

HOUSE OF COMMONS
ORAL EVIDENCE
TAKEN BEFORE THE
ENERGY AND CLIMATE CHANGE COMMITTEE

SMART METER ROLL-OUT

TUESDAY 23 APRIL 2013

MIKE MITCHAM, DR LIZ EVANS, DR JILL MEARA and DR JOHN SWANSON

AUDREY GALLACHER and ALLEN CREEDY

SEAN WEIR, TONY TAYLOR and HANS KRISTIANSEN

Evidence heard in Public

Questions 1 - 107

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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

Barry Gardiner

Ian Lavery

Albert Owen

Sir Robert Smith

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 responsibilities 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 radio waves, 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 smart meter programming.

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 would 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 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 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 Public Utility Commission'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 CPUC 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 had 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 dasymetry, 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. 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 where the smart meter might be located in the neighbour's house. 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 radio waves 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 flesh of the 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 radiofrequency radio waves 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 is 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, and vice versa. So that environmental health criteria process 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 radio waves 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 not.

Mike Mitcham: Unfortunately what we are seeing is a 50% increase in brain tumours with children 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 reality.

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.

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 increase 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 that there was a more co-ordinated approach we could see savings of about £10 per installation, 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. The few that do 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 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 has been 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 they can be used. 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 updated. 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 it 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, 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 your 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% or 15% 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 going to be 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, 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 is 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 CO₂. 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 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; 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 upgrade 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 CO₂ 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.