirements of customers with micro-generation. The basic IHD is unlikely to meet their needs and it is unclear how easy it is to for generating consumers to access data on generation to monitor efficiencies and amounts owed.

3. *Is there a possibility that suppliers will gain considerably more than consumers from smart meters? Is enough being done to ensure that any financial benefits accruing to suppliers will be passed on to consumers?*

3.1 Yes, there is a risk that suppliers will gain considerably more than consumers from smart meters. While the physical installation of smart metering technology will facilitate most of the industry benefits, as noted, there are significant further barriers to overcome before consumer benefits are realised.

3.2 As mentioned, we don't believe that relying on the competitive market is enough to keep the costs in check. A mechanism to cap costs would be welcome.

[114] HM Treasury. The Green Book. Appraisal and Evaluation in Central Government. http://bit.ly/fbEXke

[115] In his evidence to the Public Accounts Committee Daron Walker from DECC said "The other thing to add is that a fundamental part of our evaluation strategy that we are working up, and which we plan to publish next spring, will be tracking the distributional impacts, including the impacts on the vulnerable, from this programme. So we are very alive to the issue". http://bit.ly/V2vHK5

3.3 We are sceptical that suppliers will pass on benefits in full to consumers, given their track record on prepayment and the failures of suppliers to reduce retail prices promptly when wholesale energy costs have fallen.

3.4 We strongly welcome DECC's decision to produce an Annual Progress Report on the costs and benefits of roll-out to consumers and quarterly statistical updates. These are designed to help improve transparency. But we doubt monitoring and reporting will provide sufficient oversight to ensure accountability. We query what action can and will be taken if problems are identified. It is important that the Annual Report highlights the distributional impact of smart metering eg the benefits and costs broken down by different customer segments and constituency (see also Question 1).

3.5 There is also an issue that some customers may want a smart meter but not be able to have one installed, or may have to wait several years eg the technology may not work in some homes or businesses. What alternative products and services will these customers be offered instead?

4. *What lessons can be learned from successful smart meter implementation and usage elsewhere in the world?*

4.1 More than 50 countries are installing or planning to install smart metering equipment, with individual states in the US, Canada and Australia having their own roll-out programmes.

4.2 There is some useful international learning but direct comparisons should be made with caution. The GB business case, technology being deployed, scale of the deployment, and roll-out model adopted are notably different from most other countries. In particular:

- We have a supplier-led roll-out. The norm is distribution network led roll-out model.
- Our solution relies on a central data communications provider—this is very rare.
- We are deploying smart meters for both gas and electricity, whereas most other deployments are for a smart electricity meter only. Though France and Ireland are among those deploying both.
- We have a relatively large prepayment customer base (around 13% of all customers) this adds challenges and costs.
- Our cost benefit case is heavily dependent on energy savings—this is not the case in all countries. The business case in France for example is reportedly largely dependent on network savings; in Italy it was driven initially by electricity theft prevention and the efficiency of operating processes; in Victoria, Australia and some US states by a desire to address growing numbers of outages; in Spain the benefit of the roll-out identified by the Government and energy suppliers is gaining the ability to remotely change the limits on the amount of energy the household can draw upon.

4.3 Consumer engagement

Consumer backlash against deployments in parts of the US, Australia and the Netherlands in particular, have highlighted the importance of addressing consumer concerns and engaging customers prior to, during and post roll-out. In particular customers have been concerned about privacy issues, health effects of wireless technologies and rising costs. As Chris Johns, President of PG&E said shortly after the company undertook the SmartRate Pricing Program pilot project in 2010: "We thought we were undertaking an infrastructure project but it turned out to be a customer project".[116] Customer concerns were often aggravated by companies' poor complaint handling services and inadequately trained staff. We believe Government has sought to learn from these experiences in developing its consumer engagement strategy. However it is important that suppliers train and offer specialist staff to handle queries and complaints in a timely way.

4.4 Delivering energy savings

International pilots and experience has highlighted the importance of consumer engagement programmes and the provision of an in home display to delivering behaviour change and energy savings.[117] Reliance solely on web portals for information has been criticised in Austria and France. This is because customers do not access it regularly, it is not real-time and in particular customers without internet access receive no information.[118] This supports the Government's decision to require suppliers to offer an IHD. However there is evidence that new innovative feedback mechanisms could also be effective eg information available via a mobile phones, remote control heating systems and hard copy energy reports with tailored advice. Organisations such as Opower combine energy consumption data with additional information about a customer's dwelling type, its energy efficiency and the household make-up to help deliver energy savings.[119] In Denmark, electricity savings of more than 17% were reportedly achieved across 55,000 households over three years in part from

[116] Proceeds of Trials & Tribulations of Smart Grid Deployment, A Case Study That Hits Home, BECC Conference, 2010.

[117] Empower Demand—*The Potential for Smart Meter enabled programmes to increase energy and systems efficiency as a mass pilot comparison.* Involved collecting and comparing findings of more than 100 trials involving more than 450,000 households. http://bit.ly/WXoAiM

[118] BEUC survey of European consumer groups (January 2013), carried out on behalf of Consumer Focus. Further results will be available in March.

[119] http://bit.ly/u1zFPD

segmenting the customer base and providing regular tailored communications and target setting amongst other approaches.[120]

4.5 Joined-up approach to wider government and environmental policies

The experience of smart meter roll-out in Denmark and Sweden suggests that public attitudes towards energy saving and sustainability more widely can have a positive influence on attitudes towards smart meters. In Denmark there is a strong political commitment to sustainability: with 70% of electricity production[121] expected to come from renewable sources by 2020. In Denmark, the political decision to roll-out smart meters was backed by broad public consensus, and motivated by longstanding concerns about protecting the environment, reducing energy consumption and saving money. Similarly, in Sweden, where environmental issues and sustainability are given high importance, the Swedish Consumer Organisation[122] report that most consumers regard the roll-out as a positive step to modernise the energy grid. Queensland also highlighted the benefits of an overarching sustainability brand, by linking up smart meter roll-out with wider programmes on sustainable transport, health and water. This highlights the importance of joining up Government environmental policies and placing smart within a wider context.

4.6 Ensuring value for money

Network led roll-outs allow for much greater financial oversight. In some European countries, ensuring value for money for energy customers is built into the regulatory framework, and this would continue to apply in the context of a smart roll-out. For example, in the Netherlands it has been agreed that consumers won't pay for a smart meter more than they pay for the current dumb meter; around 30 Euros, per meter, per year. In Denmark, ensuring value for money is part of the general regulation for energy companies, and requires them to be transparent around costs. Further steps are needed in GB. In parts of the US customers who refuse a smart meter are charged an additional monthly fee, to reflect the additional costs to serve them. Ofgem will need to take a view on such an approach.

4.7 The importance of consumer choice

In the Netherlands the Government's initial decision to mandate granular collection of data and force customers to have a smart meter led to the halting of roll-out and significant customer backlash. Dutch consumers are now offered a range of options about the smart meter itself. Consumers have the right to: have a smart meter installed and choose how often they are billed; have a smart meter installed with the communications module turned off to address health and privacy concerns; or to refuse a smart meter. DECC should consider offering similar choices to GB customers. In addition, it should be noted that our information request found that most suppliers say they will not remove a smart meter once it is installed but rather operate it in dumb mode. It remains to be seen if this will allay customer concerns.

5. *Will smart meters empower customers to take greater control of their energy consumption?*

5.1 It's unclear. DECC estimates that domestic customers will reduce their energy consumption by on average 0.3–4% a year, or an estimated £25 a year for a duel fuel customer by 2020.[123] This level of reduction is achievable but not guaranteed.

- Having a smart meter will not automatically save customers money or help them better manage their energy use—a smart meter with a display is just a tool to help consumers better manage their energy use.
- The Public Accounts Committee stated in their smart meter Report that "Consumers will benefit from smart meters only if they understand the opportunity to reduce their energy bills and change their behaviour. So far the evidence on whether they will do so has been inconclusive."[124]
- How much customers save on their energy bill will depend on whether they are *able* to/or *decide* to use the information on their energy monitor or via other media to work out where they can reduce their energy use.
- Delivering *enduring* behaviour change is particularly challenging as even customers who make changes when their meter is first installed may lapse into less energy efficient behaviours after time.
- Consumer Focus' international research looking at energy efficiency programmes found that it was difficult to engage more than 60% of the public on an issue.[125]

[120] *Empower Demand*, 2011, VaasaETT/ESMIG, p. 79. The report looked at 100 international pilots, covering 450,000 consumers.
[121] Figures from BEUC interview with Forbrugerrådet, the Danish Consumer Council, on behalf of Consumer Focus. Jan 2013.
[122] From interview with Sverigeskonsumenter—carried out by BEUC on behalf of Consumer Focus. Jan 2013.
[123] http://bit.ly/Xyg1bC
[124] Public Accounts Committee, 2012, *Preparations for the roll out of smart meters.*
[125] *Green Deal or No Deal. Building Customer Confidence in Energy Efficiency Services*. March 2011.

- Barriers to engagement are numerous, including refusing the installation of a smart meter, apathy, not seeing the benefit to them, fear it will cost then more money, and barriers to technology access and data.
- The *Empower Demand* report which looked at more than 100 roll-out pilots involving over 450,000 residential customers identified a number of key factors that were crucial to the long term success of programmes. These included: engagement strategies tailored to meet consumers' needs; behaviour change campaigns based on customer segmentation; energy displays; technological support and a constructive regulatory framework.[126]
- Some customers may already be very energy efficient and see no saving while for other consumers reductions could be higher than average. DECC recognises that prepayment meter customers for example are less likely to see gas savings as they already have a high degree of visibility over their energy use.[127]
- Benefits will not be fully realised unless the market provides appropriate products and services, and customers take action to reduce their consumption. Cost of accessing services may be a barrier.
- The IHD is only likely to go so far in helping the customer understand their energy use. Greater reductions are likely come from more tailored feedback and support, home improvements, including heating controls. Present thinking is leaving the whole controls arena isolated and vendors are ignoring the smart metering gateway and installing a second communications gateway into the home—increasing the cost to the consumer.

5.2 Micro-businesses

- Small businesses face additional barriers. In the non-domestic IA, energy savings make up £1.75 billion of the estimated £1.76 billion consumer benefits. DECC project that this equates to average customer savings of £191 by 2020.[128] We are unclear how realistic this is.
- Suppliers are not required to offer small business customers an IHD or access to data for free. This could act as a barrier to then accessing benefits. Initial findings from Consumer Focus' research have found that:
  - In Home Displays are not normally provided to customers with advanced or smart-type meters (though apparently 2013 will see more of them).
  - A minority of suppliers (smaller suppliers generally) charge for data access.
  - Web portals seem to be the preferred option and there are a wide range of charges.
  - Some suppliers claim to provide energy efficiency information/behavioural tips at the point provided at point of installation.
- This is a particular missed opportunity as the Carbon Trust research has reportedly found that that smaller non domestic users have a higher propensity to reduce gas consumption by responding to information feedback. Indeed non-domestic users have a higher average consumption per premise than domestic users, increasing the value of any percentage saving derived from the use of smart or advanced metering.
- We query in practice what options, in terms of third party access to data, exist or will exist for many small businesses. As we understand, a sizeable number of sites will have non-compliant or advanced or SMETS1 meters installed. As the Home Area Network is not defined, and therefore potentially not fully interoperable or open, we query if third parties will be able to provide services via this route.
- It is also unclear how many small business meters will be adopted by the DCC—meaning for many, accessing products and services from a company that is not their current supplier may not be possible. Anecdotal feedback suggests that there is not a great appetite among industry to use the DCC. The net effect is that the customer is locked into their supplier for the provision of services with the resultant negative impact on choice, cost and wider competition.
- We continue to advocate that small business customers be offered an energy display alongside their smart meter at no upfront or additional cost. It is absolutely essential that DECC develops a mechanism by which small business can access their data for free. It would be wholly proportionate for all suppliers, not just those who have opted out of the DCC, to have to provide small business customers with personal data inventories on a regular basis and that data should be made available in a common machine readable format so they can share it with third parties. This and some way to access near real-time feedback should be a minimum.
- While work is underway, DECC doesn't currently have a clear understanding of how to empower micro-business customers.

[126] *Empower Demand: The Potential for Smart Meter enabled programmes to increase energy and systems efficiency as a mass pilot comparison.* Involved collecting and comparing findings of more than 100 trials involving more than 450,000 households. http://bit.ly/WXoAiM

[127] DECC IA estimates that gas prepayment meter customers will achieve average savings of 0.5% compared to two percent for gas credit customers.

[128] http://bit.ly/XygDy8

6. *Will consumers on pre-pay meters obtain the same benefits from smart meters as other consumers?*

6.1 Prepayment customers are unlikely to see the same energy savings as those using other payment methods because they already have a high degree of visibility over their energy use. DECC's Smart Metering Impact Assessment (IA), for example, estimates that gas prepayment meter customers will achieve average savings of 0.5% compared to two% for gas prepayment.

6.2 However it is clear that smart technologies could help to address many of the historic problems experienced by these customers and deliver improved customer service. *Potential* advantages include but are not limited to:

- More competitively priced tariffs—as all smart meters have prepayment functionality built in, costs to serve should decrease as separate meters and a completely separate infrastructure will no longer be required. In addition, there could be savings from increased efficiencies, such as a reduction in misdirected or unallocated payments, reduced home visits, and an end to costs associated with payment devices as these will no longer be needed.
- Easier and quicker resolution of problems when things go wrong—when errors occur or customers believe that their meter settings are configured incorrectly, remote diagnostics should make it quicker and easier to identify and resolve problems. These diagnostics will reduce the need for the customer to visit the vending outlet, or for the supplier and customer to incur the time and cost of a home visit.
- Greater choice and convenience when topping up—new technology can facilitate a range of innovative top-up options, including crediting the meter via a text message, smart phone application or phone call, as well as through an online or in-home display. In addition to the current cash-only option, customers could pay by debit or credit card at payment outlets.
- An end to problems caused by lost, broken or stolen payment devices—customers need a key or card to add credit to their meter. These devices are frequently lost, broken or stolen, resulting in customer inconvenience, additional cost and sometimes self-disconnection. Problems with faulty, lost or stolen payment devices accounted for approximately one-fourth of the calls to the Consumer Direct helpline about prepayment during the period from October 2011 to March 2012. A further one in 10 calls about PPMs came from customers experiencing a delay in receiving a replacement device, half of which were without supply.
- Reduction in misdirected and unallocated payments—smart metering will enable real-time validation of the customer's payment against supplier information, thereby removing the likelihood of payments being attributed to the wrong supplier or not allocated to any supplier.
- Reduced barriers to switching between payment methods—if full commercial and technical interoperability are achieved, customers would be able to switch to and from prepay immediately without the cost and inconvenience of a meter exchange. There also will be less justification for suppliers to require a security deposit on change of payment method if they are able to monitor daily energy consumption or offer managed credit tariffs to prevent debt build-up.
- A reduction in self-disconnection—smart metering facilitates a range of actions that could help prevent self-disconnection caused in error rather than due to financial problems: Offering friendly credit or no-disconnect periods for gas as well as electricity. These are periods when customers remain on supply even if their emergency credit runs out and they have no money on the meter; In-home displays placed in a convenient location could offer low credit alerts to warn customers when they are in danger of self-disconnecting. Many meters have this functionality but customers do not hear the warnings as the meters are located out of earshot (eg outside the property or in a cupboard under the stairs); Real-time and more granular data available from smart metering will make it possible for suppliers to offer services that help customer budget and prevent disconnection. For example, some energy companies are trialling sending low credit warnings to customers' mobile phones.
- New ways to help tackle self-disconnection—remote access to data and the ability to credit meters remotely could make it easier for suppliers to identify customers who are regularly disconnecting. It could also help suppliers to provide support more quickly for those customers who are off supply or at risk of self-disconnecting. In the long-term, if load limiting is implemented, as an alternative to self-disconnection for prepay customers *only*, customers could be offered a "life-line of energy" (a trickle flow) that might allow them limited use of essential appliances, such as lights and the refrigerator, as an alternative to complete self-disconnection. But this policy would not be acceptable if it resulted in a weakening of existing protections.

6.3 However, Consumer Focus does not believe these benefits are on track to be delivered and at present PPM customers could be the last to get smart meters. There is also a real risk that customers could face a decline in service and new problems. Barriers include:

- Increased costs leading to more expensive tariffs.
- New topping-up options raise equality issues.
- Lack of interoperability results in new barriers to switching.

— Decline in reliability and quality of service.
— Solutions to address misdirected and unallocated payments leave customers off supply.
— Incompatability with microgeneration.

6.4 It is particularly important that benefits are delivered to PPM customers as more than 13% of consumers pay by this payment method and the number is expected to rise.[129] Consumer Focus estimates that 9.6 million people in Great Britain live in homes where they pay for their energy through a PPM.[130]

6.5 While not all PPM users in Great Britain are from vulnerable groups, they remain disproportionately on low incomes compared to those using other payment types.[131]

6.6 In Great Britain, the number of energy customers on prepayment has steadily increased–from approximately 6 million to 6.8 million between 2008 and 2011. On average, an estimated 1,724 PPMs are installed every working day.[132] This is predominantly due to debt.

6.7 Timely action is needed by suppliers, Ofgem and DECC if smart metering is to benefit prepayment customers. It is widely acknowledged by the energy industry that prepayment was not a priority when energy markets were liberalized; it is important that we do not repeat this mistake as we enter into a smart world.

Full details and recommendations are available in our 2013 report Smart Metering Prepayment in Great Britain—Making prepaid energy work in a smart world.

7. *Should vulnerable customers and the fuel-poor be first in line for smart meters so they can get the benefits sooner?*

7.1 We make the following comments:

— Experience from supplier obligations such as the Carbon Emissions Reduction Target Super Priority Group, suggests it can be difficult and expensive to target low income, vulnerable households specifically. Gaining access and engagement may be particularly challenging as Consumer Focus research shows lower levels of interest and awareness (see Question 10).
— A pragmatic approach would be, for as far as possible, an area based scheme, targeted in places of multiple deprivation and at social housing providers. This would echo the approach taken by the Carbon Saving Communities Obligation, under the new Energy Company Obligation, such trials should therefore be undertaken on this basis.
— However, before such an approach is adopted suppliers and Government need to be confident that low income customers will benefit and have the mechanisms and support in place to ensure this happens. For example, an extra help scheme will need to be available, and appropriate technology and communications for customers including those with impairments. PPM customers tend to be disproportionately on low incomes but could face significant problems if they got smart early depending on what progress is made.
— There will inevitably be teething problems in the early stages of roll-out—it is important to ensure that vulnerable customers, who may be among the least likely to deal with problems, are not guinea pigs for new technology.
— Consumers who "live above the shop" must be remembered by suppliers in roll-out—they can vulnerable but end up falling through the cracks on protection (eg they are not protected from remote disconnection in the same way as domestic customers), because they are on a non-domestic account. It's worth remembering that non-domestic can also mean not-for-profit and even less engaged or savvy with regards to energy, for example charities, town halls and small voluntary organisations. These groups are often key opinion formers in communities.
— Those living in hard to treat properties are less likely to be able to take up traditional energy efficiency measures such as cavity wall insulation. For them, behaviour change, facilitated by smart meters may well be one of the few options available to help reduce energy use.

8. *What is the best way of involving third-party trusted messengers, such as charities, consumer groups, community organisations, local authorities and housing associations in roll-out?*

8.1 Provisional findings from DECC research[133] and our own experience of presenting at NEA regional Forums, suggests that community groups and local authorities are keen to get involved. They can help raise

[129] http://bit.ly/12azEyf Page 23 paragraph 3.48. Direct debit is the most popular payment method used by 49% of domestic customers. Around 33% pay by standard credit and 13% use prepayment.

[130] Based on 4.1 million electricity PPM customers (Ofgem Company Performance stats Q3 2011) and average (mean household) size (persons per household) of 2.35 (ONS General Lifestyle Survey 2010). Consumer Focus research showed that the majority of PPM households paid for both gas and electricity via a PPM: http://bit.ly/z2Cc8V Page 7

[131] Energy Supply Probe Initial Findings Report. October 2008. http://bit.ly/aVoHuD

[132] *Smart Metering Prepayment in Great Britain—Making prepaid energy work in a smart world.* Consumer Focus and Accenture 2013

[133] Research conducted by EST on behalf of DECC into the role of community groups. It involved a literature review, online survey of 178 respondents and 55 in-depth interviews. Provisional findings present to Consumer Engagement Rollout Group (CERG) February 2013.

awareness, maintain momentum, provide practical help and support to consumers including handholding customers and helping them to really understand what smart means for them. There are also opportunities for groups to act as trail blazers or ambassadors and show case activity.

8.2 Third parties face a number of challenges to engagement: lack of funding and resources; and insufficient time, skills and knowledge. In order to involve them they need to be supported. This includes the provision of training; being provided with marketing and communication materials that they can adapt and brand themselves to meet local needs; and in some instances funding.

8.3 It is essential that it is easy for groups to get involved. They do not want to have to deal with six big suppliers, and a score of smaller and non-domestic customers. A single point of contact is essential.

8.4 Rather than inventing new structures it is best where possible to piggy back on existing networks and programmes. The Digital UK outreach model successfully used existing networks of relationships between charities, and between charities and their clients. It leveraged these networks rather than replicating them. It is now being used in other areas of public policy, including the drive to increase broadband take-up. Such an approach also includes engaging with local authorities, the police (to help prevent distraction burglary and rogue traders), the fire services and health workers for example. These are groups that often already have contact with customers including the most vulnerable and the hardest to reach. Also it is important to join up with existing activity in an area eg fuel poverty and energy efficiency initiatives.

8.5 Third party involvement and partnership working will be essential to engage consumers. Consumer Focus research found that only 26% of customers trusted their electricity supplier to help them save money on their energy bills and go green, with confidence in gas companies even lower at 23%.[134]

8.6 Consumer Focus 2012 research found that no one group was trusted by everyone to provide information on smart meters: 33% of bill payers trusted an independent consumer group to provide them with advice; 26% their energy supplier, 26% their friends and family, 23% trusted Government; 17% said they would trust a specialist independent body like the Digital Switchover but for energy; 16% said they would trust a specialist green organisation eg EST, with 12% trusting an online price comparison site.[135]

8.7 Importantly we found that for different issues different bodies were trusted. For information on the health impact of smart meters for example, local GPs and the NHS were most trusted with 33% and 30% of customers trusting them, whereas only 15% thought their supplier would tell the truth.

8.8 A one-sized fits all approach cannot be taken. Different organisations will need to be involved to reach different demographics. For example, Age UK could deliver messages to the elderly while other groups will be needed to reach people with disabilities or where English is not a first language.

9. *What are the potential obstacles to rolling out smart meters in the UK and how should these be addressed? What pitfalls have hindered roll-out programmes elsewhere and are we doing all we can to avoid them?*

9.1 The following are some of the key obstacles from a consumer perspective:

- Consumers decline meters:
  - The most common reasons for refusals in other countries include: concerns about privacy, remote disconnection, health risks and rising costs—Ofgem has introduced new protections to prevent misuse of remote functionality and protect vulnerable customers; DECC's new privacy framework comes into effect in June. As noted below, more needs to be done to address health concerns and monitor the effectiveness of new protections.
  - If customers who get a smart meter early have a negative experience this will discourage wider take-up. The Smart Metering Installation Code of Practice (SMICOP) is designed to ensure a positive installation experience but doesn't cover non-standard installations in sufficient detail. For up to a quarter of installations a customer may need multiple visits resulting in additional inconvenience and disruption to the customer. Routine safety checks could result in appliances being condemned or a customer being disconnected. While not a smart specific issue, customers may be worried this will happen to them if they have a smart meter installed. Standard processes need to be established to ensure timely resolution of problems and end the current postcode lottery approach. Customers should have a single point of contact where there are problems and not be left negotiating the process themselves between different parties such as the network and the supplier.

[134] This was an online survey of 2,048 consumers aged over 18 years conducted by ICM on behalf of Consumer Focus. Conducted March 2010.

[135] Face-to-face survey carried out by GfK NOP on behalf of Consumer Focus. GfK spoke to 1460 UK bill payers between 29 March–3 April 2012.

- Cost—Government has ensured that customers will not face an upfront cost for smart meters, this is welcome. However, if the supplier hasn't read the meter for a long time, the customer may receive an adjustment bill for any undercharge, when they have a smart meter installed. While this is not a smart only issue it could result in customers associating smart meters with costing them money. To prevent this, suppliers should reconcile customers' accounts before installation so the two are not associated. Similarly costs incurred due to the smart meter installation eg hard wiring a display due to communication problems in a particular property, or moving the meter or meter box should not fall on the individual customer.

— Early roll-out/transition causes a number of additional obstacles:

  - Barriers to switching—analysis of contacts to Citizen's Advice consumer service shows a growing trickle of calls from customers worried that if they have a smart meter they won't be able to switch supplier. Interoperability problems need to be addressed as quickly as possible before concerns grow.

  - Developing an effective consumer engagement programme is essential. But consistent and simple messaging to aid consumer engagement is made more difficult by suppliers' different levels of readiness during Foundation. Similarly, while the competitive approach allows for differentiation of products and services, it makes communicating the benefits of smart and supporting customers more challenging.

  - Industry's transition from 100% legacy meters to 100% smart is difficult. We query how industry's IT systems will cope with the various changes they need to make and what the resultant impact will be on customer service. Those rolling out early are already making changes to systems, which will have to be further adapted when DCC becomes operational.

  - Government has banned sales during the installation visit but marketing is still allowed with customers consent—this effectively exposes the customer to a face to face sales pitch in their home, and the associated risks. Careful monitoring of protections is needed, in particular, to ensure that customers are fully aware of what they are consenting to when they agree to marketing. The kinds of products and services suppliers are allowed to promote should be restricted to those linked to government programmes around sustainability and tackling fuel poverty.

  - Problems with third party intermediaries are already a big issue in the non-domestic energy world—mis-selling and mis-representation is rife. We need to ensure that this is not allowed to happen during the roll-out of smart. Ofgem are looking at a TPI code of practice at the moment but government needs to consider how to protect businesses from mis-selling, especially by third parties, during the roll-out.

— Lack of an effective prepayment solution is a significant barrier for around 13% of customers to accessing the benefits of smart metering. This needs to be a higher priority for Government and suppliers. Similarly, further work is needed to understand other customer segments such as tele-switching and time of use customers as there are likely to be changes to their service and bills.

— Operational barriers to installations in some areas and property types may mean some households who want a smart meter can't have one—cost effective technological solutions need to be developed to ensure that certain groups of customers, such as those in rural areas or high rise blocks of flats, aren't the last to receive smart meters.

— Suppliers inflexible back-office systems could restrict innovation eg we are told by some suppliers that existing systems are a barrier to the provision of accurate cost information on the IHD, monthly payment options such as variable direct debit and the provision of tailored energy reports.

— Security and reliability—robust end to end testing of the system will not be possible until the DCC is fully operational. This needs to be carried out as soon as possible. Unreliable communication solutions could mean customers continue to receive estimate bills, face additional home visits and a decline in service. Ofgem should consider updating the Guaranteed Standards to ensure quality and reliability of service.

10. *Are levels of public awareness of and support for smart meter roll-out increasing?*

10.1 Awareness of smart metering is very low amongst small businesses, as reported by our colleagues in various business lobbying groups.

10.2 Findings from Consumer Focus' research into domestic bill payers' attitudes shows:[136]

- Around half of customers say they have heard of smart meter (52%). However it was clear when we probed further that the number that understood what they were and the potential benefits was significantly lower. There was particular confusion between a clip-on display and a smart meter.
- A slight decline in interest in having as smart meter with a display installed—44% were interested in 2012 compared to 51% in 2011. In 2012, 29% were not interested compared to 23% in 2011. The rest were unsure. We used comparable methodology.
- Both surveys showed that older customers tended to be more aware of smart meters, but less interested in having one. The 2012 survey found that the highest level of interest among consumers aged 18–34 (53%). This gradually decreased with age: 47% of consumers aged 45–54 were interested, 45% of consumers aged 55–64. Over 65's were least interested (27%). Surveys also showed lower levels of awareness and interest among DE classes than AB.
- In both surveys customers said they weren't interested because they were: worried that costs will rise/smart meter just an excuse to put up prices; don't see the point—this includes apathy, can't be bothered for £25, already feel they are energy efficient, have a clip-on display; hassle factor—thought something could go wrong. A very small minority raised issues around health, privacy and security.
- The main reasons why customers were interested were: to help save money; greater control over what they were using, and to budget more easily. They also said they thought accurate bills, access to detailed data so they could get the best deal, and having a reliable energy supply were important smart benefits. Easier switching and fewer visits from the meter man were not considered as important but were still valued.

11. *Is there any evidence that consumers' concerns about smart meters are declining or growing?*

11.1 Evidence suggests low levels of concerns about smart metering. However, complacency should be avoided as experience in other countries suggests the consumer mood can change very quickly.

11.2 As noted, Consumer Focus' analysis in calls to Citizen's Advice consumer service suggests a slight rise in contacts from domestic customers concerned that smart meters will be a barrier to switching. Contacts about health and privacy concerns have remained low.

11.3 Where businesses know that remote disconnection is part of smart they are very concerned, often about the potential for accidental disconnection and the attendant revenue loss. This function should be monitored carefully. Negative stories of remote disconnection in the non-domestic sector could also have a knock-on effect in terms of domestic engagement. Protections should be strengthened.

11.4 Generally information on business' aspirations or fears is low; our quantitative work on smart and small businesses will be published later this year and should paint a picture of how smart is already doing. We will also be re-running our domestic customers attitudes to smart metering survey again this March and are happy to share findings.

12. *Is enough being done to increase consumer awareness about smart meters? Could DECC's consumer engagement strategy be improved?*

12.1 Given where suppliers are in terms of readiness to roll-out, we think appropriate action is being taken at the moment to raise consumer awareness of smart metering specifically. It is important not to generate demand that cannot be met, or to raise unrealistic expectations of what will be delivered to customers at this stage.

12.2 However, there is more Government could be doing to raise awareness of the energy challenges we face as a nation. It would be useful if DECC could create a narrative around energy issues that supports not just smart metering but Green Deal and wider low carbon and energy efficiency programmes.

12.3 DECC and Ofgem should be praised for the timely introduction of new protections which should help allay customer concerns around the privacy risks, and remote disconnection and remote switching to prepayment.

12.4 The development of Government's consumer engagement strategy, including the Consumer Engagement Delivery Plan and the reporting and monitoring framework are very welcome. We particularly support the setting up of a Central Delivery Body with clear objectives to help deliver behaviour change and to assist vulnerable, low income and pre-payment customers.

12.5 DECC has also taken a number of other positive steps: These include requiring suppliers to offer all domestic customers an IHD which meets minimum standards around information and accessibility; supporting

[136] Face-to-face survey carried out by GfK NOP on behalf of Consumer Focus. GfK spoke to 1460 UK bill payers between 29 March–3 April 2012.

a demonstration of the smart metering system and display during the home visit, along with the provision of energy efficiency advice.

12.6 However, the following further activities are needed:

- Community engagement trials are required as a matter of urgency.
- The Central Delivery Body should have a greater coordination role—DECC or Ofgem should clarify once and for all to what extent competition rules actually hinder joint activity that could deliver wider consumer benefits and cost savings.
- We continue to have concerns that in practice the Central Delivery Body is not properly independent and that customers will not trust it to provide impartial information. It is set up and funded by suppliers. There are only four consumer representatives on a board of 15 including an independent chair. While suppliers might not always agree, under the proposed simple majority vote it remains to be seen if the consumer voice is consistently outvoted by industry.
- Further work is also needed around change of tenancy issues. The National Census 2001 estimated that one in eight people (6.3 million householders) move home every year and that our population is becoming increasingly mobile. There could be significant numbers of customers moving into properties with smart meters who have not had a smart meter before. It is important that new customers moving into a property are:
  - Made aware of the fact that they have a smart metering system.
  - Offered an IHD when they move in at no upfront cost (the previous tenant may have taken it with them or not had one).
  - Asked if they have had a smart meter before and are taken through how to use it, with potential supplier differences are explained.
  - Given a follow-up call to check they have got the IHD up and running if this is sent through the post.
  - Given free access to the support they need to set up and use the display. A home visit should be offered and available where it is clear that the customer has not managed to or is not able to set up the display themselves.
  - Given free levels of support which are at least as good as those received during the installation visit—including around energy efficiency advice and information on using the meter in prepay mode.
- More work is needed on how customers can use smart to maximise gas savings and what incentives may be needed to facilitate that. Most of the focus to date has been on electricity savings but there may be significant potential for linking smart and heating controls.
- It is unclear if there are sufficient incentives on suppliers to deliver the appropriate support, advice, products and services that customers need to access the benefits of smart. In particular, how effective displays are needs to be kept under review.
- Government needs to be much more proactive in joining up strategy between smart meters and other energy efficiency policies across DECC, particularly the Green Deal and Energy Company Obligation programme to ensure that when suppliers are entering consumers' homes, the opportunity to make the property more energy efficient and deliver social assistance to fuel poor customers, is not lost.

13. *Are consumers' concerns about privacy and health being addressed adequately?*

13.1 Consumer attitudes towards privacy are complex with some customers very concerned about use of their personal data, and others more comfortable with sharing information in the digital age.[137]

13.2 We are aware that to date in GB there have been very few public concerns voiced about smart meter data or health in relation to smart, but the potential for these to become issues that jeopardise consumer engagement and results in customer detriment should not be under-estimated.

13.3 DECC has been proactive in taking steps to address customer concerns around privacy while also seeking to promote competition and the potential for wider benefits that data access can deliver. Government should be praised on their open and collaborative approach to this sensitive issue.

13.4 We particularly welcome the decision not to give suppliers default access to data that is any more granular than daily. Half-hourly reads from all customers are not needed for tariff design; could encourage lazy competition by suppliers and risk resulting in customers' tariff choices being restricted. In addition, Consumer Focus's *Private Lives* research found that customers are increasingly aware that their data has a value and want something in exchange for it eg energy efficiency advice or discounts.[138]

13.5 Consumer Focus particularly supports the proposed now data (was privacy) charter which should help provide customers with choice, control and transparency over how their data is used.

[137] http://bit.ly/xrIjLu

[138] *Private Lives—a people's inquiry into personal information*. Demos research, supported by Consumer Focus and the ICO (2010)

13.6 However, how effective protections will be in practice, will depend in particular on:

- How suppliers implement and interpret new rules—there are still a lot of grey areas in the legislation. We recommend that DECC produces Guidance to support Licence Conditions.
- How they are communicated to customers and when—the range of opt-in/opt-out choices for example has the potential to be very confusing to customers. Also, three out of four (82%) of bill payers said they were unaware of their energy company's data and privacy policies in a recent Consumer Focus survey.[139] When probed further it was apparent that the real number was significantly higher still. Different approaches need to be trialled and tested to find the best approach.
- The robustness of the monitoring and enforcement framework—especially as responsibility is split between the Information Commissioner's Office and Ofgem. Data privacy regulation is notorious poorly enforced.

13.7 As mentioned, further work is needed to ensure that customers have appropriate access to data—particularly for small businesses and pre DCC.

13.8 In the absence of the Data Protection Act, and in particular because of the issue of shared premises, we would particularly welcome sector-specific data access and privacy regulation for small businesses and believe that similar kinds of rules could apply as in the domestic sector.

13.9 We continue to seek clarify as to what access Government, local councils and security services will have to granular data that can give a unique insight into customers activity within their home, and if this data will be admissible in a court of law. This is a notable gap that may cause concerns.

Health

13.10 A significant minority of consumers are worried about possible health implications of smart meters. Some concerns have been raised about the long-term impact of electro-magnetic field emissions on customers' health. In addition, a minority of consumers report a condition called electro-hypersensitivity (also known as electro-magnetic sensitivity), that they attribute to electromagnetic fields from technologies such as mobile phones and wireless technologies.

13.11 In response to the survey question—"*Many smart meters use similar communication technologies as those used for wireless internet, mobile and cordless phones, how concerned are you about any potential health effects from these technologies?"*—17% said they were very or quite concerned, 26% not sure, with 57% not concerned.[140]

13.12 Consumer Focus does not have any health experts and do not have a view on whether or not smart metering technologies could have implications for people's health.

13.13 However, we believe that insufficient action has been taken to address customer concerns in this area. In the Netherlands the smart meter has been designed so that customer can control whether communications systems in the home are on or off. Health concerns can also be borne in mind when guidance is set on how often information can be transmitted from the meters as this may affect consumers' overall exposure.

13.14 Many customers will want to know there has been thorough testing which shows there is no health risk, before they are happy to have a meter in their home. The Health Protection Agency has committed to testing smart meters but questions may be asked why testing wasn't carried out prior to roll-out. Consumers also need access to information which compares emissions from smart meters to common appliances that they may already have in their home, such as the wireless internet so that they have a meaningful comparison.

14. *Will the commercial benefits of smart meter roll-out be captured within the UK?*

14.1 We expect smart metering to deliver significant supplier benefits and substantially more benefits than identified in the IA for networks. It is essential that savings made by both suppliers and DNOs are passed on to the consumer and help reduce household energy bills. Consumer Focus believes that these commercial savings will far outweigh those expected through energy savings. Further steps also need to be taken to ensure that products and services which could deliver benefits to low income and vulnerable households are delivered even where there are not the commercial incentives to do so.

15. *Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy?*

15.1 We have a general uneasiness that Government appears to be procuring a solution where the specifications and requirements are still developing and are therefore not yet fully defined. In particular a final decision on the communications technology has not yet been agreed but this will have a significant impact on costs and the customer experience.

[139] Face-to-face survey carried out by GfK NOP on behalf of Consumer Focus. GfK spoke to 1,460 UK bill payers between 29 March–3 April 2012.
[140] Ibid

15.2 We query if sufficient time has been allocated for testing. Robust end to end testing is needed covering customer journeys (change of supply, change of tenancy, change from credit to prepayment payment methods), as well as connectivity testing.

15.3 There is real potential for the DCC to run behind schedule (therefore undermining the cost benefit analysis) and over budget.

15.4 Consumer Focus has concerns that with no DCC mandating for the non-domestic market, that interoperability will suffer, thus restricting switching rates and hence competitive pressures generally. Small businesses are unlikely to procure communications separate from their supplier. Possibly all suppliers will join the DCC anyway, however there is likely to be a large/small supplier split which entrenches the division between these sub-groups.

15.5 We have concerns that opportunities to address historic problems will be missed. For example data flow issues such as misdirected payments, change of supplier failures, incorrect billing caused by transposed meters, which result in consumer issues need to be resolved.

15.6 We seek reassurances that the needs of all consumer segments including prepayment, radio tele-switch customers, those in high rise concrete blocks, and with district heating are properly catered for.

15.7 Appropriate thinking about the customer experience and consumer scenario testing is needed especially where there are split responsibilities.

16. *What criteria should DECC use to measure the on-going success of roll-out?*

16.1 DECC needs to thoroughly map the full range of potential benefits that smart metering can deliver for both domestic and micro-business customers. This should include not just monetised benefits such as energy savings, but also those that are harder to quantify, but valuable, such as improvements in customer service. Success should be measured by the degree to which these are delivered to customers.

16.2 Monitoring and evaluation must assess the impact of smart metering on different customer segments eg by income, vulnerability, payment type, location and fuel type to ensure fairness. We expect that not all consumers will see the same benefits, but all must be able to access some benefit and get value for money from the programme they are helping to fund.

16.3 The Impact Assessments focus predominantly on the monetised benefits so measuring progress against these documents alone is not sufficient. Key benefits such as those that could be delivered to prepayment meter customers are not fully captured.

16.4 In addition roll-out should be evaluated against the contribution it makes to wider Government programmes such as those designed to tackle fuel poverty, digital inclusion and the delivery of smart grids. This should be reported in the Annual Progress Report.

16.5 A successful roll-out will also result in high levels of customer satisfaction and low levels of complaints—helping to improve trust in the energy market and wider customer engagement.

*February 2013*

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**Supplementary written evidence submitted by Consumer Futures (formerly Consumer Focus)**

This additional note outlines Consumer Futures' (previously Consumer Focus) initial response to the Ministerial Statement by The Rt. Hon Edward Davey MP: Secretary of State for Energy and Climate Change, on smart metering 10 May 2013.

TIMESCALES

1. Consumer Futures believes that delaying the date for smart meter rollout is a sensible move. The Programme and suppliers are not ready. The focus should be on getting it right, not rushing to get the meters on the walls. Customers won't remember when they got a smart meter but they will remember if it worked and if they had a positive experience.

2. This delay should enable sufficient time for robust end to end testing, the procurement of compliant SMETS2 smart metering equipment and the setting up of key communications infrastructure, which is needed to ensure faster and easier switching and deliver better customer service.

3. However, it is essential that energy companies and Government do not now take their foot off the gas. Work is urgently needed to ensure customers actually benefit from this programme. Suppliers should focus on how they are going to help households achieve the energy savings from smart metering, how prepayment meter customers in particular will benefit, and work to develop an Extra Help Scheme for low income and vulnerable consumers as part of a wider consumer engagement programme.

4. In particular, we urge companies and Government to use this time to identify opportunities to better coordinate installation activity, both with each other and with wider government energy efficiency, fuel poverty and water schemes, to offer better value, service and experience to customers. Community level consumer engagement and rollout trials must be a priority.

SWITCHING

5. We welcome recognition by Government of the on-going barriers to switching faced by domestic customers who are receiving smart meters during Foundation stage. At present if a customer switches supplier they could loose smart functionality, have to have their meter replaced, or in the worst cases be prevented from switching to a particular offer. The delayed DCC set-up will add to the scale of this problem, as industry plan to roll out in excess of 2 million compliant smart meters in the next two years, before full interoperability is delivered and switching is easier and faster.

6. However, we remain to be convinced that these proposals will address the problems customers face:

- We support in principle the "no backward step" approach. This means when a customer switches from a supplier who has provided them with a compliant smart meter, the new supplier cannot replace that smart meter with a dumb meter and must either rent the previous supplier's meter or install their own new smart meter. However, we query how this will work in practice and what the cost implication will be for customers. Supporting these meters is likely to cost more. While suppliers have a duty to supply customers who have smart meters, there is nothing to prevent them charging these customers to reflect the increased cost of supporting their meters.
- The proposal that any new supplier must continue to provide remote meter readings, is in principle also welcome, but does not go far enough. Other smart functionality such as accurate information on the in-home display may still not be available and requiring suppliers to take a remote reading does not guarantee that customers will get accurate bills. Suppliers will need to make additional changes to their back office systems and processes for this to be achieved. Government or Ofgem need to introduce a new Guaranteed Standard to require suppliers to provide accurate bills to customers once a smart meter is installed. They should also introduce a new Licence Condition to end back billing once a smart meter is installed for both domestic and micro-business customers when it is not the customer's fault. Failure to get an accurate bill causes particular detriment when the customer receives a back-bill for usage they thought they had paid for. Shock bills can push customers into debt or overdraft with resultant additional charges and knock-on effects.
- The proposals do not address problems faced by prepayment meter customers. While we welcome trialling at scale for smart prepay, there is a risk that customers getting smart prepay during Foundation stage could effectively be locked in to their supplier. If suppliers are rolling out smart prepay pre DCC, they should a) guarantee more competitively priced or lowest cost tariffs and b) offer tangible improvements in customer service eg choice of top-up options, friendly credit for gas. Ofgem and DECC should consider new Guaranteed Standards in this area.
- Government has still not taken steps to address the barriers to switching faced by micro-business customers.
- We understand that proposals do not cover the estimated 1 million customers who have had non-compliant smart meters installed.

7. While Consumer Futures supports trialling smart metering technologies at scale, we are uneasy that Government is incentivising early rollout of potentially a couple of million of smart meters before SMETS2 (the preferred specification) is available or the DCC is up and running. We suspect that these proposals will have unintended cost implications and an impact long-term on the products and service available to customers with these early meters. A cost/benefit analysis should be carried out.

*May 2013*

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**Written evidence submitted by the Federation of Small Businesses**

The Federation of Small Businesses (FSB) welcomes the opportunity to respond to the above named inquiry.

The FSB is the UK's leading business organisation. It exists to protect and promote the interests of the self-employed and all those who run their own business. The FSB is non-party political, and with 215,000 members, it is also the largest organisation representing small and medium sized businesses in the UK.

Small businesses make up 99.3% of all businesses in the UK, and make a huge contribution to the UK economy. They contribute 51% of the GDP and employ 58% of the private sector workforce.

We trust that you will find our comments helpful and that they will be taken into consideration.

## Micro-Businesses and the Energy Markets

The roll out of smart metering across the UK offers small businesses the chance to take control of their energy consumption, increase their energy efficiency and reduce their costs. Yet the FSB is concerned that, owing to pressure from the big six energy companies, essential features and protections will be missing from the roll out for small businesses.

Whilst the FSB is fully supportive of the introduction of smart meters we have serious concerns that the six big energy companies are, at present, likely to be the main beneficiaries and that if the wrong decisions are made about the nature of the smart meter rollout small businesses will not be able to enjoy the full benefits of becoming more energy efficient.

The smart meter rollout for small businesses should broadly mirror that of the domestic rollout, which has largely been decided upon, and has strong safeguards to ensure that domestic consumers can benefit from competitiveness within the market. It is essential that small business customers should remain free to switch suppliers when they wish and not get locked into using certain suppliers due to the lack of meter interoperability. For example, they should be able switch to those who offer innovative metering, good service and competitive prices. In the report we make a number of recommendations to ensure the smart meter rollout empowers small businesses.

Micro-businesses are broadly similar to domestic household in terms of energy consumption use and we therefore believe that the majority of safeguards proposed for the domestic sector should apply to the non-domestic sector as well. We also urge DECC to bear in mind that Ofgem, in its' ongoing Retail Market review, is proposing to extend the current level of regulatory protections for micro-business to small businesses—which are officially defined as having up to 249 employees. We belive this extension of protections to small business should be reflected in the smart metering rollout.

Additionally, given the potential of smart metering to maximise a firms' energy efficiency and help reduce energy bills, we believe Government should look to mandate easy and free access to energy consumption data for small firms as well as ensure maximum interoperability to help businesses switch supplier without difficulty should they choose to do so.

### *Who benefits?*

For the consumer, a smart meter can provide two main benefits. With a real time display, energy consumption and cost data are easily visible, and can allow the consumer to make energy savings. In addition, billing will be accurate and no longer require a meter reader to visit the house. Estimated meter readings for billing would be eliminated.

However it is widely thought that the real beneficiaries of the smart meter rollout will by the energy suppliers. Potential benefits include:

- — elimination of manual meter reading costs (estimated to cost £150 million per year);
- — reduction of costs to service customers. For example, debt management, prepayment/credit payment changes are cheaper to implement with a smart meter;
- — extension of the range of products and services into the home;
- — remote disconnection and connection of supply, (although existing regulatory procedures for customer disconnection will still have to be followed);
- — on-demand meter readings;
- — remote tariff management; and
- — enhancement of capabilities to detect fraud and the stealing of electricity.

Indeed, the potential benefits of smart metering for the energy suppliers are significant yet small businesses are unlikely to befit unless operability, data access engagement issues are given the right consideration.

Given the number of benefits energy suppliers are likely to see from the smart meter rollout, including a likely significant reduction in costs from meter reading, we would expect these savings to be passed on to consumers through lower tariffs. The FSB believes Ofgem, the energy regulator, should be tasked with ensuring the costs savings that the energy suppliers are likely to experience are being passed on to consumers though lower bills.

In addition, given that smart metering will tell consumers exactly how much energy they consume, rather than give the traditional estimated readings of dumb meters, we believe that new level of transparency should be matched by an increased transparency in tariffs offered by suppliers. The current lack of transparency in tariffs offered by suppliers means that small business consumers find it difficult to compare prices between different suppliers and get the best price for them.

## 1. Operability

The FSB is concerned that the large energy companies have already started rolling our advanced/smart meters to their customers despite Government only having recently released their proposal for the technical

specifications of what constitutes a smart meter. This means that many small businesses could have recently had an advanced meter that does not now meet the full technical specifications of what constitutes a smart meter. The Government has decided, for households, that energy suppliers will have to change any advanced/ smart meters they have installed that don't meet the technical specifications. The FSB is concerned that, given the current difficulties SMEs have in switching energy supplier, the lack of a mandated specification of smart meter in the micro business sector could lead to those businesses, whose supplier have already installed sub-speciation meter , finding it difficult to switch energy supplier due to the lack of interoperability of meters.

The FSB believes energy suppliers who have jumped the gun and installed sub-specification meters should be forced to install smart meters of adequate specification in the small non-domestic sector at their cost.

The Government has mandated the use of in-home displays (IHD) for the domestic sector which give visually displayed relative energy consumption information. However, they have not mandated the use of in the small non-domestic sector. The FSB fears this will limit a small businesses' ability to increase their energy efficiency and facing possible charges to access their energy consumption data online via their supplier as well as potentially being subjected to online marketing.

## 2. Data Access and the Data Comms Company

The FSB remains concerned about the lack of mandated DCC use by energy suppliers in the non-domestic sector since it has potential implications about the impartiality of energy efficiency advice offered as well as the cost of accessing such data.

Asking small businesses to pay to access their energy consumption data will seriously undermine the credibility of the programme as well as limit the potential economic and environmental benefits of the scheme. Small businesses, like domestic households, should be able to freely access their energy use data in order to maximise the potential benefits of smart metering.

Further to this, the credibility of the smart meter rollout could be jeopardised if small firms are dependent on their energy supplier to provide them with data about their energy use. Small businesses have traditionally had a poor experience in their relations with the big six energy companies and their confidence in the rollout would be bolstered by accessing data via an independent DCC. This is particularly important given that the Government is not proposing to make the mandatory use of an IHD for non-domestic premises.

### *3rd party access to data*

Further, many firms use 3rd party energy experts to advise on how to cut their energy use and where the use of DCC is not in place it will raise issues as to how or if the 3rd party can access a firm's energy consumption data. This is a particularly important consideration for energy intensive small businesses who can see significant cost savings through the use of a 3rd party.

We therefore believe, should Government proceed with not mandating the use of DCC in the non-domestic sector, that special arrangements will need to be made to ensure 3rd party access to a firm's data should they not be opted in to the DCC.

### *Network operator access to data*

Whilst we do not foresee any significant problems allowing network operators access to energy data we believe small firms should be made aware of such provision. Also, where an energy supplier has chosen to proceed with the roll-out of advanced metering, rather than smart meters that meet the Government's specifications, no additional costs should be passed on to small firms for network operators to access their data.

### *Rural based businesses*

We note in the draft Smart Energy Code document for non-domestic premises, the DCC will be able to charge depending on location where as domestic household will pay a flat rate. We believe a higher charge for rural based businesses could undermine the credibility of the smart meter rollout and further increase the cost of setting up a business in a rural area. We believe a nationwide flat rate would be more applicable.

### *Elective DCC services*

The FSB supports the proposal that DCC charges for elective services should be the same as for core DCC services. This is crucial to ensure business, and indeed suppliers, are not put off from choosing elective services and the associated energy efficiency benefits.

## 3. Engagement

In relation to engaging with small businesses during the roll-out we believe it is essential that the Government needs to distinguish between micro business sites and small sites owned by large retailers since the needs of micro-business sites will be different from those of a large business that owns multiple premises.

*Provision of initial information on the current range of smart and advanced metering*

We are broadly supportive of providing initial information based on the current range of smart and advanced metering. However, as stated above, we believe small businesses need to be made fully aware of the benefits of having a meter installed that meets the Government's agreed technical specifications in order to allow them to switch suppliers and enjoy a competitive energy market.

*Central Delivery Body*

Given the unique nature of micro-businesses and the place they hold in the energy markets we believe the proposed Central Delivery Body should be specifically tasked with engaging the micro-business sector.

Whilst we support the creation of a CDB in principle we believe careful consideration needs to be given to the governance and structure to ensure its independence from energy suppliers in order to give small businesses confidence in its role.

We also believe, in order to maximise the potential of smart metering, that consideration should be given to linking the CDB to the DCC in order to provide businesses with tailored energy efficiency advice specific to their businesses and energy consumption patterns. This would allow the small businesses to access their energy consumption data alongside bespoke advice on how they can maximise their energy efficiency to help cut costs and carbon emissions.

*Training*

We remain concerned that not enough is being done to provide adequate training for small businesses to maximise the potential benefits of using smart meters. Smart meter themselves do not save energy but the people who use them. We would therefore welcome greater focus on the training provision during the rollout.

Conclusion

Smart metering offers small firms the potential to re-balance their relationship with the big six energy suppliers. Yet the Government is risking not realising the full potential of the smart meter rollout, both in economic and environmental terms.

The lack of a mandated minimum technical specification in the non-domestic market could lead to small businesses experiencing difficulties in switching suppliers as well as undermining attempts to introduce greater competiveness in the energy markets.

Secondly, by allowing energy suppliers to opt out of using the DCC could see small firms being charged for accessing their energy consumption data which will severely undermine the energy efficiency potential of smart metering as well as the credibility of the rollout as a whole.

Lastly, given the unique position of small businesses in the energy markets special consideration needs to be given to how best engage with SMEs during the rollout of smart metering.

*February 2013*

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**Written evidence submitted by The Heath Protection Agency**

The Health Protection Agency (HPA) is responsible for advising on the public health aspects of exposure to electromagnetic fields, including the radiofrequency (RF) electromagnetic fields (or radio waves) that are used for smart meter communications. HPA is aware of concerns about exposures to the radio waves from smart meters and has published an information sheet that can be found here:

http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/UnderstandingRadiationTopics/ElectromagneticFields/SmartMeters/

In considering HPA advice on this topic, it is important to understand that the health effects of exposures to radiofrequency electromagnetic fields have been researched and reviewed over several decades. There are very many original studies published in the peer-reviewed scientific literature and also many review papers and reports that seek to draw-out consensus conclusions based on this whole body of evidence. The correct scientific approach to review such a large body of evidence impartially is to identify the weight of evidence towards or against adverse health effects occurring in a given exposure situation. This is the role of expert groups such as the HPA's Advisory Group on Non-ionising Radiation (AGNIR), whose report you mention. A more selective review can pick out studies and reviews that support a particular perspective or interest but are not representative of the weight of evidence as a whole.

Radio communications technologies have developed apace in the past 20 years, although we have all been exposed to radio and TV signals for much longer. Newer sources such as microwave ovens, VDU workstations, mobile phones and their transmitter masts, cordless phones, Wi-Fi equipment, and now smart meters, have all attracted public concern and enquiries about health effects over the years. Research has been undertaken to address these concerns and this is most evident in the case of mobile phones. It is established that exposures

when making calls with mobile phones held to the head are much higher than exposures from other sources, and coordinated international research has been undertaken in recent years to investigate whether health effects can occur. AGNIR reviewed the results of this research, which included studies from the UK undertaken under the auspices of the Mobile Telecommunications and Health Research Programme, in its 2012 report.

It is well-known that health effects (due to heating) can occur at levels of exposure substantially above those to which the public is exposed during their everyday lives, and there are internationally agreed guidelines on limiting exposure that have been developed to prevent these effects. These guidelines are published by the International Commission on Non-ionizing Radiation Protection (ICNIRP), an independent scientific organisation formally recognised by the World Health Organization. The guidelines are used in the UK and many other countries, and they have been incorporated into a European Council Recommendation on limiting public exposures to electromagnetic fields.

The 2012 AGNIR review which you mentioned aimed to answer the question of whether the latest research had found health effects occurring below the ICNIRP guideline exposure levels. AGNIR's main conclusion was that, although a substantial amount of research has been conducted in this area, there is no convincing evidence that radio wave exposures below the ICNIRP guideline levels cause health effects in adults or children.

The 2012 review from AGNIR follows an earlier 2003 review from AGNIR and a 2000 review from the Independent Expert Group on Mobile Phones. Prior to these reports and up to 2005, the former National Radiological Protection Board (now merged into HPA as CRCE) produced several review reports going back at least as far as the early 1990s. References can be supplied to these earlier publications. However, the most important reference for the Inquiry to consider is indeed the 2012 AGNIR review, as here.

http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317133826368

In addition, the Inquiry should consider the HPA response to the AGNIR review, as here.

http://www.hpa.org.uk/Publications/Radiation/HPAResponseStatementsOnRadiationTopics/radresp_AGNIR2012/

The HPA is committed to continuing to monitor the scientific evidence on this subject and will ensure another formal review is undertaken once sufficient new evidence has accumulated. HPA will be conducting independent assessments of exposures from smart meters in the UK as the technology is rolled out, working closely with DECC to identify the relevant technologies. The results will be published.

The HPA is aware of and cognisant of the contents of both the Bioinitiative Reports and of many other reports. The HPA recognises the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the World Health Organization (WHO) as international expert bodies that, together with the independent Advisory Group on Non-ionising Radiation (AGNIR), carry out and publish multidisciplinary scientific reviews. These reviews, together with information from other reports and more generally from the scientific literature, inform HPA's judgement on exposure restrictions and, where appropriate, the possible need for further precaution.

*February 2013*

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**Written evidence submitted by the Energy Services and Technology Association**

ESTA Energy Services and Technology Association

ESTA is the UK Industry Body representing suppliers of products, systems and services for Energy Management. The 120 members include energy consultants, aM&T providers, controls manufacturers through to full Energy Services/Contract Energy Management mainly working in the non-domestic sectors.

ESTA is engaged with UK Government policies on Energy and Climate Change, The Green Deal, Energy Performance of Building Directive, Part L Building Regulations, Display Energy Certificates, Carbon Reduction Commitment, Energy Efficiency Directive and the rollout of smart and advanced meters. It also provides UK input to developing international energy management standards and Chairs several BSI committees.

ESTA members are key to the UK's realisation of a low carbon, secure and affordable energy future. Our members provide equipment, systems and services for energy management to reduce energy demand at source and including renewables.

Our response is a majority consensus of the members involved. Where ESTA members respond directly, they may offer differing opinions on some issues, which we respect as expressing their own definitive view.

ESTA is a founder member of the Energy Management Alliance (EMA) along with the CHPA, ACE and leading ESCO members.

SMART METER ROLL-OUT
COMMONS SELECT COMMITTEE INQUIRY

- ESTA welcomes the opportunity to respond to this inquiry and continues to provide its support and input to government incentives and consultations from a knowledgeable demand side viewpoint.
- Our members are charged with facilitating best practice and innovative design to ensure consumers gain maximum advantage from an open and competitive demand side market and aim for this to continue throughout forthcoming policy decisions.
- For this, we require a fair and operational metering market across domestic and industry, with robust interoperability and equal access to the meter for supply and demand side (consumer appointed), to continue the management of energy through the use of automated Monitoring and Targeting (*aM&T*[1]) systems. These systems which encompass AMR and value added services help consumers manage their utilities producing consumption savings and reducing carbon emissions.
- This aM&T approach to energy management—the close monitoring of utilities and associated action by the consumer, is being continually developed by ESTA Members who are at the forefront of innovation and growth on this sector and used in the non-domestic market for over a decade.
- Further, *sufficient infrastructure needs to be in place to support innovation and drive open competition across suppliers, third parties and new entrants, with both sides working to support genuine demand reduction and response.*
- In this regard, *we require full interoperability of Smart Meters, consumer approved access to their data via the Home Area Network (HAN), a level playing field for 3rd party access to data via the DCC and the ability for non-domestic DCC opt-out to be kept within the scope of the programme.*
- In addition, *we require acknowledgement, acceptance and assurance from Government that ESTA members existing systems, processes and businesses are not unfairly competed against by the introduction of new policy, and that a robust, reliable, secure, stable and enduring system is adopted for the benefit of all stakeholders.*

QUESTIONS

*Are the Government's cost and timescale predictions for roll-out realistic and will it deliver value for money?*

1. Perhaps not. The real benefits of the Smart Meter Implementation Programme (SMIP) for consumers (business and domestic) however, must be realised in the future.

2. Due to access to resource the "big 6" suppliers dominate the programme, which raises concerns for the free and easy access to consumption data for all.

3. This effectively goes against the spirit of the EU Metering Directives, where the benefits are firmly stated to be for the consumers and the environment. We would strongly voice concern that an un-level playing field, hindering the ability to maximise the potential that smart metering can bring is currently being established due to the successful lobbying of the supply industry. And more specifically, the current offering via Smart Meter Equipment Technical Specification version 1 (SMETS1) from a single energy supplier and meter vendor, which has no interoperability or access for data provision.

4. Interoperability, which is key to the success of the programme in terms of its primary objective, is being handled by two closed trade associations, and the implementation dependent on detailed consensus design, the fundamentals of which have still not been agreed.

5. At a time of escalating energy prices and less money in the household, the public need to be convinced that smart metering can deliver real savings. It is our view that this can only be done by citing the equivalent established role advanced metering in the non-domestic sector is having in delivering such savings. The success of aM&T that has been in existence for a long time in the UK deserves government recognition and would provide a good starting point for rebalancing public perception.

6. Overall, however, there is a need for Government to investigate whether the initial basic goals of the programme remain the priority to be achieved in this roll out.

*What are the potential benefits of smart meters for consumers, and what barriers need to be overcome in order for consumers to realise them?*

7. Immediate energy consumption information, which will provide timely and accurate bills removing issues surrounding estimated billing. Domestic customers will still likely to be paying a monthly amount by direct debit but this will be continually tuned on an on-going basis. Domestic customers will therefore not see any change to the way they are billed, just no meter reading visits.

8. Access to the Home Area Network (HAN) and Wide Area Network (WAN), which can be used by 3rd parties to provide innovative energy management products and services, based on read only data, with the prospect of linking usage to time of use (TOU) tariffs.

9. ESTA members are particularly interested in having the opportunity of offering a myriad of services based on their entrepreneurialism and expertise as consumer approved 3rd parties but this requires good and simple consumer controlled access to the smart meter and the HAN. Current SMETS does not provide this and it is imperative that the work being undertaken on SMETS2 revisions accepts this as a primary objective of the HAN for consumer savings and the goal of reducing demand, carbon emissions and adding to security of supply.

10. Easier and better supplier switching and negotiation for supply.

11. From the benefits outlined above access to the HAN by consumer approved 3rd parities needing to use read only data to help in providing benefits to consumers will be hampered by a lack of technical steering at fundamental stages in the programme. The proposal to use Zigbee exclusively without full and open consultation effectively removed potential alternative market solutions at an early stage (eg Wireless Mbus). In addition, the Zigbee SEP profile that DECC propose is still to be completed and developed by the Zigbee Alliance.

*Is there a possibility that suppliers will gain considerably more than consumers from smart meters?*

12. Yes. The current perception is that this is being put in place for Suppliers to have the option for remote disconnect. This is reinforced by the attitude of the programme towards interoperability and local consumer access to information over the HAN which currently only has a 60–70% solution. This perception needs changing.

13. Practically and initially, suppliers will gain more. The quick win is the cost savings from making manual meter reads. Suppliers are the contractual hub for meter services and will be the main customers for the Data Communications Company (DCC).

14. However, revenues from analysis of the consumption data and added value services are more likely to benefit independent companies and consumers. But the only way this can happen will be to either ensure the DCC is governed equally by supply and demand side representatives, or to ensure there is level playing field and a much better and working metering market.

*Is enough being done to ensure that any financial benefits accruing to suppliers will be passed on to consumers?*

15. No. Suppliers are not required to itemise smart metering costs in their bills, so there is no way a consumer can differentiate from an informed position.

*What lessons can be learned from successful smart meter implementation and usage elsewhere in the world?*

16. ESTA members have been offering aM&T for the last 15 years in the non-domestic market. The UK has been a world leader in aM&T and advanced metering systems, yet the knowledge of this sector is vastly under-used or consulted by Government departments on many demand side policies.

17. There are many lessons that the domestic sector can learn from the aM&T being implemented in the non-domestic sector. Perhaps the main one that is still cause for concern is placing the consumer as the owner of his consumption data, such that he is free to choose how that data is used.

18. The distribution business is the metering contractual hub elsewhere. These parties are largely impartial on supply/demand issues over and above network security, which has made decisions and roll-out much easier. However, they are not customer facing.

19. ESTA believe suppliers are equipped to help reduce demand, but they must be incentivised more to do so, perhaps through performance contracts via bench-marking. The provision of a DCC opt-out for non-domestic consumers is essential to ensure these bench-marks are continually improved by non-supply-side parties.

20. ESTA are conscious that opt-out may be side-lined, and suppliers cite "security issues" as an objection to this. Technical challenges must be overcome to ensure opt-out remains. The issue of stranded assets can be overcome by true interoperability and systems and software to enable this can be achieved more quickly and at a lower cost than methods currently proposed.

*Will smart meters empower customers to take greater control of their energy consumption?*

21. Yes. With access to immediate demand information. However, the key will be automating demand control with the consumers consent and allowing 3rd parties to help consumers do so with innovative designs.

22. Such market activity will drive performance bench-marks needed on the supply side. Automated demand side management is the logical conclusion to a national roll out of SMIP. The scale of the "negawatt" capacity depends on adoption of multiple enabling technologies which will need to be funded by consumers, which leads back to the question of engagement.

23. The consumer should rule and be at the heart of the programme. The EU says that the EU Metering Directives are for their benefit.

24. In the UK, the power of the "Big 6" and the influence that big business have been allowed to bear on SMIP thus far is decreasing the consumer voice which needs to be upheld by policy makers in Whitehall and Westminster. Tick box engagement exercises that do not gain consumer and demand side viewpoints for policy programmes will not help the UK in achieving its 2020 and further goals.

25. Civil Servants understand that consumer and demand side representation is under resourced, yet must gain a greater percentage of their budget to encourage this vital information loop to ensure a level playing field is maintained and that programmes aimed at assisting consumers, do assist consumers.

26. The evolving SMETS and project creep would appear to be limiting consumer access and control of meter data. Without this access consumers stand to be even less empowered than they are now.

*Will consumers on pre-pay meters obtain the same benefits from smart meters as other consumers?*

27. Yes, provided that the technical barriers are overcome. However, security requirements are being cited inappropriately for a supplier's own credit security. Credit control is a suppliers problem, just like for any other business. It is wrong for suppliers to rely on the country's resources for secure credit control. They should devise their own security regime in conjunction with their preferred vendors, as they do currently. There are technical solutions in the market-place today that will allow them to do this in an interoperable manner. The security issues are seriously impeding the progress of the programme.

*Should vulnerable customers and the fuel-poor be first in line for smart meters so they can get the benefits sooner?*

28. Smart meters will rely initially on consumer engagement. The best group of consumers to benefit initially will be those that opt for smart meters with a view to becoming greener, saving money, and getting a good (fair) deal from their energy supplier.

29. There are several primary and secondary benefits that smart metering and the comms to dwellings can bring to help protect vulnerable consumers and the fuel-poor and best practice for maximising the benefits from smart meters should be seen as a continual engagement programme across all groups of consumers.

*What is the best way of involving third-party trusted messengers, such as charities, consumer groups, community organisations, local authorities and housing associations in roll-out?*

30. The best way of involving third-party trusted messengers is by allowing knowledgeable, non-supplier related value added utility related service providers to flourish and be the bridge between such organisations and the Suppliers and the Consumers.

31. The expertise and experience of ESTA members can provided such bridge services if the conditions are in place to facilitate this. This starts with good consumer controlled access to the meters and the HAN.

*What are the potential obstacles to rolling out smart meters in the UK and how should these be addressed? What pitfalls have hindered roll-out programmes elsewhere and are we doing all we can to avoid them?*

32. Over-scoped security, lack of robust interoperability plans, over-reliance on the work of the main adopters, and low consumer acceptance—ways of avoiding are mainly dealt in other replies.

33. Over-reliance can be overcome by a better technical understanding by DECC, which we believe DECC have lacked during this programme. Total transparency is required to gain the much needed public trust in this roll-out.

34. On security ESTA see no reason why the supplier should have the privilege of remote disconnect (apart from that associated with prepay). Remote disconnect will serve a network capacity and de-stressing function, and is therefore needed only by the DNOs. Granting it to just the DNOs will increase security substantially—the DNOs are a controlled monopoly set. In addition the DNOs also currently run a similar load-shedding service (Radio Teleswitch for over 30 years), which has never raised the security issues DECC are considering now.

35. Further, the problem of non-supplier related service providers is the same as exists in the I&C market, which is that supplier industry added by the Regulators make it difficult for consumer or consumers agent's to get access to meters by which consumers are charged. Consumers must have control of their data and who can access it.

*Are levels of public awareness of and support for smart meter roll-out increasing?*

36. No. The perception is they are paying for something and the benefits of which are unlikely to be passed on. The engagement campaigns are not being funded by suppliers as currently claimed, they are being funded by increased bills to consumers.

37. Rather than spending millions of public money to tell the public that suppliers are doing the "right thing" for them why not let them negotiate properly for their energy supply?

38. We have seen the supply industry jump on the bandwagon using the expression Smart Meters and claiming to have installed them when many they have installed are largely dumb, interoperable and will not incorporate the ability to easily switch supplier or provide access to the HAN.

39. Unless the public are properly engaged and the benefits outlined from day one with the whole industry on board, the whole public interest in smart metering will wane.

*Is enough being done to increase consumer awareness about smart meters? Could DECC's consumer engagement strategy be improved?*

40. There needs to be a way of giving the consumers (and their advisers) more say in what they can and cannot do with a smart meter.

41. DECC's consumer engagement strategy could be improved by espousing the successes of aM&T in the non-domestic market—perhaps starting with aM&T systems fitted in Government departments. The Government already has the tools to use this information for a positive effect on the programme and will be supported to do so by the service providers within the non-domestic marketplace.

42. For such a large programme inter-department sharing of information is paramount to cover all the bases in this consumption reducing decade.

*Are consumers' concerns about privacy and health being addressed adequately?*

43. Yes. However, conversely, some consumers want their data to be examined by energy suppliers who will give them a better deal.

*Is there any evidence that consumers' concerns about smart meters are declining or growing?*

44. Most consumers that realise they will have a remote switch-off in their smart meter may reject its installation for that reason. The only way round this is to ensure the consumer can switch away his demand (to another supplier) AS EASILY as a supplier can switch off his supply. This needs good interoperability, which currently does not exist, but should be a core component of the SMETS2 revision.

*Will the commercial benefits of smart meter roll-out be captured within the UK?*

45. No the commercial benefits of smart meter roll-out will not be captured unless there are substantial changes to Consumer buy-in. How this can be achieved is discussed in the answers above.

*Will DECC's current approach to roll-out, including on procurement and establishment of the central Data and Communications Company, deliver an optimal data and communications strategy?*

46. No. Only the dominant parties know the details of the specifications, and they will control the prices going forward. To provide optimal strategy a proper IPR access regime must be established (both technology and people) to ensure that non-owners are granted the same access as owners to existing and emerging IPRs.

47. Currently meter vendors are in a stalled position—they cannot sell meters until the interoperability problem has been solved. This makes it difficult for them to provide the combined resource necessary for interoperability. The flowchart included in appendix 1. outlines the current methods proposed, which indicates still many months away from vendors committing to silicon, delaying roll-out substantially.

*What criteria should DECC use to measure the ongoing success of roll-out?*

48. Supplier performance criteria, benchmarking domestic property types against decreased consumption. Similar to that used by the Carbon Trust in the Advanced Metering Trials in 2006.

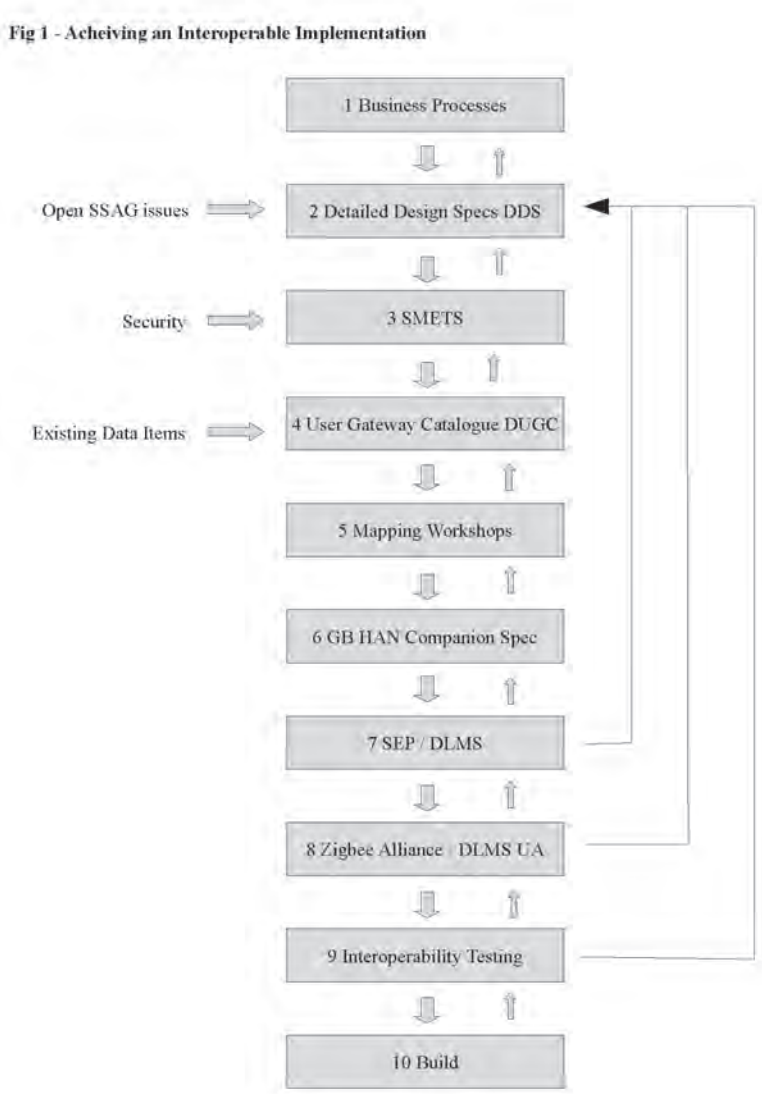
*February 2013*

## Reference

[1] http://www.esta.org.uk/MAIN_MENU/GROUPS/documents/ESTA_aMT.pdf

## APPENDIX 1

**Fig 1 - Acheiving an Interoperable Implementation**



**Supplementary written evidence submitted by the Energy Services and Technology Association**

UK SMART METER VERSIONS—A CLARITY TABLE

| *Item* | *Name* | *Description* | *Installed* |
|---|---|---|---|
| 1 | NSS | Non SMETS Smart. An advanced domestic meter that largely meets governments original objectives for a "smart meter" designed to proprietary specifications and installed by suppliers at consenting customer sites. These meters may need to be replaced and also may not meet supplier obligations for smart meter roll-out. | 600, 000 |
| 2 | SMETS1 | The first version of the Smart Metering Equipment Technical Specifications comprising of a series of Detailed Design Specifications (DDS) for electricity (EM), gas (GM), comms hub (CH) and in-home display (IHD). Written by DECC in consultation with industrial stakeholders. May be installed now to meet supplier obligations. Non-standard communications protocols for Wide Area and Home Area Networks (HAN and WAN) may be proprietary but must be open. Suppliers use their own head-end systems (HES) to read. SMETS1 meters are not technically interoperable but suppliers may make commercial arrangements between themselves to remotely read the main register. May not be installed once SMETS2 meters are available. May be required to be read by DCC once available. | 10, 000 |
| 3 | SMETS2a | The second version of SMETS specifying the final hardware version to enable meter vendors to start designing and building kit. Successfully notified to the EU in April 2013. The underlying protocol is specified for WAN and HAN. These are DLMS and Zigbee respectively. The details of these protocols are still to be completed by meter vendors and suppliers in the Great Britain Companion Specification (GBCS). | 0 |
| 4 | SMETS2b | Fully interoperable meters using completely specified protocol (GBCS) which is scheduled to be complete in April 2014 (Version 1.3). Latest estimate for availability of compliant meters December 2014. Read only through/using the DCC, unless customer opts-out to have the meter read by a third party (non-domestic) | 0 |
| 5 | SMETS3 etc. | Occasionally referred to, but no documentation as yet. Will include items to address 30% HAN non-coverage of above, using sub-GHz radio frequency (RF) and power line carrier (PLC), support for smart grid, demand response, embedded generation, electric vehicles charging, etc. | 0 |

*June 2013*

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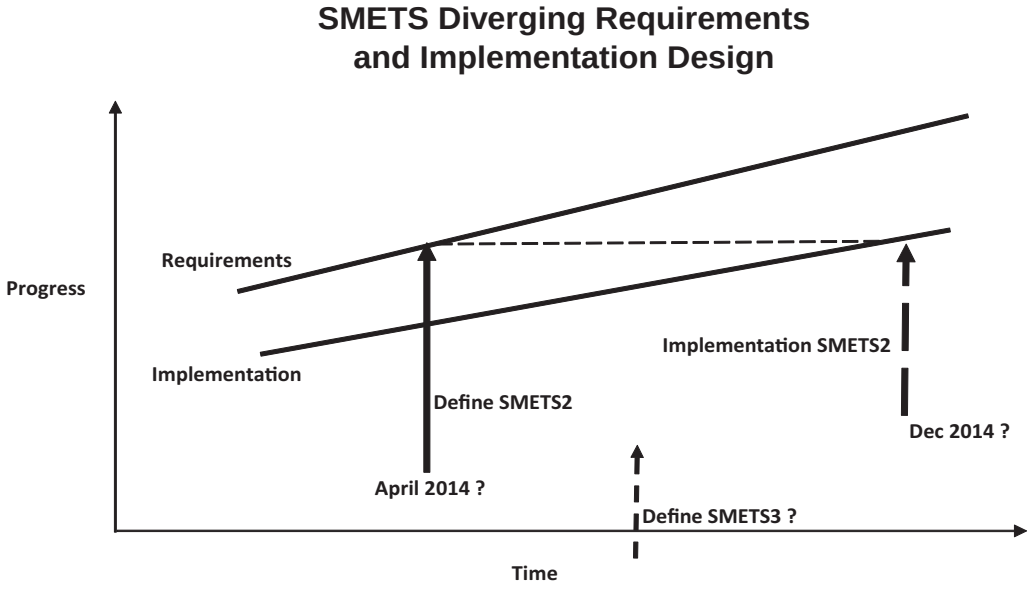
**Supplementary written evidence submitted by the Energy Services and Technology Association**

FINAL DETAILED EVIDENCE FROM ESTA FOR DECC SELECT COMMITTEE, 24 JUNE 2013

| | *Issue* | *Resolve by* |
|---|---|---|
| 1 | Divergence (see fig1). SMIP requirements are emerging faster than implementation is progressing implying we will never have a solution | Mandate use of generic protocols in DCC that are not application specific and do not need to be fixed against a time-line |
| 2 | Technical robustness—Program has relied on expertise from trade associations and IT (not meter) consultants without accountability for delivery. Little confidence on technical capability | Require vendors to prove capability and interoperability before DCC award |
| 3 | Exclusivity of access to Big 6 and their supply chain. Customer access only through what is granted in this chain. | Mandate proper accessible standards for meter communications |
| 4 | Onerous security requirements, impeding 1 and 2 and upholding 3 | Remove supplier remote disconnect, and restrict this to DNO only |

| | *Issue* | *Resolve by* |
|---|---|---|
| 5 | Displacement of many large existing systems and processes (eg ECOS, SCOGES, DTN, Elexon, ASPCop) without full consideration of implications | Review SMETS against existing systems, and assess why they are being replaced |
| 6 | Maximum coverage 70% of sites. No solution for remainder. | Determine a complete solution that can be mandated in SMETS before DCC award |
| 7 | Little control of existing Intellectual Property Rights of developed material and access to it outside contracted consultants—potential DCC procurement flaw | Require DCC bidders to outline what and how much they are relying on the knowledge of existing consultants/contractors moving over from DECC |
| 8 | Extremely low consumer engagement with a Program of this size—critical dependency for success | DECC (not supplier) funded awareness campaign that outlines burdens as well as benefits and how a good working metering market will ensure customer gets a good deal |
| 9 | Build-up of stranded assets of non-interoperable meters permitted to allow roll-out to start | Do not permit further non-interoperable meters to be installed, delay award of DCC until interoperable meters are available, or allow any meter that meets the minimum SMETS1 interoperable standard to count towards supplier obligations |
| 10 | Concern that SMIP will not deliver savings envisaged | Engage more environment and sustainability groups in developing further SMETS specifications |

**Fig 1**




1. Divergence

See Fig 1. The flaw in current implementation design is the need to fix the specification at a point in order for detailed development to take place. For the foreseeable future, requirements for the SMIP are emerging faster than the GB Companion Specification (GBCS) can keep up. This implies that we will never have an interoperable solution using current methods. The GBCS must be complete to the fixed point in absolute detail before implementation can be made. This involves detailed analysis, discussion and agreement between competing parties, requiring the sharing of intricate design information of their individual products. ESTA made notes on issues from two recent SDAG meetings (firmware upload and prepayment) which were circulated to the members present and any comments taken in. The notes highlighted 20 red issues on which the GBCS is dependent. The original target completion date for the GBCS was April 2013. This was then moved to December 2013 and currently stands at April 2014. How confident are we the the time-line will not slip again?

DECC must take a firmer approach with vendors who want to have "control" of the application layer of the design. Both Zigbee and DLMS associations demand this "control", unnecessarily because both support generic protocols (Zigbee PRO and DLMS/FLAG). The GBCS can be (and generally is) implemented through these generic protocols. This approach must be mandated, rather than specifying application data in detail. The latter can be achieved through bilateral dialogue between vendor and customer (energy supplier); the benefit of this approach is that the lack of completeness in the GBCS does not prevent the roll-out of DCC and Comms Hubs

(CH). The CH can transmit generic messages between HAN and WAN without them needing to be defined completely. This definition can be achieved in the Head End System (HES), In Home Display (IHD) and Consumer Access Device (CAD) through the use of vendor specific "drivers", similarly to the way a new "gadget" is connected to a PC. This will be a much more robust method than using complete firmware upgrades.

2. Technical Robustness

ESTA attended the first two Industry Day seminars run by DECC, where DCC (CSP and DSP) bidders were invited to present their proposed solutions. Members for current large scale data retrieval companies (Technolog and Siemens) attended and asked challenging questions about the technical implementation. Whilst bidders were strong on general communications and database systems there was an obvious lack of expertise in detailed meter protocol support. This aspect is essential in the SMIP because both the CH and HES depend on it. An added complication is because CH and HES are supported separately (by CSP and DSP) there will need to be arbitration between each technical solution, falling to the overall DCC bidders. Neither DCC bidder was able to demonstrate the technical expertise to perform this function. Whilst ESTA accept that technical expertise can be brought in at a later date, there are technical impositions here which will shortly become irreversibly fixed, outside the control of any bidder. ESTA has offered expertise to assist in reducing this risk, but were not invited to the third Industry Day in May. We have not yet been advised by DECC why we were not invited.

3. Exclusivity

The HAN and WAN are, and are likely to remain under the exclusive control of the Big 6 Energy Suppliers. ESTA are the only representing body on SDAG, HAG and CWG that represent the demand side. It addition ESTA have restricted access to many of these groups, in particular GBCS meetings. Note recent lobbying has resulted in some of the restrictions being lifted, but ESTA are still only an "observing" member despite providing valuable input to the design process. Whilst we appreciate the difficulty in getting coherent consumer representation, it is essential that the demand side position is taken in because this is what will be needed to engage the consumer. If exclusivity is upheld the consumer will simply not allow the SM to be installed (an option he now has). Furthermore if the consumer is forced to pay a premium if he does not have a smart meter, then surely he must be given a choice of what type of smart meter he can have (see 5 Displacement).

4. Onerous Security

The functions specified in SMETS have initiated concerns over security and the need for the implementation to be one of critical national infrastructure. However this is only the case if the supplier continues to retain the right to remotely disconnect using the current implementation model. The need for such security has impacted the Program significantly, and we are still uncertain about the effect on the details of the design in many areas. ESTA urge DECC to review whether this privilege is necessary for suppliers. They already have the facility to switch to prepayment mode. The only need for remote disconnect is to de-stress the network, and this is therefore a function only of the DNO. In addition it emerged recently that the meter is not a fiscal instrument, and double accounting will be performed (as at present). This negates need for such security for protection of financial information since they are for consumer indication only.

In current metering systems, where tariffs and configurations are programmed into meters, a PIN Sentry type of algorithm with "write-only" key is used, similar to that used on Internet banking. ESTA would ask DECC to review this method against the table below, using a number of use case scenarios, to take a pragmatic view of cost against risk, perhaps phasing in Method 3 gradually. ESTA would not recommend Methods 4 or 5.

DECC must take a firmer approach with suppliers on whether they should have the privilege of remote disconnect.

| *Method* | *Access to Remote Switch* | *Potential Breach and Remedy* |
|---|---|---|
| 1 | SM includes remote switch but is not enabled. | None |
| 2 | Remote switch is enabled, but access code and security algorithm for each version is not passed outside meter vendor | Infiltration of access code and security to individual meter type from meter vendor. Security breach entirely with vendor. Identify breach and recall/replace meters affected |
| 3 | Individual meter vendors provide security access to activate remote switch for each meter version to each distribution business where such meters are installed | If infiltration is restricted to a single distribution area, then security breach is with that distribution company. If the infiltration is across multiple DNOs then breach is as 2 |
| 4 | Same as 3, except information is provided to supplier rather than distributor | Review history of suppliers to meters with breach. If a single common supplier is identified then breach is with supplier. If a single common meter type is identified then breach is with vendor. |
| 5 | Single universal highly secure method. Access to DCC, DNO and suppliers | Difficulty identifying who is in breach. Complete replacement required |

There is an additional complication mentioned at the recent prepayment meeting where the remote disconnect could be used by suppliers to "simulate" prepayment functions in SMETS1. Apart from the major implications this would have on the Program it would be unreasonable for the consumer, and he would be unlikely to accept it. Being switched off, without the possibility to switch to another supplier (in the case perhaps of a dispute) is a predicament DECC would not wish to impose on the consumer.

### 5. Displacement

ESTA are concerned that the SMIP will displace many metering systems already installed for the consumer to help reduce demand. Customers have paid for these metering systems, and ESTA members revenue depend on their continued operation. Whilst DECC assure ESTA that opt-out will be available to I&C consumers, there is significant risk of creep of the DCC, especially when its costs can be hidden inside an energy suppliers bill. It is likely too that the meter provided under the SMIP will have less specialised functionality than has been installed by the ESTA member.

There is also a general concern that existing systems are being overlooked. Some of these systems have been in place for 15 years, and have taken time to settle in. Replacing them with "green-field" designs exposes us to risk of repeating processes and making the same mistakes a second time. Such exposure is difficult to quantify but is likely to be significant. Such systems include The Data Transfer Network (DTN), ECOS for electricity meter details, SCOGES the equivalent in gas, the MRA (Master Registration Authority), Elexon for electricity balancing and settlement, the Quantum system for prepayment, CHIRPS for interoperability, and the ASPCop (AMR Service Provider Code of Practise). The latter is extremely important because it allows the consumer to nominate a smart meter provider, the readings from which the supplier is required to accept. This empowering of the consumer is essential for engagement and must be upheld.

### 6. Lack of Coverage

The SMIP currently mandates Zigbee at 2.4 GHz as the frequency for the HAN. However, tests that ESTA and other industrial stakeholders participated in showed that this will only properly address 70% of properties n the UK. Whilst there is provision in the SMETS2a specification for 868MHz where coverage will be vastly improved, we do not have certainty that the full GBCS can be implemented at 868 because of lower bandwidth. Going ahead at 2.4GHz which DECC propose will preclude consumers from these benefits if they cannot be implemented.

The use of wired connections (power line carrier, PLC) is precluded in SMETS2 because there is no mandated provision for the connections necessary. Vendors are merely "strongly advised" to include them.

Such decisions have made it difficult to generate sufficient interest from RF and PLC vendors to commit to developing product. Only recently has the Zigbee Market Requirement Document (MRD) for 868 been raised, and we are due a PLC industry day in September, where vendors will be showing their wares. However this does not give us assurance of completeness since the DCC contract is scheduled to be awarded before this.

The use of Zigbee at 2.4GHZ in SMETS2a was successfully notified to the EU on the 24th January. However the SDAG had already raised many issues on this over the Christmas period, and the SDAG meeting on 24th January was ear-marked to debate and resolve the outstanding issues before notification. However the SDAG members received this notification in their inboxes during the meeting (email Niccola Hobbs, DECC, 13:39 24/1/13). Whilst we understand DECC were under pressure to meet notification time scales, we do not believe due process was undertaken in this instance. ESTA decided not to object to the notification in the spirit of good relations and UK credibility, however it is important for DECC to accept that the proposal to use Zigbee at 2.4GHz was not fully endorsed by the stakeholders that they were consulting.

### 7. Access to IPRs

There are considerable Intellectual Property Rights (IPRs) that have built up over the two years Program development and whilst DECC assure us that contracted individuals pass all material that arises back to DECC, there will be IPRs that emerge that are less accessible, particularly when a larger group of individuals work for the same contracting organisation. There is a danger that there may be polarisation, especially if those organisations are already engaged with stakeholders in the Program. Attached to this evidence is the result of several freedom of information requests made to DECC, demonstrating the difficulty we have had in getting the information on contractors and the Company they work for. The head of end-to-end at DECC, who we originally thought was a civil servant is a contractor, and despite raising queries, we do not yet know who he works for, or who he reports to at DECC. A number of junior DECC staff were also under the misapprehension that the end-to-end design was being led by a civil servant.. This is a highly influential position and will define how the technology will emerge going forward, including participating parties and their costs. It must be impartial between supply and demand.

It is important that we know how many contractors plan to move over to the winning DCC bidder, and how much the procurement process depends on this. If it is too dependent, then it will be flawed, and we are in danger of spending public money on IPRs that we will never have access to.

## 8. Consumer Engagement

The Central Delivery Body (CDB), since it is paid for by all large suppliers is effectively being paid for by customers. This raises the question of why such expenditure is necessary. Granted, the trust element must be improved, but this is surely achieved by ensuring we have a good working meter market in which the consumer can operate. If, on initial installation, he doesn't like metering offered by one supplier, he should be able to move to another, or a third party and be confident that the meter can be supported by a new supplier if it so wishes. This allows him to put pressure on the suppliers to innovate. It does not negate the universal SMETS specifications as the ideal; however ESTA believe derogation will be required as vendors start to deliver meters to their energy supplier customers. In addition, suppliers will wish to add value to their offering through unique metering features that others are not providing. The system must support this natural innovation process, allowing suppliers the option to take on new features inherited on CoS if they so wish. The current GBCS implementation approach will not allow them to do this—it forces a universal roll-out, which is proving impossible to achieve.

ESTA plan to be involved with the Smart Energy Code (SEC) and if possible to accede to the panel. DECC have provided cost figures for the daily collection of half-hourly data which are far less than those ESTA members can currently achieve. It means that we can provide Energy Automatic Monitoring and Targeting Systems (AM&T) to a much wider audience (lower consumption thresholds), and it may even be that this model drives adoption of half-hourly settlements in the domestic sector. This is something the economists have wanted for some time, but it has been resisted by suppliers because of the systems they would need to process it. We hope that DECC will continue to encourage this initiative from ESTA.

## 9. Stranded Assets

DECC have a duty to ensure that meters installed under the smart metering initiative do not need to be removed before the end of their life. Interoperability is essential to facilitate this. Further work must be done to identify how the 600,000 non-SMETS and SMETS1 meters can remain on the wall and continue to operate on CoS. Vendors of these meters must be invited to offer their protocols and other details to the industry so that solutions can be best explored. Criteria for roll-out obligations must be reviewed. If DECC envisage only a single register read will be achieved interoperably before SMETS2, then it must allow all meters that provide this, and meet European technical metering requirements (MID) to count against roll-out. Alternatively DECC must not allow further meters that are not fully interoperable to be installed before DCC is ready to receive them. In this case, the risk of advanced adoption must clearly remain with those taking the risk, and customers switching supplier should not have to pay for a meter a second time. The payment should come solely from the supplier that took the risk. The alternatives are clear. Either the advanced adopters make provision for their technology to be accessible outside their supply chain, or they pay for the consequences of their equipment not being compatible. The charges must be transparent to the consumer so that he knows the cost implications of meter replacement against what he was originally offered (n.b. It may have been a "free" offer of course).

Another alternative would be to insist that the DCC makes arrangements to adopt these assets (ie operates the necessary head-ends and comms). ESTA originally understood this to be mandatory, but believe this requirement has now been relapsed. This will avoid SMETS2 meters bulldozing out existing advanced meters in PC3&4 to the detriment of ESTA members existing working products and service.

## 10. Environment and Sustainability

It is noticeable that environmental and sustainability groups have been absent from the SMETS development process so far. If a good working meter market can be achieved, then this is not a critical factor because influence from these groups will be included through natural market forces. However in the meantime ESTA do recommend closer engagement with such parties, and appreciate the time DECC have provided in ESTA face-to-case meetings over the last year.

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