



Energy and Climate Change Committee

Oral evidence: [Heat](#), HC 743

Tuesday 17 December 2013

Ordered by the House of Commons to be published on 17 December 2013.

Written evidence from witnesses:

– [DECC](#)

[Watch the meeting](#)

Members present: Mr Tim Yeo (Chair); Ian Lavery; Mr Peter Lilley; Albert Owen; John Robertson; Sir Robert Smith; Graham Stringer; Dr Alan Whitehead

Questions 150–286

Witnesses: **Rt Hon Gregory Barker MP**, Minister of State, Department of Energy and Climate Change, **Stephen Martin**, Director of Heat and Industry, DECC, and **David Wagstaff**, Head of Heat Strategy and Policy, DECC, gave evidence.

Q150 Chair: Good morning, Minister, and sorry to keep you waiting. Welcome back—it is nice to see you again so soon after your previous appearance.

One of the striking things about your Department’s 2050 calculator is that, among other things, it shows that if we all turned our thermostats down to the temperatures we had as recently as 1990—I understand there was an average of 16° C—that, by itself, would produce a very substantial reduction in emissions, and also of course lead to a reduction in energy bills for the consumers doing so. Are you doing anything to encourage people to go back to 1990 average temperatures in their homes?

Gregory Barker: No. I entirely take the point, but it is the view of the Department that we have to go with the grain of living in the 21st century, and although we would certainly think it is a good idea that people think carefully about where they set their thermostat, we are not trying to encourage them down to 16° C. We are trying to encourage them to be much more heat aware and much more thoughtful about how they heat their home and, most importantly, how they insulate their home, and about the very substantial savings there are to be had from comprehensive insulation and energy saving.

Q151 Chair: We have some evidence that although low-carbon heating systems work well in practice, a lot of consumers are used to switching something on and expecting it to get warm straight away. Is there anything that the Department can do to overcome the poor practice that some consumers follow?

Gregory Barker: Well, it is a lifestyle change that takes a bit of getting used to. I think you are probably talking about heat pumps in particular. Obviously they require a different type of use from when you have a combi boiler that you can rustle up at a moment's notice. But, increasingly, the evidence is that people do get used to them. There was some disconcerting Energy Saving Trust research a couple of years back, but since then we have had a larger roll-out of ground source heat pumps in particular, supported by our precursor to the domestic RHI, the Renewable Heat Premium Payment programme. The feedback we have had, primarily from social housing that has installed these systems at scale, is, broadly speaking, very positive.

Perhaps, Mr Yeo, I may ask my team to introduce themselves?

Stephen Martin: I am Stephen Martin. I am director of heat and industry in DECC.

David Wagstaff: I am David Wagstaff. I work for Stephen and I am the head of heat strategy and policy.

Chair: Welcome both of you.

Gregory Barker: David, did you want to add anything about the experience of RHPP?

David Wagstaff: There are two things that definitely do work to help people to get the best out of their low-carbon heating systems. One is to educate the installers, because all the evidence is that installers are incredibly important, not only in putting in the system, but in explaining how to use it. We have put some money into apprenticeships and training so that installers who are currently expert only in gas appliances will also be able to install low-carbon heating appliances. We have had very good take-up of that in the couple of months since it has been up and running, and that is being timed specifically to go with the launch of the domestic RHI.

The other thing is the Microgeneration Certification Scheme standards, which we have improved as a result of the field trials to which the Minister referred. So we are making sure that the technical expertise is there and that customers are given all the information they need on how to use them properly.

Q152 Chair: On the equally important question of larger and commercial buildings, are you taking specific steps to try to ensure that the right decisions are made in the commercial sector?

Gregory Barker: When you say the right decisions, what do you mean?

Chair: Well, helping people to use their heat systems in the most efficient way and to take advantage of any features.

Gregory Barker: In the two years in which the RHI for non-domestic users has been up and running—this is primarily large industrial and commercial customers—just over 2,500 quite substantial appliances have been installed. Again, by and large, the feedback has been broadly positive. We now need to drive the take-up of these novel technologies more ambitiously.

Stephen, do you want to say anything specific about the experience of the first wave of pioneers?

Stephen Martin: In terms of the non-domestic RHI, there are now about 2,700 participants accredited into the scheme, so we have seen steady progress during the first couple of years. As the Committee will be aware, we announced some major improvements to the non-domestic scheme in the week before last, which will increase the subsidy levels available to some technologies that have been deploying at a low level and also widen the range of eligible technologies within the scheme.

Gregory Barker: Do you want to say something about the actual experience? I think that was the main thrust of the question.

Stephen Martin: In general, the feedback that we have from participants is positive, but we are still at a stage in the RHI evaluation where we are putting in place the formal framework for the scheme. We will get a much better understanding of non-domestic users' experiences starting from next year. We have more recent data on customer experience from the domestic side from our experience of running Renewable Heat Premium Payments.

There a couple of other things I was going to mention in terms of the question about behaviour change and effective energy use in the commercial sector. Clearly, the non-domestic RHI is a key policy that we have in that area but, again, the Committee will also be aware, for example, that we have the CRC energy efficiency scheme, which incentivises the more effective use of electricity and gas, which will include gas for heating in many cases. We also will be bringing in the Energy Savings Opportunity Scheme, which will introduce energy audits for large organisations as well, so clearly we have a range of policies that encourage and incentivise organisations to think harder about their energy use.

Q153 Chair: Two of our witnesses suggested that it would be good to focus on what has actually happened—on outcomes or people's experience. Is that something that the Department feels would be helpful?

Gregory Barker: Certainly very much so, given that these are novel technologies—well, some of them are not novel, because they have been around for many years, but they are new at scale, in terms of their deployment in the UK, while others are more novel. Yes, real-life experience is invaluable, and the Committee's views on that would certainly be extremely helpful.

Q154 Chair: Do you think that there would be value in getting energy performance certificates on a wider basis than just when a house is built or it changes ownership, because obviously there are a large number of houses on which we do not have the information? Is that something that would be useful, and should there be a target for trying to get all houses measured with an energy performance certificate by a certain date?

Gregory Barker: If we have more information on the energy efficiency of the built environment—where we know the size of the task, and whether it is domestic, industrial or commercial—and higher-quality analysis, that would definitely be helpful, but we are also mindful of the regulatory burden that that could place on consumers and businesses. Would we welcome better, more up-to-date and higher-quality information, and would that help to inform policy making? Yes, of course, so this is something that we look at.

Q155 Sir Robert Smith: I remind the Committee of my entries in the Register of Members' Financial Interests—in particular, in the oil and gas industry through a shareholding in Shell, and also, for this inquiry, through rent from property.

In response to the Committee's report on the Green Deal, the Government promised to use data from the national energy efficiency database to monitor actual carbon savings resulting from the Green Deal and ECO. How will DECC monitor changes and will it produce annual figures for any savings?

Gregory Barker: Sorry, was that how long will we monitor the changes for?

Sir Robert Smith: Yes. How long will you monitor the impact of the Green Deal changes?

Gregory Barker: I do not think that we have any plans to stop. So far as I am concerned, and unless I am corrected by my officials, we need to collate the data on an ongoing basis to be clear whether we are succeeding or not with the policy outcome. We will continue to iterate the Green Deal policy as we roll it out.

Q156 Sir Robert Smith: On statistics, Liz Lainé of Consumer Futures suggested that the Government should start collecting figures on the measures that people are installing on the back of Green Deal advice, but without using Green Deal finance. Do you have any plans to get into that?

Gregory Barker: This is something that we are looking at. It is a bit tricky, because obviously the focus of the regular statistical releases is on the number of finance plans that have been lodged, which is still relatively low. However, just looking at finance packages alone gives a very disproportionate view of the success of the Green Deal. We now have had more than 120,000 assessments and our latest polling evidence shows that more than 80% of the people and households that have had a Green Deal assessment have been moved to install measures already, are taking steps to install measures, or are looking to install measures. The figure of 80% is pretty impressive. What we do know, however, is that the first wave of 120,000—the early adopters; the more enthusiastic; the pioneers—are, perhaps unsurprisingly, more pre-disposed to

see the value in what they are installing. Also, I think people underestimate just how personal and compelling a Green Deal assessment is. This is not something that plops through the letterbox; you actually sit down and discuss it at your kitchen table with a professional installer who runs through a checklist. People have a bespoke, personal explanation and can ask questions. That means that people are installing these measures.

The problem that we have, which your other witness raised, is that if people say, “Actually, I do not want to share the savings with a finance company. I do not want to wait until I have paid off the loan to get the full benefit. I want to do all these things now,” they are not obliged to register them in the same way as if a finance plan is lodged with the Green Deal finance company. They are not even obliged to install Green Deal measures with a Green Deal installer—they could use their own tradesmen. Anecdotal evidence suggests that the Green Deal market that we have created—starting with the assessment, and then the approved kitemarked installers and products as recommended in the assessment—is a very useful tool, and overwhelmingly that is what consumers are going for. We do not have the means of capturing it at the moment, but that is something that the Department is very mindful of, and we are looking at it. I do not have any proposals to share with you today, because we are not that far down the road, but it would definitely be better if we could understand what had motivated consumers to install as a result of having the Green Deal assessment.

Q157 Sir Robert Smith: You mentioned you would use some polling evidence.

Gregory Barker: Yes.

Sir Robert Smith: So that is taking a sample and following them.

Gregory Barker: That is a sample, but it is not a comprehensive dataset.

Q158 Sir Robert Smith: One of the other concerns raised by BEAMA was that while you can go to all the trouble of insulating a property, there still do not necessarily have to be heating controls in the property under the Green Deal. Is that an accurate representation of how it works? It seems a pity to go to all the trouble of reducing the carbon emissions of a property and then not to put proper controls on the heating.

Gregory Barker: It is important to understand what the Green Deal is: it is basically a market framework. We are creating a private sector-led market in energy efficiency. We can make recommendations on what people put in their homes, but it is not obligatory.

Q159 Sir Robert Smith: Does the assessment always steer people towards things such as thermostats in rooms, radiator valves and so on?

Gregory Barker: Heating controls are a very important measure. The great thing is that there have been significant step changes in heating control technology, which in the past has not been at all user-friendly. I have seen heating controls for which you need fingers the size of a three-year-old's to push the little plastic bits in, but you have to have the intelligence of someone with an aerodynamics PhD to work out what the control setting is. There are new products coming to the market, not least driven by the creation of that market by the Green Deal, that are a lot more user-friendly. This works well, and it also works well with the roll-out of smart meters. It is going to be consumer-led, rather than Government-led, but certainly every Green Deal assessment runs through a checklist of, I think, 46 measures that are eligible for Green Deal. I expect that list to grow when we publish the next approved list of measures. Certainly heating controls are right up there in terms of the most important measures you can install, if you do not already have good heating controls in place.

David Wagstaff: May I say something about the way in which these things are scored? Underlying energy performance certificates and underlying the Green Deal assessment is the Standard Assessment Procedure, which allocates points across the way the whole heating system operates. In order to score the maximum efficiency of your heating system, it would need to have thermostatic controls on the radiators and a controller at the centre. In effect, what happens is it scores for a system that is controlled, and if you do not have all those controls, you lose points.

Q160 Sir Robert Smith: Do Green Deal assessors have an understanding of the RHI, so that there is harmony between the two schemes?

Gregory Barker: We hope so, because the Green Deal assessment includes recommendations for both microgeneration and renewable heating systems, so although currently the golden rule of the Green Deal is that the finance can support only absolute energy efficiency savings, rather than taking into account the income that is generated from either a feed-in tariff or, in due course, an RHI payment, they are part of the assessment.

People are often very interested in microgeneration or, increasingly, renewable heat installations. That is often the thing that first triggers their interest. We have seen that with the phenomenal proliferation of solar panels. There are now about 1.2 million people who have solar panels on their roofs at home. There have been just over half a million installations over the last three years. It is a very popular technology. The prices have come down substantially. Three years ago, a typical set of solar panels for a 4 kW system typically cost more than £15,000; you can now get them in some cases for under £5,000. So not only has the cost to the consumer of supporting these technologies come down, but it's a lot more democratic because, for a lot of families, finding the finance to put £5,000 into a system is a lot easier than finding £15,000.

Stephen Martin: I might just add that as well as Green Deal assessors responding to the opportunity of the domestic RHI in the way the Minister has described, we expect that some renewable heat installers will become Green Deal assessors as a result of the introduction of the domestic RHI, so that they can offer the whole package, the end-to-end package. Certainly, anecdotal feedback that we have

had from the industry, which clearly is gearing up now for the introduction of the domestic RHI, suggests that that is what they are thinking about.

Gregory Barker: We deliberately improved the—when I reformed the feed-in tariff system to bring down the subsidy, I also put in place an energy efficiency requirement, because it obviously makes no sense to subsidise people to produce renewable electricity or heat in an inefficient home.

Q161 Sir Robert Smith: What fiscal measures do the Government have, and are they considering, to encourage energy efficiency in the home?

Gregory Barker: The most recent measures are those announced as part of the autumn statement package. The Chancellor has allowed us further measures, which will allow us to put in place a stamp duty rebate of more than £1,000, which will apply to people who are moving house. That is particularly pertinent because we know that when people move, it's the time when they are most likely to consider many of the larger measures, because that is when they will be decorating—they might be taking up carpets and moving furniture; they might be doing all sorts of things—so there is a degree of disruption anyway.

Q162 Sir Robert Smith: Is that stamp duty rebate on an energy efficiency achievement, or does it require you to do a Green Deal?

Gregory Barker: We haven't yet announced the details. We are working on those in the Department, but we hope to have it in place by the spring. Then there are a number of other things. For example, in the same package, we announced a quadrupling of our Green Deal communities scheme, which is supporting local authorities with cash to fund a roll-out of street-by-street installations. We know that the most effective way of delivering energy efficiency and of creating interest in and enthusiasm for the larger, whole-house makeovers is by doing it on a street-by-street, community basis, so we are now putting £80 million into funding those programmes.

Q163 Sir Robert Smith: Is there any incentive for landlords?

Gregory Barker: Yes. We also announced that the private rented sector will—we have overcome the teething problems that there were with initial Green Deal finance; they are now sorted. There was a degree of equivocation over where the liability lay as a result of the drafting of the legislation. While Government counsel was pretty clear that it was clear, there were some others who differed, and as it is they who are putting it into place, their opinion obviously counts; but that has been sorted now.

Then there is regulation of the private rented sector, which means that by 2016 no landlord will be able reasonably to refuse a Green Deal-financed energy efficiency upgrade, and by 2018 there will be a hard requirement for them to improve the energy efficiency of their homes.

Q164 Sir Robert Smith: Finally, what more do you think can be done to get solid wall insulation in? Certainly in my constituency a lot of people live in stone-built houses, which are off the gas grid, so they have a double incentive to try to do something, but the costs and the disruption of solid-wall insulation are still a real challenge.

Gregory Barker: Well, I think the honest answer is we have a big challenge on solid wall. We have to drive down the cost. If we are going to roll out solid wall at scale, which we need to, we have got to work with the industry to deliver it much more cost-effectively. It is still pretty expensive to install solid wall on a typical property, which is why most solid wall will require some form of subsidy, usually from the ECO scheme. So we have got to work on driving down the cost. As the market scales up, we think there are opportunities for industry to bring their prices down.

The other thing we have to do is improve the quality of solid-wall products. It is good to see that there have been some very exciting innovations in the way that solid wall is delivered now, for both internal and external applications. The days when solid-wall insulation basically used to mean smothering any form of character or differentiation on a property, so it just looked like a sort of Lego house, are gone. You can actually get some very attractive products that look like brick, or respect local vernacular.

Likewise, internal solid-wall insulation, which can be sometimes more problematic because of the disruption it causes to the home, or the loss of space in the room, is getting much thinner, and easier and less disruptive to install; but there is still progress that we need to make, to make it more attractive to consumers to install this, because as you rightly identify there is a high number of properties where really only solid-wall insulation is going to make a big difference to their energy consumption.

Q165 John Robertson: Minister, I have to say I have quite a number of solid-wall insulations in Glasgow; they are usually multi-storey buildings, and they are a real problem.

Moving on to building regulations, according to our witnesses, the Government has pulled back from zero-carbon homes. Kelly Butler from BEAMA told us, “We are very concerned that we have a department, DECC, over here pushing renewable heat and we have CLG systematically taking that apart.” How can you work more closely with Communities and Local Government so we do not seem to have this sort of conflict?

Gregory Barker: First, Mr Robertson, we have not abandoned zero-carbon homes. There may have been some degree of fine tuning, but we definitely have not abandoned zero-carbon homes. We are absolutely committed to that from 2016.

The position for new homes was reinforced in 2013, alongside a commitment to consult on proposals for zero-carbon allowable solutions. There is also a commitment to implement the requirement in the energy performance of buildings directive for near zero-energy buildings by 2020. We are working closely together with DCLG on the requirements of the building regulations under part L, on energy.

Q166 John Robertson: Will DECC be pushing for regulations guaranteeing better heating controls, including TRVs?

Gregory Barker: I would have to get back to you on that. We typically do not like to push for more regulation where there are other solutions. Innovation and incentive tends to be our preferred model, rather than yet another regulation, although smart, long-dated regulations do have a clear role to play, in particular if they drive innovation. I will look more carefully at the point you raise, Mr Robertson, but it is not one that I am aware of.

Q167 John Robertson: To go off at a tangent, what discussions have you had with the Scottish Government on your projects?

Gregory Barker: I actually have discussions with the Secretary of State, I think, this evening.

Q168 John Robertson: And will you be discussing everything?

Gregory Barker: Not everything. I believe that we have an agenda to talk about energy efficiency, solid wall and the roll-out of energy efficiency projects for rural areas in particular.

Q169 John Robertson: On the specifics of the Green Deal, will people in Scotland have the exact same rights and deals as people south of the border?

Gregory Barker: In terms of access to the Green Deal Finance Company, yes, that is true. Obviously, there is a degree of discretion. If people want to sweeten the pill with additional incentives, either a local authority or the Scottish Government could layer on such incentives, but they basically have the same access to the Green Deal Finance Company.

Q170 John Robertson: Could you keep us informed of the deals you make with devolved areas?

Gregory Barker: Yes, I am very happy to.

Q171 John Robertson: While what we do is generally for the Government as a whole, it does mainly involve England, and where rules in England and Wales, in Scotland and in Northern Ireland are different, it would be interesting—

Gregory Barker: Perhaps I could write to the Committee with a summary of the different programmes in the United Kingdom.

Q172 John Robertson: That would be helpful.

Moving on, you mentioned part L regarding the heating requirements and the technologies that are included in it. Was DECC disappointed by what was put forward?

Gregory Barker: Well, I don't think that I was particularly disappointed. I do not know whether either of my colleagues would like to shed some light on discussions at official level.

David Wagstaff: I have probably taken part in most of the discussions, because I joined the 2016 taskforce that is chaired by DCLG Ministers and I take part in the discussions. We all recognise—it is not only DCLG and DECC, but the Department for Business, Innovation and Skills and Her Majesty's Treasury—the balance that has to be struck, to which the Minister has already referred, between trying to ensure, especially at this point in the economic cycle, that new-build houses are affordable and that we are not imposing unnecessary costs. At the same time, we are trying to ensure that new-build houses are built to the highest possible energy-efficiency standards, which is why the zero-carbon homes commitment is still there and allowable solutions are being consulted on. An allowable solution is one that offers the builder a cheaper way of meeting the zero-carbon homes requirement while still saving the same amount of carbon.

Q173 John Robertson: Thermal mass was not recognised in the Standard Assessment Procedure. Do you think it should be?

David Wagstaff: I am not familiar enough with the details of SAP—the SAP methodology document is quite long—to know exactly how thermal mass is treated.

Q174 John Robertson: Again, perhaps you could look at it and get back to us.

David Wagstaff: Certainly.

Gregory Barker: Mr Robertson, it is worth pointing out that the part L regulations have actually been strengthened twice since 2010 by the Government. The 2010 change delivered a 25% increase in performance. This year, our improvements are expected to deliver a 6% increase in performance for new homes and 9% for other buildings. Contrary to the view that we are somehow watering down the commitments, while we are being realistic about the impact that any regulation has on either new building or costs to consumers, the overall trend has been to drive higher performance in buildings as a result of improvements that we have made to regulation.

Q175 John Robertson: Minister, I am not criticising; I am only trying to find out the information.

What is your response to the suggestion that buildings should be designed to use low-grade heat so that heat pumps and district heating can be more easily retrofitted?

Gregory Barker: Very sensible.

Q176 John Robertson: And what are you going to do about it?

Gregory Barker: David, what are we doing? Do you want to talk about our strategy?

David Wagstaff: I could talk at length about our strategy, but I will try to speak specifically to that question.

We certainly think that that is a good potential solution. There is obviously a difference between saying that it is a good idea and making it happen—the Minister has already explained that we are not likely to be forcing people into particular solutions. The potential for heat networks and exploiting currently under-utilised forms of heat is one of the things that we said quite a lot about in *The Future of Heating: Meeting the Challenge*, which we published in March.

New-build homes are being put on to heat networks at the moment—quite often driven by planning, for example in Greater London—and we have set up an entirely new unit in the Department called the Heat Network Delivery Unit, which is specifically working with local authorities with both financial support and expertise from within the team to expand existing heat networks, to plan for new heat networks and to look at all the different forms of heat that you can exploit. The fundamental thing about a heat network is that, once you have the pipes there, you can look for lots of different heat, including low-grade heat and heat pumps. It is easier to envisage a set of options for low-carbon heating that goes on to a network than it is to try to transform every one of 25 million individual domestic properties.

Q177 John Robertson: So would it be fair to say that you are at an early stage in this process.

David Wagstaff: It is certainly fair to say that we do not have as many heat networks in this country as there are in some other European countries.

Gregory Barker: I think David is being a little bit modest.

John Robertson: We are not used to that.

Gregory Barker: Actually, the fact that for the first time we now have a heat network unit in DECC recognises that this is a big opportunity. For the first time we have a strategy to deliver heat networks. We launched a round of funding in the autumn, and 100 local authorities responded positively. Of those 100, 31 submitted full applications for 54 different heat network projects. We are not supplying the actual capital to roll out the projects, but we are providing small amounts of resource to pull together a heat network plan locally, which will give them the support to draw up a

plan that they can deliver on. It is early days, but there is now a plan, and we actually have capacity in DECC to work with local authorities to roll this out.

Q178 John Robertson: Again, that is one of these things to keep us updated on. I am particularly interested in the local authorities in question that have been helpful—and perhaps the ones that have not been so helpful —¹

David Wagstaff: Sorry, I wonder whether I should have mentioned, given your previous question about the devolved Administrations, that this unit supports local authorities in England and Wales. Scotland has its own.

Q179 John Robertson: I knew that, and I have to ask you questions for them, too. Hopefully you will raise that with the Minister who you are meeting.

What is DECC doing to push for appropriate ventilation to be included in building regulations? We have seen the American style of having air conditioning on in the summer. If it is going to get warmer and if we have hot spells, there could be a much larger drive for people to have air conditioning units, which we probably did not have 10 or 20 years ago. What are we doing to try to reduce the demand for air conditioning?

Gregory Barker: We are not actively encouraging people to think about air conditioning per se.

Q180 John Robertson: Buildings can be built in such a way—I know it depends on how the building is built because I saw it in Australia with a relative's house—that they can produce the air conditioning without actually having an air conditioning unit.

Gregory Barker: Absolutely. Smart design, particularly using the thermal mass principle, can be extremely helpful, but you do start to cross over into DCLG territory—we do not lead on the regulations here, but obviously we have a view.

David Wagstaff: I can add something to that. Obviously it is led by DCLG, but we work together. Getting to the bottom of ventilation is very tricky. As you say, at the moment it is not in part L of the building regulations. New research was carried out this year by the National House Builders Council, DCLG and AECOM, and there is quite a lot of concern. Basically, it is hard to find out exactly what is going on in homes in terms of overheating. We know that it can be a problem. I am afraid that we have got as far as saying that we don't understand enough about the problem, so we will have to work with DCLG to do further research.

Q181 John Robertson: Would it be fair, Minister, to say that there needs to be a serious look at building regulations?

¹ *Witness correction:* Interruption. End of sentence was intended to be 'heat network policy'.

Gregory Barker: We keep them under constant review, and try to get a balance between regulation and positive benefit.

Q182 Sir Robert Smith: When you are writing about your dealings with the Scottish Government, will you also expand on the issue of ventilation in the winter? When all the insulation is put in, the health of the property and the health of its occupants can be affected if ventilation was not effectively designed into the property in the first place.

Gregory Barker: Absolutely. That is why proper training and accreditation is important, and it was why, when framing the Green Deal market, we put a strong emphasis on the kitemark for products and installers. You can make horrendous mistakes if you don't properly allow for ventilation.

Q183 Sir Robert Smith: Are there any thoughts on the landlord energy saving allowance as one way of tackling properties with solid walls? A lot of the solid walls in rural Aberdeenshire are in rented properties. If you could incentivise landlords to make that big capital investment, you would get round the problem that the ECO and the Green Deal don't really quite deliver on.

Gregory Barker: We are very aware of that, and in the new year we will come forward with more details on how we will incentivise landlords to make the improvements that you mention. Again, I go back to the fact that the biggest constraint on our ambition is not regulation, but the cost of these measures. They are supported by ECO, but that is a finite sum and obviously it is funded by consumer bills. There is a limit to how far we can roll this out. The most important thing is that we continue to drive down the cost and focus on those properties where there will be the greatest benefit, particularly for the fuel-poor.

Q184 Sir Robert Smith: Again, that can be solid rural properties.

Gregory Barker: Absolutely, yes. The design of ECO is unlike that of the previous energy obligation, where there tended to be a strange delivery pattern. There was insufficient delivery in inner cities—particularly London—because of the perceived high cost of installations in inner cities, which was associated with parking and the higher cost of doing business. Yet equally, there was very poor distribution of these subsidised measures to rural communities, because they are harder to reach. I personally insisted that we ring-fenced part of the ECO funding to make sure that rural communities got their fair share of access to it. This recognised that many rural properties had very specific problems associated with solid walls.

Q185 Sir Robert Smith: There is still quite a large concentration in rural areas, with a large number of houses.

Gregory Barker: It is very large, yes.

Q186 Mr Lilley: How important are heat pumps for your strategy of moving away from fossil fuels? A third of gas is used in domestic heating.

Gregory Barker: In the long term, heat pumps are very important. In the modelling of the DECC chief scientist, they really start to kick in during the 2020s. The deployment through the current decade is seen as a precursor to a more ambitious level of deployment. In the current decade, we are testing the systems, making sure that they are consumer user-friendly and developing the economies of scale. The plan is for a more much ambitious level of deployment in the following decade.

Q187 Mr Lilley: My brief tells me that they produce “low grade heat, requiring well insulated buildings, and a change in heating habits”, and that efficiency falls when producing hot water. Does that mean that we will have to get used to living in colder buildings and having cold showers?

Gregory Barker: No, not unless that is your personal preference. As I said in my introductory comments, heat pumps have been very well received where they have been installed. When they are properly installed, and their functions have been properly explained to the tenants or residents, the overwhelming majority—not all of them—have worked very well. I have met very happy residents in a range of properties, particularly the fuel-poor, who one might suspect are more used to the practice of leaving the door open, going in and turning the boiler on, and being used to instant hot water, but are getting on very well with heat pumps.

Stephen Martin: I might just add that we have been supporting the use of domestic heat pumps on a relatively small scale for the past two and half years through the RHPP. We have had positive feedback from participants. We recently published a first set of qualitative research findings on participants that reported about 90% satisfaction levels—90% would recommend renewable heat technologies to a friend. As the Minister says, we have evidence that shows that for many, many people these technologies are already working well. It is also important to emphasise that under our approach to the domestic RHI, which will replace the RHPP in the spring, we have built in a number of incentives and standards to ensure that installers and householders are incentivised to put in efficient systems. That is all part of the strategy to see heat pump performance improve further and steadily over time.

Gregory Barker: It might smack of change and progress, but we are not expecting people to switch in a manner that compromises either convenience or comfort.

Q188 Mr Lilley: I declare an interest in that I depend on propane gas at the moment, and I would quite like a heat pump, if it would work. I notice that Calor Gas, which might be in a Mandy Rice-Davies situation, says “Many heat pumps, when installed, do not do what they say on the tin, and no amount of taxpayer’s subsidy can draw a veil over that. Air Source Heat Pumps emerge from independent testing as a bust technology undeserving of taxpayer support.” Do you share—

Gregory Barker: I probably would not go to Calor Gas for the most impartial—

Mr Lilley: I acknowledge that, but—

Gregory Barker: It is by no means perfect, and the reason we are deploying heat pumps as we are is to learn from that deployment. The reason we operated the RHPP scheme as we did was to allow us to get the maximum input from the analysis of how these new technologies are being used—not just how they work in laboratory conditions but how they work in reality for family life, single people, working people or stay-at-home households—to work out what improvements there need to be and what advice you need to give to consumers to make sure they get the maximum from them. It depends on the nature of your house, but I have met constituents and people nationally in my ministerial role who have been extremely satisfied with heat pumps, because they deliver a level of comfort and convenience but, more importantly, because they are much cheaper.

Q189 Mr Lilley: You will know that we look as sceptically on you as we do on Calor Gas. I followed up my brief, which pointed me to an objective source, namely a document by Grant Wilson and others entitled *Historical daily gas and electrical energy flows through Great Britain's transmission networks and the decarbonisation of domestic heat*. It states that an efficiency of 3:1 is being assumed, but describes that as an “optimistic...value, reflecting improvements in the technology and installation practice. UK field trials reveal far poorer performance in real heat pump systems, predominantly due to poor quality design and installation in buildings”. Yet you have only had rosy reports back.

Gregory Barker: I would not say that I have only had rosy reports back, but I did say that I have had many rosy reports back.

Q190 Mr Lilley: But you did not mention any of this—the fact that according to this objective study, field trials show that the real performance is very much poorer than the theoretical performance.

Gregory Barker: If you recall, Mr Lilley, I said in my earlier remarks that there had been very poor trials of heat pumps carried out by the Energy Saving Trust some two years ago, which were a cause for concern. Since that trial, a lot of work has been put into understanding what the causes of the problems were and what the nature of the difficulties was, and the subsequent field testing has been more positive. My remarks are broadly anecdotal, but perhaps, David, you would like to say something about the analysis.

David Wagstaff: The second round of trials certainly showed a significant improvement on the first round, but they also showed that heat pumps in this country are still not performing as well as they do in some other countries. We are not in any way shying away from that conclusion.

Q191 Mr Lilley: Why is that?

David Wagstaff: It is a whole range of factors. I think you mentioned at the beginning of your first question that they have to be put into a well insulated home. There may be an element of the state of the housing stock, which is not particularly well insulated in the UK, as we have already touched on. Then there is the way that the pumps are installed and the way that consumers use them.

It is also worth pointing out that for both the Renewable Heat Premium Payments scheme and the domestic RHI, the target market is off the gas grid. There are about 4 million off-gas grid homes, of which about 1.5 million rely on heating oil and a smaller number on bottled gas. A significant number of them have direct electric heating—storage heating—at the moment. Although I am not in any way saying that less than 3 is a particularly good performance for a heat pump, it is significantly better than direct electric heating, which is what it will be replacing in many cases.

Q192 Graham Stringer: You said that heat pumps are going to come into their own in the '20s. Why has the Committee on Climate Change changed its target from 7 million heat pumps to 4 million?

Gregory Barker: I do not know; I am not the Committee on Climate Change.

David Wagstaff: Hopefully it is because they have read our March document.

Q193 Graham Stringer: So it is your figures that they have taken?

David Wagstaff: Sorry, that was a slightly flippant comment. There has been a significant and important debate about the extent to which heating will fundamentally electrify in the decades out to 2050. I think that both the Government and the Committee on Climate Change had a starting position based on some fairly simplistic modelling, which showed that the most cost-effective way to decarbonise heating would probably be largely to electrify it. That works until you put in the very granular modelling that actually looks at hours and days throughout the whole year of heat demand, which fluctuates very significantly across the seasons. When we re-ran some modelling—with the help of a number of different external bodies—with hour-to-hour heat demand, it showed that because heat demand peaks so heavily in the coldest days of the winter, you end up with an enormous drain on the electricity grid if you have electrified all your heating demand. Clearly, the more you can do with insulation and storage, the better. None the less, the more refined modelling shows that there might well be a case for keeping forms of gas heating as a back-up or alternative for perhaps longer than both we and the Committee on Climate Change originally assumed.

This also plays into the conversation about heat networks. We as a Department have said that we think heat networks have been under-exploited and their potential has not been fully recognised. I think the Committee on Climate Change agreed with us on that point, although obviously you could ask them directly. One of the reasons why their estimates of the number of heat pumps in the 2020s has gone down is that their estimates of the amount of heat networks distributing will have gone up.

Q194 Graham Stringer: So they are following you rather than you following them?

David Wagstaff: I think we follow each other.

Q195 Graham Stringer: It was a rhetorical point, really. In terms of the heat pumps that have already been installed, there have been a lot of consumer programmes, particularly on Radio 4 but also elsewhere, with people who have installed them complaining that their bills have gone up rather than down. I have been trying to get some quantitative analysis of that from the Department. What figures do you have on that?

Gregory Barker: Do we have figures on that?

David Wagstaff: Can you repeat the end of the question?

Q196 Graham Stringer: Basically, whether heat pumps cost people rather than saving them money.

Gregory Barker: Do we have any figures?

David Wagstaff: That was the research that Stephen Martin has already referred to—the evaluation of the Renewable Heat Premium Payment. That is the most current, recent evidence that we have. We asked in that research about the impact on people's bills. I do not have the answer on that particular point in front of me, I am afraid, but I am pretty sure that if we get the evaluation, we can answer that question, unless Stephen can add to that.

Stephen Martin: These are illustrative examples, because obviously the answer to that question can vary hugely with different householder types and circumstances. This is based on an average three-bedroom semi-detached home with an air-source or gas-source heat pump. Compared with a current electric heating system, it could offer savings of between—

Q197 Graham Stringer: Sorry, I am trying to get at real-life examples, whether of air source or ground source heat pumps. Air source heat pumps appear to be the bigger problem. Do we have numbers on how many, after they have been installed, have cost the consumer more than was saved?

Gregory Barker: Are you sure that you are not referring to exhaust air heat pumps, which are not really renewable and which are not supported by our scheme? They have featured on *Panorama*, I understand.

Q198 Graham Stringer: This was on the 12 o'clock Radio 4 consumer programme. I think it was on air source heat pumps.

Gregory Barker: On the point that Mr Lilley made earlier, you do have to ensure that your home is insulated and that you—

Q199 Graham Stringer: I am just trying to get at the facts of—

Gregory Barker: The bottom line is that we will write to you with our definitive analytics, but we do not have substantial evidence that a large number of individual consumers experienced an adverse impact on their bills. If we had that evidence, it would cause us to check the policy, but that has not been the feedback that we have had. Obviously, it is early days on the programme, so we continue to iterate and do more research. One reason for the Renewable Heat Premium Payment was to give us definitive feedback. Grants were given on the condition that we got feedback from consumers. The overall conclusions that we drew were positive. I do not have the individual figures, but I am sure that there were some people who did not have a good experience. We will let you have an exact breakdown.

Stephen Martin: I was going to add that, clearly, we do not have data on the performance of all heat pumps within the economy. We are able to model savings that will occur under some circumstances, which is the basis of the sort of examples that I was in the process of providing. We had previously a sample from the EST field trials, which we have talked about quite a bit. We now have a sample of around 700 heat pumps that we are metering from the RHPP scheme. We are planning to publish an update and some initial findings from that evaluation in January and the full analysis probably towards the end of 2014.

We have those kinds of data sets and we can analyse what they tell us. We also understand the circumstances under which heat pump performance and value for money for a consumer is likely to be better or not. That is one reason why the domestic RHI is focusing more on the off-gas grid homes than the gas grid, but, clearly, we do not have a direct handle on what all heat pumps are doing.

Q200 Graham Stringer: I talked to some of your officials about monitoring heat pumps and they were helpful. Where heat pumps are performing below standard performance, will they continue to count towards the renewable targets that the European Union demand? That is, when they are stamped as a heat pump when they go into the ground, do they count towards those renewable targets, whether or not they are performing as they should?

Stephen Martin: Essentially, the reporting of renewable heat, in this case, renewable energy, to the Commission is based on a UK statistical analysis of the deployment of the relevant technologies, but then the heating load—the intensity with which the heat pump is used—and the seasonal performance factor are based on deemed assumptions that the Commission provides.

Q201 Graham Stringer: Rather than the actual performance.

Stephen Martin: Indeed.

David Wagstaff: It is worth adding that, in order for a heat pump to receive the Renewable Heat Incentive, it will need to have been manufactured and installed by an MCS-registered company. Part of the MCS standards is that they should achieve that seasonal performance factor.

Q202 Graham Stringer: But the evidence that we have got so far is that some of them do not.

David Wagstaff: There will be some that are performing below where they should perform, yes.

Q203 Chair: It will be helpful if you wrote to us about that. Clearly, there is legitimate concern about whether people's experience is one of disappointment or is negative. It would be nice to have as much clarity as possible on the information that you have so far.

Gregory Barker: I reiterate that we are keen to get that evidence ourselves and have put in place structures allowing us to gain much more evidence about this than on the productivity of other systems that are installed by consumers.

Q204 Chair: On the point about peak demand, if the use of heat pumps becomes much more widespread, there is a peak demand issue, is there not, associated with it?

David Wagstaff: Yes, there is. Of course, to reiterate, at the moment, heat pumps are mostly replacing electric heating or oil heating, so if they are running at 250% or 300% efficiency, then it is considerably better than relying on electric heating, in terms of the demand it is putting on the grid. However we meet our heat demand in this country, it is large. If you include all heat—industrial, commercial and domestic heat—some 45% of our total energy demand is just on heating, so there is always going to be an enormous call on some form of energy to meet that demand.

Q205 Chair: And a move from oil to heat pumps will exacerbate the difficulties in terms of peak demand for the electricity network.

David Wagstaff: Clearly it is going from burning oil to using electricity. That is also true—sorry, just to go slightly outside the remit of this hearing—of the transport solution, if you are going down the electric transport route. The whole system needs to be looked at. I know that other witnesses have referred to the importance of the whole system analysis, but if you are looking decades ahead, you need to think about the way that the grids interact and the different demands.

Q206 Chair: That is true, but in transport it is much easier to spread the load through different times of the day and night. On heat, if it gets very cold one night, you cannot say: "I

am going to heat my house at midday tomorrow”, whereas you could defer the recharging of your electric car, for example, to a low-demand period.

David Wagstaff: That is a point that lots of people who have spoken to us have made and we certainly recognise it. In fact, it is one reason why storage is so important, whether you are talking about storage of electricity, heat, chemical or hydrogen storage, it is clearly one way of offsetting the peakiness of the demand.

Gregory Barker: It is also why, as part of our electricity market reform, we have a capacity market. Demand-side response will feature in that for the first time.

Q207 Chair: We are eagerly looking forward to details of the capacity market, I must say—not only us, but some investors in gas-fired power stations as well. Finally, have you analysed or compared the relative costs of upgrading electricity distribution networks, as opposed to installing heat networks?

David Wagstaff: That is actually part of the whole system modelling work to which I just referred. The answer is that we have not done that fully or adequately yet. Again, we are working with a number of academic institutions, National Grid and others to try to do exactly that. It is a very complicated bit of modelling to try to work out these different interventions. You have, of course, national and local infrastructure and, in any case, you are having to upgrade. For example, there is a gas grid upgrade going on at the moment, which is primarily for health and safety reasons, but you need to factor in all the things that will have to happen anyway—reinforcing electricity substations, distribution networks and so on. So, yes, we recognise that this would be an incredibly useful thing to have and we are trying to do it.

Q208 Dr Whitehead: Could we go back to heat networks? You mentioned that you have a heat network unit and a plan to deliver heat networks. What is that plan?

David Wagstaff: We have said in our document and on a number of occasions—including most recently when the Minister, Mr Barker, made a speech at the annual heat conference last month—that we are not suggesting that heat networks are the solution to everything, just as we are not suggesting heat pumps or any other single technology are the solution to everything. But where there is density of heat demand, which effectively will mean in urban areas, often a mixed demand, partly to get away with the peakiness problem of seasonable demand, what you ideally want to make a heat network profitable is a fairly steady demand across the year. That means you are probably looking for things such as hospitals, leisure centres, swimming pools or prisons. There is a number of large buildings that you can put on a heat network alongside domestic buildings, offices and so on. These things do exist, this is not theoretical.

You obviously need a heat supply, typically provided by an energy centre, which might have an energy-from-waste element, bio or gas CHP and, increasingly in places such as Denmark, it will also have cheap electricity that can be taken off the grid when the wind is blowing and the demand for electricity is relatively low. You can

take that electricity at a very cheap price and heat up water in large thermal stores on the network.

That is the vision of how an urban heat network can operate and we do it. As I said, it is not just in places such as Denmark. Sheffield, Nottingham, Southampton, Birmingham and so on already have networks.

Gregory Barker: It is worth putting that in context. In the EU as a whole, heat networks deliver about 12% of heat demand, whereas currently in the UK, it is only about 2% of our heat.

Q209 Dr Whitehead: That suggests that even on that statistic we have a long way to go.

Gregory Barker: Yes. While David is absolutely right, there are networks in some of our great cities that are relatively small as a proportion of the overall population served.

David Wagstaff: The question was about our vision or strategy for it, and Mr Robertson mentioned high-rise flats earlier. I was in Glasgow recently, talking to people who have plans there. A heat network would be great for a system where you had Strathclyde university, a brewery, a hospital and some high-rise housing in quite a deprived area with quite a lot of fuel poverty. The tenants are paying a lot of money for not very good electric heating in their tower blocks. The plan—it is only a plan at this stage—would be to put in a network that involved oversizing the heating supplies for the university, the hospital and perhaps the brewery and taking that excess heat into the tower blocks. The tenants in those tower blocks would then get much cheaper heat that would be more secure and more reliable, because it would be on a network that also supplied the hospital and the university.

Q210 Dr Whitehead: So it would be far more efficient.

David Wagstaff: Yes, more efficient and lower carbon.

Q211 Dr Whitehead: But certainly CHP and district heating networks miss out on every single incentive that is being put in place. They do not qualify for the Renewable Heat Incentive or the EU ETS.

David Wagstaff: It was only a couple of weeks ago that the Government announced that we would consult on heat networks becoming a primary measure under the ECO. That is one way of addressing that issue.

Q212 Dr Whitehead: In terms of an incentive as such—

Gregory Barker: ECO is an incentive; it is a direct subsidy.

Q213 Dr Whitehead: Yes. The inclusion of heat networks into qualifying measures for ECO purposes under the latest measures announced by the Department is welcome, in principle, but my point is in terms of the EU ETS, the Renewable Heat Incentive, the Renewables Obligation and CFDs for the future. CHP and heat networks simply do not come into that picture, do they?

David Wagstaff: Bio CHP would benefit from the RHI and the Renewables Obligation.

Q214 Dr Whitehead: Obviously in terms of the in-principle efficiency of the network and the in-principle efficiency of installing a CHP engine to provide that heat network, the incentives will be available only if there is a further factor engaged over and above the fact that that network is in place.

Gregory Barker: There is nothing intrinsically good about a heat network, because one of the biggest heat networks was Battersea power station. It used to burn a huge amount of coal right in the centre of London and supplied a heat network from that. It is important that we recognise that the heat network is as good as what you put into it.

Q215 Dr Whitehead: Well, yes, but if you have a heat network attached to a power supply, with heat captured that otherwise would not be captured, and then resupplied to a heat network, that is a tremendous gain in efficiency and in principle a good thing, is it not?

Gregory Barker: It depends. In terms of supporting it as a source of low-carbon heat and electricity, it depends.

Q216 Dr Whitehead: I appreciate that it is relative. One of the problems that CHP and heat networks have always had is the relativities of the whole question of how the spikes spread, how the efficiencies are gauged and what the counter-factuals are seen to be.

Gregory Barker: We totally recognise the broader point that you are making, Dr Whitehead, because that is why we have created the heat network deployment unit. It is why that unit is empowered to offer grants to local authorities to allow them to plan, prepare and scope out the potential for heat networks in their area and it is why, in assisting them with financing them under the ECO—that is a substantial slab of funding that runs to several billion pounds—they are now a primary qualifying measure. We might not be doing everything, but we have taken some important steps forward with heat networks within the last 12 months.

Q217 Dr Whitehead: So as a qualifying measure under ECO, how would you envisage a heat network as a primary part of the whole process? Obviously the question of a heat network is one element of the jigsaw that goes into district heating. You need to fund your

network and you need to have your power source and connection to homes. How will the development of applicability under ECO actually fund and support heat networks?

David Wagstaff: It already has done, because the announcement was that it would become a primary measure. Heat networks are already a secondary measure, which means they were already going into some areas, supported by ECO. One of the things that people had asked us for, in addition to making it a primary measure under ECO, was for certainty going forward to be extended under ECO, which was also done two weeks ago. Those extra two years will also help, because the prime difference between a company choosing to use a heat network to meet its ECO obligation, as opposed to a measure in the building, is that it is a much longer-term, larger project, so having that certainty over time should help.

It is still a consultation. We have still got to consult on the detail. Fundamentally, it will be a choice for the company on whom the obligation falls whether they wish to score using a heat network to address whole streets of houses, effectively at the same time, or whether they want to take measures individually. They will be encouraged to do both, so we would expect them to be taking insulation measures in the homes that they are putting on to the networks.

Q218 Dr Whitehead: Typically a heat network requires, say, 15 years' funding, which is much longer than the likely longest contract for the heat supply that there is, whereas what you are talking about is a pretty short-term guarantee that something might happen—

David Wagstaff: The commercial potential of heat networks is recognised in the market. The Green Investment Bank had always been informally working very closely with us; it is now formally stating that it is very interested in investing its own money in heat networks and leveraging other money into heat networks. We are confident that the commercials will stack up with the heat networks, which is precisely why, as the Minister said, we are not suggesting that Government money should be used to build heat networks. What we are trying to do is help local authorities and others who have a strategy that involves developing a heat network to put in place all the building blocks to build a business model and to get private sector investment, and we are confident that that will happen.

Gregory Barker: And I think the engagement of the Green Investment Bank on this agenda, although it is early days, is very encouraging, because this is a classic example of where the bank can address current market failure and create a new market for private sector investment by leading the way.

Q219 Dr Whitehead: You could have some form of underwriting incentive, however, in terms of underwriting the length that is required.

Gregory Barker: There are different ways in which you could cut it, or incentivise it.

Q220 Dr Whitehead: You have not looked at that, then.

Gregory Barker: No, and that will be a matter for the Green Investment Bank.

David Wagstaff: May I come back to an earlier question? You talked earlier about our support for CHP and specifically for non-renewable CHP. It is worth separating that question from the question of heat networks. Clearly they are related, but we have said a number of things about gas CHP as well in our recent policy statements, so the Department is currently looking at what form of support we might be able to provide for gas CHP, so long as we can be sure that it is not displacing lower-carbon forms of heating. It is not a case of our not being interested in gas CHP; we have specifically said that we want to look at options for a policy to support gas CHP.

Q221 Dr Whitehead: I was going to be very rude and ask how that differs from the previous occasions when the Department has looked at gas CHP in a sympathetic way. Is there some new idea here? The Department has looked at the problem of gas CHP on several previous occasions and ended up with worse incentives as a result, hasn't it?

Gregory Barker: I think that there is perhaps more political will to address the issue and to see it as a genuine part of a broader energy strategy. There isn't a silver bullet, so you are quite right, but the priority that CHP is getting in the Department—the resource that is being targeted on it—is greater than we have seen before, and that is partly because of that political priority that is being placed on it.

Q222 Dr Whitehead: So this time it is serious.

Gregory Barker: It is serious. You can look at what we are doing with the support that we are giving to smaller-scale CHP and also at the clear role that CHP will play in the heat networks. The whole heat network strategy is brand new.

Q223 Dr Whitehead: In its modelling, what account does the Department take of the ability of networks to introduce a substantial element of storage and economical release, and the use thereof? Is that included in the modelling?

David Wagstaff: Not only is it included in the modelling, but it is one of reasons why we have been so keen that we should have a proper, whole-system approach to energy modelling. We were mentioning earlier the strain that effectively electrifying heat and then trying to meet a very high heat demand would put on an electricity grid. As you will be only too aware, if you have combined heat and power at local, possibly even micro, level, you will be meeting the heat demand with the heat element of the CHP plant and you will be making electricity at the same time. You will actually be offsetting the additional demand for those who have gone for the electric heating solution, so there are some interesting questions about how CHP can help to balance heat demand met by combustion and heat demand met by electricity.

I do not have the answers, but I certainly agree that the question is very important, and I can assure you that if we are going to do whole-system modelling properly, we are

going to have to understand the way in which combined heat and power works, the way heat pumps work and the way that storage can work, as a whole system.

Q224 Dr Whitehead: A final point. In terms of what is happening with, for example, the capacity market and the development of further gas-fired power stations—indeed, the development of longer-term nuclear power stations—there has been some discussion of the extent to which that sort of assistance might be—

Gregory Barker: I am sorry, but which sort of assistance?

Dr Whitehead: The emergence of payments through the capacity market and the emergence of effective assistance through CFDs, for example, for new nuclear. How far that sort of assistance might be predicated on the extent to which power stations actually recover and use the heat that they are generating appears to have gone into the background, particularly bearing in mind the fact that high-grade heat can now be captured and can remain pretty robust over hundreds of miles. Are there thoughts on how power stations themselves perhaps need more assistance? The EU directive is an example.

David Wagstaff: I don't think any of us are experts on the electricity market but if, all other things being equal, a nuclear power station can either make electricity and sell that, or make electricity and heat and sell them both, it should not need any Government help to do so. Surely that would make sense from a commercial point of view?

Gregory Barker: I was not aware that it was now commercially viable to send heat hundreds of miles. Is that right?

Q225 Dr Whitehead: Not hundreds of miles, but over 100 miles.

Gregory Barker: Even over 100 miles is interesting.

Dr Whitehead: Yes.

David Wagstaff: But you would have to pump it quite far, and there would presumably have to be quite a lot of energy used in pumping it.

Dr Whitehead: That depends on your supply of heat in the first instance—what the grade of heat is and what your continuing supply is.

David Wagstaff: My fundamental point is that it is not that anyone disagrees with the potential for capturing and using heat from all manner of places, including nuclear power stations, but it does not follow that they should be assisted in doing so. What I am saying, although I am not an expert in how the electricity market works, is that there should be a commercial case for doing it if you have an additional product to sell.

Q226 Dr Whitehead: As you initially said, part of the plan for heat networks is for where they exist in relatively dense urban areas. Perhaps a plan for locating power stations, for example, will relate the availability of heat to the area that it might serve. There are power stations in the middle of nowhere, for example.

Gregory Barker: But it does not have to be domestic heating. Industrial heat from power stations can sometimes be more appropriate. If you have a power station, it makes sense to co-locate large industrial sites next to it.

Q227 Dr Whitehead: So perhaps planning power stations might be a—

Gregory Barker: I am the planning Minister for this, and I am not aware that any applications for power stations in the middle of nowhere have come to me.

Q228 Dr Whitehead: Hinkley C is not exactly in a big industrial zone, is it?

Gregory Barker: It has the potential. I do not know the detail of the surrounding area, but obviously, if you have a heat load, you have the potential to co-locate. It might make more sense to bring industry to Hinkley C than to take Hinkley C to industry.

Dr Whitehead: That is an interesting further discussion, I guess. Thank you.

Q229 Albert Owen: May I discuss off-grid, which has been touched on a number of times today in our discussions about rurality? You will know from DECC's figures that there are more than twice the number of households in fuel poverty off the gas grid as there are on the gas grid. What specific policies do the Government have to assist people who are not on the gas mains? Bear in mind that when we have the debate that we have been having over the past few months, we always talk about average dual fuel, which has discounts, and nobody who is off grid gets a dual fuel discount. There is therefore considerably higher pressure on those people, which is unlikely to be resolved by dual fuel and switching.

Gregory Barker: Obviously people who are off the gas grid still benefit from up to £300 of winter fuel payments and the cold weather payments, and the warm home discount goes to 2 million households.

Q230 Albert Owen: That is for people on the grid. What extra resources are the Government making available for people who are paying considerably more for their heating?

Gregory Barker: I would estimate, although I do not have the figure, that a disproportionate number of people who are off-grid are in receipt of the warm home discount, which covers about 2 million households.

Q231 Albert Owen: But DECC's figures show that twice as many people in fuel poverty are off-grid.

Gregory Barker: Correct, and the ECO has ring-fenced funding for the rural fuel-poor who are off the gas grid. The whole policy of the RHI, as we said earlier, is predicated on targeting—

Q232 Albert Owen: Minister, I am with you on that. People who are off grid get extra ECO, which means that they can insulate their houses—I am not sure whether that covers windows and various other things as well. What I am saying is that even with all those modifications and after adapting their homes to be as energy efficient as possible, they still pay more for their fuel, which causes real fuel poverty in those areas. Is there a specific policy to help those people? We are talking about considerable sums. Mr Wagstaff, you mentioned a figure of 4 million people. The figures we have received show that it is 15% to 20% of UK households, and in areas such as mine, it is considerably more than that. We have talked about switching—not in a flippant way, because people can do it quite easily—but those people cannot switch.

Gregory Barker: They can't switch. I am an off-gas grid customer, and although I can't switch, I have cut my fuel bill quite significantly.

Q233 Albert Owen: You can't get dual fuel discounts. That is the point.

Gregory Barker: No, you can't get dual fuel discounts, but you can shop around. First, I left my supplier and went to a much cheaper one that I found on the internet, and then I got an even cheaper one still by switching my supplier again to a community purchasing—

Q234 Albert Owen: But you are still paying more than if you were on the grid.

Gregory Barker: I still pay more, but I have reduced my oil bill quite considerably as a result of switching. My community co-operative buys early. Buying early makes sense—I think my last delivery was in September. We have a programme to encourage people to buy early. Your basic premise, Mr Owen—that people who live off the gas grid are intrinsically disadvantaged to a degree—is correct.

Q235 Albert Owen: What are we going to do to address that? Does DECC have a policy for connecting people to the grid? There are no incentives to do that. Gas mains go through my area. I am not talking about individual isolated properties—this is true across the United Kingdom—but hamlets. They are close to gas mains, but there is no incentive—there has not been since privatisation, to be frank—for a big roll-out of connecting houses if people want that. If the choice was there, they could save considerably.

Gregory Barker: In actual fact, that is not quite true. Ofgem announced earlier this year that it would continue with the fuel-poor network extension scheme for the period from 2013 through to 2021.

Q236 Albert Owen: How many households would that include? There are 4 million—

Gregory Barker: We have an objective to get 80,000 new vulnerable households on to the gas network.

Q237 Albert Owen: I know you are probably reading that for the first time this morning, but I am going to push you anyway. How does that work? I have been campaigning on this for a long time. You talk about the multi-buying of fuels, but you have to get a group of people together to approach a supplier and a distribution company for that to happen. It is not easy. It is all right for Ofgem—

Gregory Barker: It is not that difficult; I managed to do it.

Q238 Albert Owen: It is very expensive, with respect, Minister. It costs thousands of pounds.

Gregory Barker: Switching?

Albert Owen: No, to get on to the gas grid. That's what you are reading out there.

Gregory Barker: Oh, I thought you were going on to something else. That is right. There is a programme—

Q239 Albert Owen: How does it work? What incentive is your Department giving to make that happen? That is the question I am asking. What is the Government policy so that people can have the choice to go on the gas grid and substantially reduce their energy costs, and to come out of fuel poverty?

Gregory Barker: We have to accept it is not economic for some.

Q240 Albert Owen: So it is economics—the market—letting these people down.

Gregory Barker: If you want to put up people's energy bills in order to send gas pipes to serve one distant house, you will drive people into fuel poverty.

Q241 Albert Owen: No, I'm afraid that that is the kind of remark that many of my constituents do not like to hear. We are not talking about individual isolated properties; we are talking about 20% of United Kingdom households, many of whom are in fuel poverty.

Gregory Barker: But you do accept, Mr Owen, that there is a cost to connecting people to the gas grid.

Albert Owen: There is a cost.

Gregory Barker: And you are suggesting that that cost should be socialised.

Q242 Albert Owen: No. I am suggesting a level playing field.

Gregory Barker: What does that mean?

Albert Owen: I'll tell you what it means. It means investing in distribution.

Gregory Barker: Where does that money come from?

Albert Owen: It comes from some of the profits of these large companies.

Gregory Barker: So we are going to get profits to go down again.

Q243 Albert Owen: You are asking me questions and I am trying to answer them; you are the Government Minister and I am asking you what the Government are going to do. The answer that you have given is, "Tough, it's going to cost too much. These people will have to remain in fuel poverty."

Gregory Barker: No, that is not what I am saying. I am saying is that it is a slightly more complex argument than simply saying you can magic up money from nowhere and pretending that spending a lot of money will not push up people's bills. It does. There is a balance to be struck.

Q244 Albert Owen: Okay, I will push you on this. If it were not an issue of economics and money, your Department would extend the gas grid. Is that what you are saying, even though you want to electrify many properties?

Gregory Barker: It is very desirable. We want to get as many people on to the gas grid as possible for exactly the reasons—

Q245 Albert Owen: Is that your stated policy? In the past some of your Ministers have said the contrary—that they wanted to see ground source pumps and electrification. Which is it?

Gregory Barker: Perhaps you would let me finish the sentence. We want to get as many people on to the gas grid as possible, and we support Ofgem's policy of continuing with the fuel-poor network extension.

Q246 Albert Owen: I am sorry, but I have to interject.

Gregory Barker: You are interjecting in my interjection.

Albert Owen: Yes, because you just repeat what Ofgem says on a piece of paper. I want to know what that means practically to households in the United Kingdom.

Gregory Barker: I am saying that it is not practical nor economic to suggest that every household in the UK, under the current cost of extending the gas network, should be connected to the gas network, so we need to look at a range of measures that will help to mitigate the impact on bills. That is both insulation and other heating mechanisms. We all know that being dependent on heating oil or bottled gas is very expensive. We have a programme to help to insulate those who are unable to afford insulation themselves as part of the ring-fenced ECO. That is rolling out at scale.

Secondly, we recognise that there are other technologies that will be more cost-effective, especially in the future, and also more carbon-effective—our models anticipate that. The RHI is targeted pretty much exclusively at the off-grid gas customer. We are not ignoring those who are off the gas grid; we also have a strategy to encourage those who cannot get off heating oil to make the best of that by switching suppliers, when possible, and by buying earlier in the year when possible. And, in addition to that—

Albert Owen: I am going to interrupt now because that is a very long-winded answer.

Gregory Barker: They qualify for a range of additional benefits so it would be entirely wrong to say that we do not care. We care very much, but unfortunately there is no one-size-fits-all solution.

Q247 Albert Owen: What you said there was slightly contradictory. The Department is quite ambitious to extend the gas mains, but on the other hand you say you have carbon reduction targets. Would this not push your carbon targets up? Would it not be counter-productive in many ways?

Gregory Barker: Why?

Albert Owen: Because gas probably has higher carbon than electricity.

Gregory Barker: Than heating oil? I do not think so.

Albert Owen: Than electricity.

Gregory Barker: But heating oil is the primary source of heat.

Q248 Albert Owen: It is not; it is solid fuel, actually.

Gregory Barker: It is certainly more carbon-neutral than either solid fuel or heating oil.

Q249 Albert Owen: No, most of it is electricity in my area, Minister. You can laugh as much as you want, but I visit these households.

Gregory Barker: That may be so in your area, but it is not replicated across the country.

Q250 Albert Owen: Well, one of the main sources of heating in off-grid homes is electricity. I think you will confirm that, Mr Wagstaff.

David Wagstaff: There is a simple element of time here. At the moment, electricity is higher carbon than natural gas because there is a lot of unabated coal being burned in power stations. In the future, electricity will obviously decarbonise gradually, which is why there are two different answers to your question. There are different answers in time. At the moment it makes sense to extend the gas grid wherever it is economic to do so. In the future, for carbon reasons, it is likely that we will be encouraging other non-fossil fuel solutions.

Q251 Albert Owen: That is very useful; thank you.

On the price of different fuels, smokeless fuel is the cheapest, but, of course, it emits an awful lot of carbon, as we were saying. Do the Government hope that off-grid solid fuel central heating will change in the future? The dilemma is that it is one of the cheapest sources at the moment, so to encourage people to go to other sources of heating oil will cost them more.

Gregory Barker: We would not suggest that people go from solid fuel to heating oil. We would hope that they would go from solid fuel to heat pumps or something similar, supported by the RHI.

Q252 Albert Owen: Which is expensive.

I have one final point. In my area—I am speaking parochially, but I am sure it is replicated across much of the United Kingdom—a lot of solar energy and PV is being used for heating systems and for electricity. Do you have a policy to assist that to continue?

Gregory Barker: It is unlikely that solar PV is used for heating.

Q253 Albert Owen: Some heating of water in the summer period is used as well as electricity from solar—predominately electricity.

Gregory Barker: Yes. Solar PV is a very attractive technology, but it does not really lend itself to the heating market. Solar thermal is obviously helpful for hot water, although it is frustratingly expensive. Prices have not come down the cost curve in the way we have seen with solar PV in the past three years.

Q254 Albert Owen: Staying on solar PV, many of the households I am referring to actually put back into the grid in the summer so that they are making some money out of it and reducing their energy bills. What policies have you got for that to continue? Again, the reduction of subsidy makes that less attractive. Also, I cannot have you in front of me, as a north Wales MP, without mentioning Sharp's decision yesterday, which has a huge impact on the solar manufacturing industry. Will you comment on that? It is a big issue in my area—600 jobs.

Gregory Barker: First, the solar market is in good health. Since 2010, we have deployed nearly 3 GW of solar in the UK. That is extraordinary. I do not think anybody would say that that is not an extraordinary feat. The idea that the solar market died a death in 2011 with the reform of the feed-in tariff is a complete travesty. In actual fact, the gloom-mongers were proved completely wrong.

Q255 Albert Owen: Installers are saying that they are installing a lot less in north-west Wales.

Gregory Barker: The bottom line is that the scheme was never intended to provide bumper returns for investors. It is now delivering sensible returns for the investment—some really quite good returns. We now have a degression-based feed-in tariff system, which means that the burden on consumers is not a problem. We are driving solar towards grid parity. In terms of Sharp, I am very sorry indeed to learn of that. I think 250 people have lost their jobs.

Albert Owen: Six hundred.

Gregory Barker: Six hundred in total. Last year Sharp announced that it was relocating part of its operation, sales and marketing from Germany. In September it was reported as working at full capacity in the factory. Unfortunately, as I understand it, the closure of the Wrexham plant is as much to do with the wider problems of the group and the broader state of the PV market as anything to do with individual demand here in the UK. As I say, it was reported as at full capacity in September.

Q256 Albert Owen: Were you aware that it had problems before the announcement?

Gregory Barker: Yes, I was.

Q257 Albert Owen: You said on 12 December that investment was going to go up, but here is a company pulling up.

Gregory Barker: Well, it is. You have to look at the total picture. The bottom line is that the cost of PV has fallen very substantially around the world. Some companies that are already in that market will struggle to keep up with those cost falls. Where they have got plant that they have paid for—

Q258 Albert Owen: If we do not make it here in the UK, we will import it from China.

Gregory Barker: We will import it from China—

Albert Owen: That is not good for UK manufacturing, is it?

Gregory Barker: It is not good for UK manufacturing, but it is not necessarily bad for the UK economy. The fact of the matter is the actual manufactured element of a solar project is now less than 50%—it is something closer to 40%. The value chain is captured in what you do with the panels, the treatments that can be added, and then the design installation. There is a lot we need to do now to push down the cost of installing panels, which now counts for a very significant part and is often a job-rich area. It cannot be right that it still costs more to install solar panels in the UK than it does in Germany, despite the fact that it has higher labour costs. There are still more efficiencies that we need to drive in, but it is very regrettable that Sharp has closed.

Q259 Albert Owen: We have digressed somewhat but I think it was important to do that, because people in my area—

Gregory Barker: Absolutely, I understand that.

Albert Owen: They would like to get their panels made in Wales as well, not in China.

Gregory Barker: And we would love them to be made in Wales.

Q260 Albert Owen: So what are you going to do to help them?

Gregory Barker: We do not intervene every time a factory closes, unfortunately. Obviously the best thing that we can do is to create the conditions in which companies can grow and expand.

Q261 Ian Lavery: I am mindful of the time, but I want to move swiftly on to industrial heat and the use of biomass. We all understand that biomass creates high-quality heat. It is a renewable energy, but supplies are very much limited, so is it wise basically to waste biomass in the RHI or electricity production when it could be better saved for industrial heat?

David Wagstaff: The Department published its bioenergy strategy a couple of years ago, as I think you will be aware. As with so many things that we have spoken about today, you cannot look at the heat angle without looking at all the other angles as well, so you are quite right to mention bio for power and equally, of course, biofuels for transport as well. What the RHI does is, obviously, to incentivise the use of biomaterials in a whole range of commercial and industrial uses. I think I am right in saying that some of the biggest users of bio are those very industrial plants that you suggest we should incentivise. There is some really large bio CHP. I was at the Markinch plant a few months ago in Glenrothes, which is starting up now. That is burning waste bio. That is not virgin material; it is waste wood, primarily.

I think it is doing exactly what you are saying it should do, but it is not a closed market. There is an international market for bio materials, so it is not necessarily one at the expense of the other. It is possible to burn bio in Drax power station, as is being done, and in a combined heat and power plant, as is being done, and in the paper industry, for example, and other industries that require high heat, and indeed in commercial and domestic buildings. So all those things are happening at the moment.

Stephen Martin: I might just add that the RHI will support biomass at a range of different scales. In terms of the amount we expect to spend and the amount of heat that we expect to get from that, the non-domestic RHI will be substantially larger than the domestic RHI. The changes that we announced to the non-domestic RHI two weeks ago included measures that are very deliberately designed to stimulate more large biomass and biomass CHP to rebalance the spread that we are getting. We have been getting a lot of small and medium-sized biomass up until now. So we see those as important uses for biomass incentivised through the RHI and, as I say, we expect to see a lot more going to larger installations, including some that are in the industrial sector.

Q262 Ian Lavery: What alternative low-carbon sources of heat does DECC envisage heavy industry using?

David Wagstaff: This might be an opportunity to very briefly mention the sector-specific work that we kicked off in the last couple of months. Again, we announced it in the March document. It is where we are working with the eight most heat-intensive sectors of industry. Effectively, to answer your question—this is not a full answer to your question—we will work with each industry in turn.

Clearly, when you look at industrial heat, it matters massively what you are making. That might sound like a rather obvious point, but temperatures and processes are very important and solutions are very different in something as disparate as the food and drink industry, which is one of the eight and where there are hundreds if not thousands of different processes going on around the country, as opposed to oil refining. That is another one of the eight. There are only eight refineries operating, but they use more heat than any of the other sectors because they are so large. So the solutions will be very different depending on the sector.

Clearly, where you are talking about very high heat temperatures, you are not talking about heat pumps, which means you are talking about bio, but you are talking about combustion of something that is not a fossil fuel, which will mean bio, or it could mean electrification, which is an existing technology in some processes involving steel, for example. Perhaps further out into the future, you could be talking about a hydrogen-type solution or a synthetic-gases-type solution. We are not saying that we know the answers yet but that we want to work with the industry. The industry, incidentally, is very keen to work with us. So this is a very good partnership approach. We are sharing the project with BIS as well.

The other thing I should mention in this context is industrial carbon capture and storage, which we do not yet have any demonstration of in this country, but we have

jointly funded a techno-economic study into industrial CCS. We appreciate that it is an under-explored area and the industry is very keen to do that as well. Indeed, as part of the City Deal process, we have been working with Tees Valley, who have an interest because of their chemical plants up there. They are very interested in industrial CCS as well. So this is another example of where lots of things have to be joined up and a lot of collaboration is involved. We are very positive that we will have a better answer to your question once we have worked with the sectors.

Q263 Chair: I was struck by the fact that 16% of a typical household's energy budget is accounted for by hot water, a lot of which disappears down the plughole afterwards. Are you taking any measures to try to make that a more efficient process, so that not quite so much hot water is wasted?

Gregory Barker: Certainly, the Green Deal assessment will include advice on how to reduce such waste, whether through dripping taps or pouring it down the sink.

Q264 Chair: What about baths and showers, and that sort of thing?

Gregory Barker: Sorry?

Mr Lilley: Sharing baths.

Chair: Some of us already do that on a routine basis, of course. I digress, but hot water is nevertheless a high proportion of a household's energy bill and, obviously, certain types of shower may be more efficient than a bath. There may be ways of using your dishwasher that reduce waste. You have mentioned the Green Deal.

Gregory Barker: Advice. I hope that we will see the development of products that are financeable through the Green Deal in terms of waste heat recovery. One of the reasons why we have created that framework of the Green Deal is to create a showcase and a market for innovation. I hope that the market will be encouraged to bring affordable technologies to consumers. There are already technologies on the market, but they are not particularly cheap, although I am sure someone will prove me wrong. Waste heat recovery is a very attractive idea, and increasing consumerisation of that would be welcome.

Q265 Chair: Is there anything worth discussing with DCLG? Is this an area on which they might be able to help?

Gregory Barker: I am sure they might. We always enjoy conversations with DCLG.

Q266 Graham Stringer: I will follow up on Ian's question before coming back to the question that I was going to ask. Mr Wagstaff said that he could not answer the question on the kind of energy that industry will use. After yesterday's statement from INEOS saying that

they are paying a great deal more in this country than in France, let alone the United States, do you think there will be any industry left to talk to?

David Wagstaff: Sorry. Could you just clarify that? Are INEOS paying a great deal more for their electricity or for their gas? That makes quite a lot of difference.

Q267 Graham Stringer: They are paying a great deal more for their electricity in this country under the current deals than they expect to pay. From memory, they said that it is two-and-a-quarter times more expensive to buy electricity here than in France.

Gregory Barker: We take carbon leakage extremely seriously.

Q268 Graham Stringer: This is a straight price mechanism issue. Why will industry be based here if they can go to France and the United States and buy energy much more cheaply?

Gregory Barker: It is a very legitimate question, but there isn't a single answer. We take carbon leakage extremely seriously. One of the first things I did after coming to this job was to dig behind the figures by going to Germany and trying to work out why a country that was able to deploy and pay for the deployment of the largest level of renewables in Europe was simultaneously able to dramatically increase its share of the world market for manufactured goods.

Germany continues to have a very robust manufacturing sector, while deploying renewables and paying for that deployment in a way that, to date, significantly outstrips the UK. The reason for that is not because energy prices are generally cheaper for industry and commerce—they are not—but because Germany allows very significant exceptions for energy-intensive industries, which are, by and large, the minority of the manufacturing industry. Where there is a very high energy load as an essential part of an industry's production process, in Germany they get a very substantial rebate on their energy bills.

For the German economy, this amounts to about €5 billion per year handed back to that small section of energy-intensive industries as compensation for policy costs. We recognise that, and it is why last year the Chancellor announced an initial sum of £250 million for a compensation scheme. We recognise that that does not go the full distance in terms of compensation, but it is a step in the right direction. Unfortunately, we have to take into account the record deficit and the state of public finances inherited by the coalition.

We are clear that more needs to be done to assist energy-intensive industries. Clearly, there are two drivers. One is the cost of Government policy on energy-intensive industries, and what we need to do to mitigate that. The other is the underlying cost of energy. These are two quite different factors. Consider France and America. Obviously, America is benefiting from the fact that it is a closed market for gas—or at least has been to date—and it has enjoyed extraordinarily low gas prices. That has a

very beneficial effect on its economy. At the same time, it has also been able to reduce its carbon emissions, by switching quite significantly from coal to gas.

We are very keen to encourage the same gas revolution here that there has been in America, by the application of fracking. Tomorrow, we will announce a further iteration in our fracking strategy. However, at this early stage, we are cautious about suggesting that we can fully replicate here the price collapse that we saw in America, not least because of the different shape of the market and also the geological potential. There is the issue of the appetite of Europe as a whole to embrace fracking, given that we have a Europe-wide market for gas. At the moment, the UK and probably Poland are grasping this opportunity, but there is some resistance elsewhere in the EU.

Q269 Graham Stringer: I now come to the questions I was going to ask. The UK Energy Research Centre is calling for a gas network strategy group to examine the future role of gas networks in the UK. Are you going to establish such a group?

Gregory Barker: That doesn't form part of my primary brief, but my officials might know. Mr Fallon leads on gas.

David Wagstaff: I'm afraid I don't know. It is a perfectly reasonable thought, and I don't think there is a particularly strong view. I am afraid that I haven't actually asked the person who would be responsible for that, so I don't know what the answer is.

Q270 Graham Stringer: Well, going back to some of the questions Albert asked before, you gave two answers to his question about gas connections and gas disconnections being time-based, as it were. I understand that. How are you going to deal with the transformation process from an expanding gas network to one that is much smaller?

David Wagstaff: I think that is probably one of the hardest questions which could be asked. The big transformational changes that have happened to the energy system in the UK by and large took place in a pre-privatisation world. We can look to what happened in the early '70s, for example, when we went from town gas to natural gas, but that happened under regional boards rather than private companies. I think all countries will have to go through a similar transitional challenge, so this is not something the UK will have to answer on its own. It is also worth pointing out that, despite the difficulties which are faced by people with off-gas-grid homes, the UK has probably got a more extensive gas grid than virtually any other developed country.

Gregory Barker: Which would be of benefit if we are able to develop fracking here.

David Wagstaff: And we are not saying that the retreat from a gas grid is inevitable. That is an important point about the whole-system modelling that we have been doing.

Q271 Graham Stringer: Before you finish, can you expand on that point? The implication of what you were saying before was about gas shrinking, as you move to a much greater percentage of electricity.

David Wagstaff: Undoubtedly, an implication in hitting an 80% reduction in carbon emissions in 2050 is that we will be burning significantly less fossil fuels, including gas. It is without doubt the case that not as much gas will be used, assuming, of course, that that is still natural gas. One possible scenario would be for something else to go through the gas pipes that is not natural gas, and I mentioned hydrogen earlier in passing.

It is also worth noting that a lot of customers on the gas grid are industrial and commercial customers, so even while domestic users may not be burning gas, we haven't ever said that there would be no gas available for industry. So it is likely that parts of the network will still be in operation. The question then becomes: which parts of the network won't be in operation and how do you effect that change? That is a very long-term question, and we have not been definitive in our answer to that because we simply do not know.

Q272 Graham Stringer: How will you explain to the electorate, Minister, that they can no longer have gas?

Gregory Barker: I think you're pushing quite far into the future. I appreciate your confidence that we will still be in government in the 2030s.

Q273 Graham Stringer: I am fascinated by how a Conservative Government, who supposedly believe in choice, will come out with the Stalinist view that you will no longer be able to have gas piped to your house.

Gregory Barker: But I think we are talking about something that is decades ahead. That certainly will not be in our next manifesto.

Q274 Graham Stringer: So you don't look forward to explaining that?

Gregory Barker: I look forward to being politically alive to explain it. As David said, we are talking about something that really will not be a policy choice until the 2030s or possibly later.

Q275 John Robertson: The point is that no preparatory work has been done.

Gregory Barker: Well, we have quite a lot on our plate as it is.

David Wagstaff: There is preparatory work being done.

John Robertson: I would have thought so.

David Wagstaff: Not knowing a definitive answer to when and how we will do that in 20 years' time is not the same thing as not doing any preparatory work. And it is not just Government: National Grid, British Gas and all the people you would expect to have a very big interest in this are indeed looking at it. So are UCL, Imperial College and the Energy Technologies Institute and various research councils. A lot of work is being done in this area.

Q276 Graham Stringer: Don't you think the politically responsible thing to do, even if it is unlikely that you will be a Minister in the same position in 20 years' time—

Gregory Barker: What are you saying?

Graham Stringer: People live in their own homes for a long time, and the implication of the current policy is that, if this policy is to be carried through, a Government of the future will tell people that they can no longer have gas piped to their homes. I have never heard a Minister say that.

Gregory Barker: No, and I think it will be a long time before you do hear a Minister say that.

Graham Stringer: We will have to try to encourage you.

Q277 Sir Robert Smith: As Mr Wagstaff said, that is a problem that will face not just the UK, but many across the globe. But he did go on to say that we have one of the most highly developed gas networks and, therefore, we probably have to take a lead in seeing what the interaction will be between electrification and the gas network.

David Wagstaff: Well, it is always useful to look at what other countries in similar positions with similar economies are doing. Of course, in some of those countries, as we have already referred to, there are far more heat networks in place. One of the advantages of having heat networks is that it is easier to decarbonise a grid than an individual installation. So for countries with heat networks, their decarbonisation plan will involve the gradual replacement into that grid of fossil fuel forms of heating with non-fossil fuel forms.

On the point about someone having to tell the electorate at some point that they cannot burn fossil fuels, it is worth reminding ourselves that we are here because of climate change. If there were no such thing as climate change, then, quite likely, we would not have to face that difficult message. But the fact is that burning fossil fuels causes dangerous climate change. I do not think that the Government have kept quiet about that fact and it is relatively well recognised. What we have been trying to do is work out what the implications of that are for the future of our heating requirements. Clearly, the implication is that we cannot burn as much fossil fuel as we do, whether that is gas or coal or oil.

Gregory Barker: But we're going to continue to burn gas at that scale for quite some time. That is part of our plan.

Q278 Chair: What are you doing to help the replacement of old domestic storage heaters, which are not very efficient and rather expensive, with better, newer ones?

David Wagstaff: They get an improved SAP score. SAPS is the thing which underpins the green deal assessments and energy performance certificates. We have spoken to some of the companies involved, specifically Dimplex, about making more efficient electric storage heating. Dimplex is also very interested, as are we, in exploiting the storage potential as a balancing mechanism, so there is a demand side response element there as well. We have had a number of meetings with that particular company, but also with others who are interested in this area. There is a very interesting pilot in Shetland, which we referred to in our document, involving Dimplex and Scottish and Southern Electricity, which involves using storage heaters in exactly that way.

The answer is that storage heaters are already recognised through their SAP score as being more efficient, but storage heating is another of these technologies which, to fully understand its potential, you need to plug into the whole system and work out how that works with the balancing and trading off of heat and electricity demand.

Q279 Chair: One of our witnesses expressed concern that there aren't, in the whole range of incentives that exists, incentives that encourage the storage of either power or heat. Do you have any suggestions about this? Are there ways in which you can encourage storage solutions either for individual consumers or for communities?

Gregory Barker: We are putting money into storage technology. We recently announced some further funding for storage, recognising that storage has not had the focus of Government attention that it deserves to date and that there is still a lot more work that we need to do to develop it as a cost-effective technology. We recognise that we are going to need to develop that technology and it will be an increasing part of our focus. The latest grants to storage technology research and development reflect its increasing priority in the Department.

Q280 Chair: Do you think it would be helpful if there were a market for energy storage? A lot of people would like to see energy storage available, but none of them seem to regard it as their business to get on and promote or develop it.

Gregory Barker: Well, there is already a market in storage. Pump storage has been a part of the electricity economy for decades and continues to be so. We certainly want to encourage all these things, if there is going to be a resurgence of interest in pump storage, even the potential for new interconnector links with Scandinavia, for example. Discussions have been had at a very broad level of being able to see the benefits of linking our massive expansion of, say, offshore wind and intermittent renewables with pump storage in Scandinavia, where they have excess capacity. That is just one technology. There is a whole range of other technologies and applications.

You raised the issue of battery storage associated with electric cars, which is another more distributive model equally deserving of further funding and support.

Q281 Chair: Power to gas can produce low-carbon gas, which is a high-value fuel. Is there potential to use power to gas as a form of energy storage at times when there may be over-capacity in electricity?

Gregory Barker: Not a technology that I am particularly familiar with.

David Wagstaff: I think it is part of this question: if you are not going to put natural gas in the pipes, what might you put in the pipes instead? I think making gas from power would be one possible solution—making hydrogen from power. Indeed, you can have local solutions using anaerobic digestion plants and making biogas, and putting that in pipes. Again, there are isolated examples of that going on. So I think it is possible. It will depend on how the commercials and the economics of all these different alternatives stack up.

Q282 Sir Robert Smith: You touched earlier on the whole-systems approach and the need to be holistic and joined-up. One of the points put to us, especially with growing electrification and the talk about using cars and batteries, is about the smart grid and the time-of-use tariffs. How do time-of-use tariffs fit into the retail market review and the simplification of tariffs? Is it still possible to have a market for time-of-use tariffs in this new arrangement?

Gregory Barker: Yes, and what's more time-of-use tariffs will really come into their own with the roll-out of smart meters. That is going to be a real game changer in terms of time-of-use tariffs, not only by allowing a more sophisticated relationship with the supplier, but by making it easier for consumers to understand and navigate their way through these tariffs, which can be complex. Also, it opens up the opportunity for consumers who are generating some of their own electricity to have a genuinely interactive relationship with suppliers and the grid.

Q283 Sir Robert Smith: But when it comes to trying to simplify the switching market, is there not going to be a challenge?

Gregory Barker: You're right; there is a slight conundrum there. Simplicity is good for comparison, but if you are going to have time-of-use tariffs, they are, by definition, more complex the more sophisticated they become. If you introduce a new technology such as smart meters, that is a way of making that sophistication and complexity easier to understand and navigate for the typical consumer. Overall, we are trying to bring better understanding of and to shed some light on what had become a very complex market for all consumers to try to understand. The point you make about time-of-use tariffs is well made.

Q284 Sir Robert Smith: I suppose that, with the smart meter historic data, you could start to shop around and see who would have given you the better—

Gregory Barker: Well, you can not only shop around but, with an open-ended interactive smart meter, you can have a much smarter relationship with your supplier, so that you could have real-time data that allows your smart meter to switch.

Q285 Sir Robert Smith: On the other side of joining up, how are Local Government, Transport and the other Departments integrated into trying to take a whole-systems energy approach?

David Wagstaff: Well, they are integrated; that is the good news. As I say, we are working quite closely with academic and private sector partners on developing what this solution will look like. We are also working with the Energy Technologies Institute, and the other Government Departments are also contributors to those processes. DCLG is probably the closest, because of the built environment question and also because of planning and—as you say—local government. There is another part of the Department that is leading on this whole model development; I think they are putting in place some governance. I am afraid I don't know exactly which Departments are or are not represented on that, but I would be very confident that they will ensure that the whole of the relevant architecture is in place.

Q286 Sir Robert Smith: Maybe you could write to us with a bit more detail.

David Wagstaff: I am very happy to do that, yes.

Chair: We've kept you a long time. We are very grateful to you this morning. Thank you very much, and we look forward to writing our report.