HOUSE OF COMMONS

Energy and Climate Change Committee

Oral evidence: 2020 Heat and Transport Renewable Targets, HC 173

Tuesday 7 June 2016

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Watch the meeting

Members present: Mr Angus Brendan MacNeil (Chair), Rushanara Ali, Mr Alistair Carmichael
James Heappey, Julian Sturdy

Questions 1 - 68

Witnesses: *Witnesses:* **Philip Sellwood**, Chief Executive Officer, Energy Saving Trust, **Paul Blacklock**, Director of Corporate Affairs, Calor Gas, **Juliet Davenport**, Chief Executive Officer, Good Energy, **Christopher Snelling**, Head of National and Regional Policy and Public Affairs, Freight Transport Association, and **Jonathan Murray**, Policy and Operations Director, Low Carbon Vehicles Partnership, gave evidence.

Q1 Chair: First, could I apologise, panel, for our late start this morning and thank you for coming to give evidence to our first public session on the 2020 renewable heat and transport targets? I hope you are sitting comfortably. I see it is quite a squeezed table. Could I please ask you first to state your names and organisations for the record, starting on my left?

Philip Sellwood: Philip Sellwood, Chief Executive of the Energy Saving Trust.

Paul Blacklock: Paul Blacklock, Calor Gas.

Juliet Davenport: Juliet Davenport, Good Energy.

Jonathan Murray: Jonathan Murray from the Low Carbon Vehicles Partnership.

Christopher Snelling: Christopher Snelling, Freight Transport Association.

Q2 Chair: Thank you very much. We are going to be moving between questions on heat and questions on transport throughout the morning session, but we are also interested in looking across energy systems, so please, panel, if you do contribute when you see the cross-cutting issues and issues of note, it would be appreciated. The first question I have is: the UK must provide for 15% of its energy consumption from renewable sources by 2020, including a sub-target of 10% for transport. To achieve this, the Government plan is to reach 30% renewables

in electricity, 12% renewables in heat. So my first question for each of the witnesses: will the UK achieve some or all of these targets?

Philip Sellwood: I think it is more than likely that those targets that are around the electrification and electric will be met, given that we are already some way ahead of the target in 2014. It is unlikely—certainly from the insight work that we have done—that the targets for renewable heat and renewable transport will be met, and I think even the Secretary of State on several occasions, in response to pieces of evidence from the Climate Change Committee, and indeed from the European Commission, has already made it clear that there is a policy gap between that which needs to happen between now and 2020 and that which is currently the declared target, so I think on balance we will see an exceeding in one area but certainly, as far as transport and renewable heat, we do not see at the moment that there will be a chance of that target being met by 2020.

Q3 Chair: Does anybody disagree with that on the panel?

Juliet Davenport: No.

Paul Blacklock: No.

Jonathan Murray: No.

Christopher Snelling: No.

Q4 Chair: What levels will be met then? If it is not the targets set out, how close will it be to the targets? Juliet, you look as if you have bated breath there.

Juliet Davenport: Yes. When we look at the targets particularly around heat, a lot of the progression we have seen between 2010 and 2014 has really been made as a result of reduction in energy use, so we are seeing a reduction in energy use, which is partially energy efficiency but we are also seeing a temperature impact on demand in the UK. So in December, because it was unusually warm, we saw a 20% reduction in demand. So we are seeing some movement, which is great, in terms of that target, but we are not necessarily seeing it delivered by renewable heat technologies. I think we still have quite a long way to go in terms of making sure that we are moving forward on the technologies themselves as well as doing all the great work we are doing on reducing energy demand.

Q5 Chair: So if the target is 12% for heat and 10% for transport, what do you think they will be? Will they get within 2% of that? Will they be half that? Any ideas of where they might get to?

Juliet Davenport: I would suggest you might get to half on heat, possibly. On transport—

Jonathan Murray: The analysis that we have done on the low carbon vehicle partnership and working with DfT's analysts as well, the indication that we have is on the transport side. In terms of the proportion of renewables actually in transport, energy would be of the order of about 7% maximum and, in terms of complying with the target, you would be relying on double counting: double counting of waste trends, multiple counting of electrification of transport.

Q6 Chair: What would be the impact of missing the targets? Would they impact on consumers in the long or the short term if these targets have been missed?

Paul Blacklock: I do not know if there would be any impact on consumers, unless it feeds through into some sort of fine that then gets fed through in some way in terms of the taxes. I would say on transport one of the problems that the industry has is even at this moment the Department for Transport are looking to change the regime around renewable fuels, which has put in significant uncertainty in terms of exactly what fuels would be allowed and at what level between now and 2020. Certainly, in terms of the increase in renewable fuels that would be required, very few companies are going to be prepared to make the investments that would be necessary against that level of uncertainty. In particular, Brussels took about four years—no, longer than that I think—to agree a crop cap for renewable fuels and they set that as 7%. But you now have the UK Government who are going to consult on that in the summer and they are looking to bring in a very aggressive—not 7% but pushing down towards 1.5%, which means that the renewable fuels industry at the moment does not know where it is, and you cannot plan in terms of that uplift in production within a three-year period when you don't know where the pitch is going to be.

Q7 Chair: You say there has been a sudden shift in Government direction there that has left uncertainty in the renewable fuels market—

Paul Blacklock: This is what we have been promised is a significant change.

Q8 Chair: Therefore, those in the renewable fuels' market are concerned at the direction of travel of the Government and are uncertain how to trim their sails?

Paul Blacklock: Exactly. It takes a long time to increase production or provide the production capacity in the first place. At the moment the industry does not know what the rules are going to be, and certainly are not going to know that renewables won't come in, at best, until next April, but we have been told that could be delayed because of the referendum and all the rest of it. Against that background, I would say the renewables target is one of the three that is the least certain of getting anywhere near it.

Philip Sellwood: In response to your direct question about what impact that might have on consumers, I was going to say it is important to see the context of the renewable heat agenda and particularly the RHI. One of the major issues we have at the moment, from the work that we and many others have done, is the level of awareness in the public is so low. This is potentially a programme that we are going to be spending £1 billion on and the latest evidence suggests that there is probably about a 5% awareness of renewable heat incentive, and about a 12% awareness of things like ground source heat pumps, so unless we align some form of public awareness campaign between now and 2020, frankly, apart from those who were early adopters and those who really want to get involved, I think the impact will be pretty low because people do not know that it exists now.

Q9 Chair: I heard some criticisms out of the Government changing or seeming to change that. What should the Government do instead then? We can all criticise—and probably nobody better than myself is doing that—but would it be constructive, Jonathan?

Jonathan Murray: Yes. I can talk to the transport side of it and I think that the change that is being proposed to the renewable transport fuels obligation is supported by stakeholders and is being called for. Part of the reason for that is that the policy around renewables has been in a holding pattern for a number of years. There has been investment put in place

into providing a production plant, particularly for bioethanol in the UK where those plants are not being used at the moment—they are being mothballed—because the market has not evolved as it was anticipated.

The recommendations of the Transport Energy Task Force, put to the Government in March last year, was that the sub-target for transport, if you looked at the multiple counting, could just about be achieved by 2020 if we deployed a new blend of petrol, E10, which would allow for more bioethanol in petrol blend and also, greater use of waste biodiesel in the current blend of diesel. Those would give us the best chance of improving and it would be in line with a longer term trajectory for reducing or decarbonising road transport. That is probably one of the main concerns that stakeholders more broadly have—that the target for 2020 should not be a diversion. If we are going to implement it, if we are going to change policies, it should be in a way that allows us to continue a trajectory that will be around the longer term objectives of decarbonisation and reducing greenhouse gases.

Juliet Davenport: To come back to your question in terms of what impact does it have on consumers, I do think there is an impact that is slightly forgotten quite often in this debate, which is around localised pollution. So when you look at decarbonising, and particularly depending on which technologies you look at, you could start to look. So if you look at electric heat pumps, electrification of the heating market, you begin to reduce the local emissions that you have in those cases and the same with the transport market. So I think there are some benefits that you see long term for consumers.

In terms of looking at a balanced market—I think the transport market particularly—there are opportunities to see an overlap with supporting the electricity market as well. One of the things we think is an interesting technology is looking at potentially hydrogen in the transport market. One of the reasons for that is that you can use it to take excess load out of the electricity market, and particularly we are now seeing that in the summer, and use the transport market, and potentially even the heating market and the gas market to mix hydrogen—I think you can mix up to 5% into the gas mix—and use that as a balancing across the three. An integrated thinking across these three policies would be welcome. I am not saying it is the only way you do it, but I think it is an interesting opportunity across those three.

Q10 Chair: Thank you. Can I have a view from the Freight Transport Association on biofuels because I have heard criticisms, particularly in rural areas where the volume of throughput might not be great, of the stability of these sorts of fuels? I wonder whether you have any view, positive or negative, on this shift.

Christopher Snelling: From our point of view as potential users—and our interest is more in actually having alternatively fuelled vehicles—the market for that is still at a very niche stage at this time. There isn't the faith in it as an operational technology at the moment. It is partly because of a lack of faith in, as has already been referenced, Government policy. A lot of people had invested in used cooking oil and then the duty differential was taken away, and experience like that, the memory of that is held within the industry and it puts off a lot of people experimenting in this area. I would say very much looking at this horizon to 2020 it is still very much an almost experimental area within particularly the heavier commercial fleet where we are looking at alternative fuels. In the current trajectory, the current framework, we wouldn't expect to see a mass take up over this next

four-year period. I think things would need to change in terms of fiscal support for that to happen.

Q11 Chair: Thank you. Before I bring in Julian Sturdy, a final question from me at the moment. Given we reckon that the renewable heat target of 12% and the renewables transport target of 10% will be missed, what would the panel's view be on the Government making up these shortfalls by focusing on renewable electricity?

Juliet Davenport: From our point of view we think that is a good intermediary stage, and particularly if you are looking for a translation into the electric vehicle market as well. So, electric vehicle, hydrogen vehicle, you can translate between the two marketplaces quite well. We have seen a lot of the policies that Government is taking out in the last year in terms of any forward look, in terms of both onshore wind, onshore solar, both of which are very effective technologies, and the transport market and the heating market can begin to work in integration with them as I suggested earlier. That is becoming quite an exciting potential proposition with storage coming through, not only stationary storage but storage within cars, and that kind of integration of these markets, suddenly you begin to look at a very different picture and making life a lot easier instead of trying to just do it in these three silos that we have traditionally thought about.

Philip Sellwood: I could not agree more with that point in that consumers at the moment are being asked—whether they be business consumers or domestic consumers—to in a sense make false choices between, "Do I want to have an electric vehicle? Do I want a renewable heat technology in my home? Do I want to put cavity wall insulation in?" Frankly the answer is: if we do not adopt that systems-based approach, and things like storage have the ability to bring into alignment renewable heat, transport and electricity, decarbonisation, then I think we will stutter with either one technology or one piece of the agenda going forward and then possibly be caught up with another. I think we do have to look at it from a systemic point of view, otherwise we will make false choices between putting all our eggs in the decarbonisation basket.

Q12 Julian Sturdy: I want to come back on transport. I find this interesting, and there has been a lot of talk about the bioethanol in the waste fuels. We talked about hydrogen briefly and obviously about electric vehicles. It always seems to me that they are all seen as a panacea to solving the problem but they seem to have a short lifespan and then another one takes over, if that makes sense. We used to talk about hydrogen and suddenly that has dropped away and now electric vehicles have taken over. We talked a lot about ethanol fuels and then we have seen a drop in the oil prices, and suddenly that is not as economically viable as it used to be. Can all three play a role or do we really have to focus on one to actually deliver?

Jonathan Murray: Perhaps I could start the ball rolling on this. One of the things that the low carbon vehicle partnership has done—we are a multi-stakeholder group—we have been working with the fuel suppliers and the vehicle manufacturers, and one of the things that we have looked at is developing a series of roadmaps in terms of delivering targets for decarbonisation to 2050. This is a set of vehicle technology roadmaps, which is the automotive suppliers' view as to how they are going to deliver that. That makes certain assumptions about fuels that would be available and technology breakthroughs. In conjunction with that we have done a set of fuel roadmaps as well: what are the fuels that

are going to supply those vehicles? Also infrastructure roadmaps: how are those fuels going to be provided? One of the key things is that as we move away from traditional fossil liquid fuels, which are very good in terms of energy density—you can get a lot of energy into 1 litre and transport them around very easily—once you move away from that as being the key choice, the key criteria for choosing a fuel to power your vehicle, you are then starting to come into a lot of issues. There is no panacea. Each technology, each fuel fits a type of operation very well. So, electric vehicles are very good at urban passenger car delivery; on the freight side, electrification of long distance freight trucks would be very difficult. There things like biomethane trucks would be much more suitable. Likewise, as Juliet has pointed out, there are energies that play a role, for example, hydrogen, in terms of energy storage and balancing the network.

If you look at those roadmaps, all those technologies are there. So, basically, if you talk to the vehicle manufacturers, the energy suppliers, they will say that we are going to need all the tools in the box to decarbonise transport.

Q13 Julian Sturdy: There is a slight problem there, though, isn't there? The consumer needs to trust one to be able to buy into it. Electric vehicles seem to be leading the way now in that. But then they have been in the past and hydrogen has taken back over and leapfrogged it again and now electric vehicles are in the front, so for it to really work the consumer has to buy into it and believe in one of those technologies that it is going to deliver what they want, which is something that they can use anywhere in the country not just in certain areas.

Juliet Davenport: But I think also we will begin to see people using different vehicles for different activities. The hybrid vehicles obviously are a brilliant first stage in terms of getting people over that range anxiety particularly, so I think we have seen the huge success of the Mitsubishi PHEV technology come through as one of the bestselling hybrids in the UK. Then you are seeing other technologies come through in terms of those. Obviously, the Tesla is worldwide known. It sold out overnight. So, I think that what you are seeing is that change. It is not going to change overnight, but I think one of the things that Government can do is be consistent about its approach. One of the issues—

Q14 Julian Sturdy: But it isn't, is it?

Juliet Davenport: No. I have an excerpt from the *Daily Mail*. I hate to quote the *Daily Mail* but I am going to. It is all about road tax and the recent road tax reform basically puts the Ford Mustang GT ahead of a Volvo hybrid in terms of the actual change in cost. A Ford Mustang is going to cost you 900 quid less over the next five years to tax. The Volvo is going from a zero rate and you are going to end up paying £2,500 more to put a Volvo hybrid on the road, so we need consistency in terms of policy across because consumers need that and they need to be given confidence by Government that they are doing the right thing, and if the tax is telling them they are doing the wrong thing they are going to feel, "This is not great".

Q15 Julian Sturdy: Sorry, Chair, last point. That was my point. The consumers don't believe at the moment, do they? I think that is the problem.

Juliet Davenport: They believe in the concept and they love the concept. Electric cars perform very well. They are a good performance car. I don't know if you have ever had a chance to drive one.

Julian Sturdy: I haven't actually.

Juliet Davenport: You should because the acceleration, the noise, all those things are great, so it is a great consumer experience. I think we have a technology that could move very fast, we just have to make sure—similar to we were talking about the RHI—there is a public awareness around this that this is a technology that works today.

Philip Sellwood: One thing that I think is lacking is leadership of public procurement. One of the ways in which we could make it clear that this is something that is good and progressive—50% of new cars that are sold are fleet, and the work that we have done with Government agencies and public sector agencies says that can lead not only to significant cost reductions, but also to all of the consequent reductions in emissions and gases—is if people were seeing the public sector taking the lead in terms of procuring electric vehicles, for instance, in their fleets, whether it is passenger cars or heavier vehicles: then I think they would start to take it seriously, but at the moment, despite the evidence, that is not happening.

Paul Blacklock: Part of the problem you say is about consumers having trust and there are fashions in technology. Those fashions come from Government. We are a victim to that. Back in the 1990s—and the Energy Savings Trust were very much involved in this—we were encouraged by Government to develop a network of refuelling stations for LPG. They said, "We will give you a reduction in fuel duty. In return, you go and establish a network". We had no taxpayers' money. So the industry duly went out and did that and established a network of more than 1,500 refuelling stations in the country. Then the Government changed their mind. In fact, to the extent that if you go to the DfT now they say that they use the LPG industry as an example of how not to treat an industry.

As it happens, the other thing that changes is your fashions in policy. Air quality has now come in as the overriding factor in terms of transport policy, in terms of there is an urgent need to do something about air quality now, and electricity, while it is a long-term play, is not going to sort out air quality in the timescales that have been set by the likes of ClientEarth. Now, luckily, our network is still in place and LPG has the advantage of delivering both carbon savings but also fuel quality benefits, and we are bringing in bio-LPG early next year. So, sometimes there needs to be a longer term view of these things because existing industries can adapt as we have seen with liquid fuels introducing bioethanol, as opposed to completely trying to come up with a completely new technology, which is over there or over there. As for public procurement, at the moment local authorities and Government have very severe fiscal constraints and their ability to run a large proportion of their fleet with these alternative fuel vehicles, like electric and hydrogen, is challenging because they are that much more expensive for the vehicle in the first place and then they have to pay for the infrastructure as well.

Q16 James Heappey: I am going to move on to look at consumer issues around the RHI and its proposed reform. I will start by asking: should the RHI reforms have gone further and, in your view, how could they have done so?

Paul Blacklock: Yes, basically, one of the reasons why the public have not particularly engaged with renewable heat is because the options they have been given have been fairly niche. A biomass boiler is a large piece of kit and a lot of existing properties will not have the room to put in a large biomass boiler, and when you start looking at electric heat pumps there have been a succession of Government trials of electric heat pumps that have shown them failing to deliver either sufficient heat to the home or qualify as renewable heat. It seems that every time that an estate has installed a load of electric heat pumps Angela Rippon turned up doing "Rip Off Britain" programmes and all the rest of it. So part of the lack of engagement was a lack of consumer confidence that, if they invest in this technology, they are going to have a warm home and one they can afford to heat.

Juliet Davenport: I think they are twofold in terms of renewable heat. One of the things that we would suggest is, if you look at the way it has been structured in terms of the tariffs, it tends to incentivise large homes. So for the mid-tier homes or the average user in terms of heat the return is not as good as if you have a bigger home. We think that they should review the way it is structured to be able to appeal to a wider audience.

There also needs to be more information. Renewable heat pumps particularly produce low grade heat, so it does not switch on very fast and heat your home immediately. It keeps a much more consistent low heat, so it is much better in highly insulated homes, more modern homes particularly if you can put it in at the construction phase. So, obviously zero carbon homes going as a piece of legislation was a real shame because that technology suits that type of high insulation level.

Q17 James Heappey: I want to follow on on that in two areas: first, whether we have the right amount of funding right there and the tariffs are available and, secondly, desirability. So, on the money first, is your view that enough funding has been made available to make the RHI successful?

Juliet Davenport: It depends if you are trying to hit the targets or not. If the RHI is there to hit the renewable targets on heat then potentially not, because we have already seen it cut from £1.9 billion to £1 billion and it has been agreed that it is cut almost by a third in terms of the total amount that it will deliver. On that basis, you would say it is not enough money but, on the other side, I think we need to look at restructuring it. Because I think Philip very well said that the awareness of this is very low, so you need to think how much of that budget you spend in other areas. Secondly, one of the other things is this: the RHI is very dissimilar to the feed-in tariff. The feed-in tariff is managed by electricity suppliers. We look after customers. We are a customer-facing organisation so we tend to have systems in place to talk to customers, call centres, all those good things. Under the RHI the legislation insisted that DECC or Ofgem had to manage this, and one of your biggest problems with an economic regulator is that they don't naturally have a customer-facing edge. They are not in the business of making sure that customers understand things, whereas energy suppliers tend to be. Well, maybe not all of them but I would say some of us are pretty good at it. Therefore, you engage with them, explain what the RHI is, explain how it works. In terms of filling in the forms, I think there was one point where there was an 80% backlog where people had been waiting for more than six months to process their RHI. So I think the process, in terms of how consumer friendly it is, is really important, the awareness and then looking at the actual tariffs themselves and seeing whether you can make sure that they appeal to a wider audience just than to large homes.

Q18 James Heappey: That is very helpful but my view is that, regardless of the amount of money that you make available and how you incentivise things through that, there is simply, as you say, a lack of understanding and a lack of desirability for doing this. It is a bit niche and it is being done—

Juliet Davenport: I think there is a lack of trust. I am not sure about desirability because I think once people get used to having a heat pump and they understand the technology, it is like anything new—

Q19 James Heappey: But people are not clamouring for it. The issue is that all of this is great. We get the need. We are seeking to decarbonise heat. The Government has a policy in place. This is just passing consumers by, so the key challenge is to make consumers want to do this in their homes.

Philip Sellwood: Yes. The key challenge is not to talk just about the technology. To your first point, I don't think the money is the issue. Juliet's point is about how that money is being disposed between the different technologies because our view would be, for instance, on DECC's own figures, small biomass is making no sort of return and all the emphasis is on heat pumps. That aside, the key issue for us is that people are just seeing this as a technology play, not about what it gives consumers and how it ties in with other things. For instance, we have many, many instances of heat pumps being put into houses that are fantastically thermally inefficient, so heat pumps in houses that do not have cavity wall insulation. There is no concept for the consumer that what we are selling them is comfort, security, warmth and an escape from fuel poverty, so how to sell them the technology they do not understand.

Q20 James Heappey: Look at this from the perspective of the consumer, how do we change consumer thinking so that heat is viewed as a commodity? There is a difference. The Committee visited Denmark where heat is very much regarded as a commodity in its own right. In this country that is just not the case. Heat is the product of the gas or electricity that heats your home. So we need to effect that change and then, once you do that, people might then start to consider how to get that heat into their home more cost effectively and potentially in a less carbon intensive way.

Philip Sellwood: It is about talking in the language of the consumer. They do not want to know about the renewable heat incentive or ground source heat pumps. They want to know whether or not if they have this technology it means their house is warmer, their bills are lower, and they have greater comfort and better health outcomes. That is the language we need to talk—not, "Get an air source heat pump or a small biomass". I think that is a turn-off.

Q21 James Heappey: Is it fair to say we in this place, Government, the industry, the green lobby, are all rather obsessed with the green issues and the technology and that we do not speak the language of the consumer?

Paul Blacklock: No. The renewable heat target got in the way because it was quite clear it was about having renewable heat in its own right, whether or not it saved carbon. If you look at some of the biomass and certainly if you look at the inefficient deployment of heat pumps, that does not save carbon. It was a fixation with hitting the renewables target and what the Government was forcing consumers to do was go and buy their heat advice from

a different place. Most of them are distressed purchasers—their boiler has broken down or it needs repairing and they rely on the expert, the person they have called in to come up with a solution. If that solution is not available from that expert, because most of the gas installers and oil installers don't install heat pumps, they are not going to say, "Well, I am sorry, this one is broken now, we cannot repair it. We don't do these. Can you go down the road and get an electric heat pump?" and similarly with biomass.

The Government spent a lot of time and effort trying to establish a new supply chain and trying to push the consumer towards that new supply chain. At the same time, because of all the administration that sat around RHI in terms of the MCS, which is an incredibly bureaucratic scheme, it just made it very difficult for installers. It made it very difficult for consumers. They did nothing to try to work with the grain of the market to where consumers get their advice, which is from those trusted experts, from those installers. If you focus properly on things like energy efficiency, which then gives you your carbon savings, there is a lot more that can be delivered through those installers in terms of better controls on systems. Half the boilers in people's homes are F and G, old boilers. If you look particularly at oil boilers they will see everyone in this room out. They are made of cast iron. The only thing that ever needs changing on them is the thermocouple and unless the Government aggressively targets those, not that we are trying to get them to put in a completely different technology that needs the house insulating to within an inch of its life, a massive disturbance for the consumer, but instead start looking at what—a new boiler will knock 25% off an existing F and G rated boiler. If you then combine that with additional controls you are probably going to get another 5%, 6%, 7% saving, so there are different ways. If I am quite honest, with the death of the renewable heat target, because after 2020 there is no renewable heat target, and a pure focus on carbon saving, and with that energy efficiency, I think the Government will be forced to work with how the market and how consumers work without having to send them in a different place.

Q22 James Heappey: Are we backing the wrong horse potentially? Is the employment of these individual technologies within individual homes a tougher sell than focusing on district heat, for example, and aggressively promoting district heat?

Philip Sellwood: I think it is how you sell it, so the analogy I would use is if you are putting in a new kitchen or a new bathroom you don't go out and say, "I am today going to buy a sink and next week I will go and get a bath". You say, "I want a system. It is called a bathroom. A system, it is called a kitchen". What we do in this area is we say, "We want a bit of energy efficiency over here, see what that does. Oh, and by the way there is a subsidy or some sort of support for this technology. We will put that in". There is no explanation about how the bath works with the sink, so you end up with suboptimal performance, and we know from the two major field trials we did between 2010 and 2015 that the actual performance in situ was much, much worse than anybody was predicating from the manufacturers, not because there was a conspiracy but because it had not been sold to the consumer as a system. It had been sold as a technology, so I think the analogy works for me that that is how people buy things. So I don't think we are wrong, how we are selling it is wrong.

Q23 James Heappey: But to pick up from the point earlier on about the public sector showing a lead, one of the areas that I have been particularly impressed with—as I have been invited out on various visits in the run up to this inquiry—is in where social housing schemes

have retrospectively fitted quite large scale district heat networks. When you do that you get a lot of properties in one go as part of a more carbon efficient heat network, and it seems to me that if that were to be where the Government's heat focus went and you started with the social housing stock, you may well create a clamour for those networks to be rolled out more widely than just social housing.

Juliet Davenport: I think the district heating systems are interesting and they have been used extensively in Northern Europe, particularly because you have high heat loads. If you look at somewhere like Sweden, CHP from biomass has been historically used significantly. But if you look in the UK I think there are opportunities for district heating, particularly in social housing, particularly off-gas grid because we have some of the cheapest gas prices in Europe. In the UK we have a very liquid gas market, so off-gas grid is where you are really looking at this. But what you have to be aware of is that, yes, I think that is a good way forward but if you focus it all on there, again, you are just trying to go down one route and you will begin to hit barriers where it will not be as efficient to do it that way. So we do need to think across technologies. A one-technology solution is not going to work.

Q24 James Heappey: Paul, I saw you shake your head, which is good because the last question I wanted to ask I suspect you will find you can pick up on that and answer my question in the same go.

Paul Blacklock: I could not disagree with Juliet more.

James Heappey: I thought you might. I was going to ask you what further support you would like to see for consumers who are in rural areas and are potentially not on the gas grid, if you can answer that and pick up on Juliet's points.

Paul Blacklock: I will start with Juliet. In terms of district heating and off-gas grid, heating oil for the past 18 months, pushing two years, has been cheaper than natural gas, so what you are going to offer the consumers in terms of a reduction in energy costs is questionable. Again, you only have to look at off-gas grid areas where you have a very disperse, not very dense level of housing and development. The thought of then piping those up the district heating networks at scale is questionable at best. In terms of—

Juliet Davenport: I completely agree with you and what I was saying is it is only district heating in places where it is appropriate—where you have condensed housing—so that was my point.

Paul Blacklock: Again that is going to be at scale in urban areas where you have a high enough density of housing and likely to have—

Juliet Davenport: Not always.

Paul Blacklock: Anyway, it would be nice for rural householders to have some help in the first place. If you look at the main energy efficiency programmes that have been in existence for the past 10 years or more, virtually none of that has been spent in off-gas grid areas. Going right back to CERT and CESP, nothing happened in off-gas grid areas essentially because of the way that the rules for the schemes were written. The obligated suppliers were targeted to achieve energy efficiency savings but at the lowest cost, obviously, and consumers wanted to see that for the lowest bills and all the rest of it. That

meant that they chased the low hanging fruit in urban areas. We lobbied on this and when the Government brought in ECO they brought in a rural sub-target for ECO, but they defined "rural" as settlements up to 10,000 people, which basically meant small market towns and urban fringes. So, yet again, none of ECO happened or very little of ECO happened in off-gas grid areas. In fact we had to do a freedom of information request to Ofgem to get any numbers because DECC refused to provide us with numbers and certainly were not answering parliamentary questions that Members were putting forward.

When you then start looking at the numbers, there was a *Telegraph* article back in 2014 that quoted that off-gas grid consumers had put £70 million in, £42 per household and they got about £2 back at best. So, in terms of the next iteration of ECO, there needs to be a far better definition. In fact, in the last fuel poverty strategy the Government admitted there had been a policy failure in terms of addressing energy efficiency in off-gas grid rural areas. You always have to put those two things together: off-gas grid rural, because quite often the Government achieves its off-gas targets by doing tower blocks in the middle of cities and, again, we have seen a lot of the off-gas grid work has been insulation of tower blocks and new electric heating for tower blocks in urban areas. People see fields but it is not—it is tower blocks.

Q25 Julian Sturdy: Very briefly, would you say there is a rural/urban divide in terms of support from DECC?

Paul Blacklock: Absolutely, and what we have seen is—well, we had a situation with when they were trying to sustain the green deal and get people to take up a green deal, they came up with the green deal home improvement fund, which was essentially a bung to consumers to take up a green deal. Within that, consumers who put in a new boiler under green deal would get money off a new boiler, but DECC specifically excluded anyone that was on heating oil and LPG. When we challenged that, the official said, "I don't want anything to get in the way of me hitting my renewables target. They can have renewables", and we said, "So if you live in an urban area you can have £300 or whatever off a boiler, but if you live in the middle of a field you have to find somewhere between £6,000 to £25,000, whatever the cost of that new system is, for a new heating system", and he said, "Well, why wouldn't they do it? It is such a good deal. It is an investment", and we said, "That is not how people view heating systems". So there has been a complete failure in terms of off-gas grid rural, and certainly in terms of consumers' access to the same rights as people who live in towns and cities.

Philip Sellwood: Could I just bring a bit of evidence that is in contrast to that? The Chair will know we run the Scottish district heating loans scheme, which hopefully tries to address a better balance between urban and rural schemes. It has been hugely successful. The minimum saving is around 10% for those communities, but we are also seeing savings in terms of energy bills between 30% and 40% in some of those rural off-gas grid communities. So in terms of the earlier question about whether or not district heating is appropriate, I think it is not only appropriate but we have to be really clear about who benefits most because it is those communities that have the multiple benefits in terms of relief of fuel poverty, better health outcomes and so on. So I think it does have a role to play. There is no question.

Q26 Mr Alistair Carmichael: Paul has picked up the point already. Much as I was entertained by this little spat about the appropriateness of district heating schemes off grid, it is all in the definition—what you regard as being urban and what you regard as being rural—because there are a lot of communities that I would regard as urban, and you have seen the figure of 10,000, when in fact you see very successful and effective operations of district heating schemes. It is kind of frustrating, though, that we are after all this time still delivering so much by targets rather than the outcomes.

Paul Blacklock: No, I completely agree. To pick up on Philip's point, there have been some instances within the district heating schemes that have been supported in Scotland that we would question. There was one in particular that was three houses—a district biomass scheme that cost £60,000 for three houses. For £60,000 you could have given 30 homes a new boiler, so there are times where you say the achievement of targets and fashions can get in the way of trying to deliver the most help to the most people.

Q27 Rushanara Ali: I wanted to turn to the renewable transport fuel obligation. How important would you say it is to the Government meeting its 10% renewable transport target?

Jonathan Murray: I would say it is critical and without the changes that were recommended through the transport energy task force—the transport energy task force made recommendations. There are risks in whichever approach you take. The two that they recommended as being the minimum risk would be deploying a new blend of petrol E10, which would have a higher concentration of bioethanol, and using more waste in biodiesel. That would give you a fighting chance of getting to the target using double counting. There really isn't anything else that you can deploy in the timescale that would deliver anywhere near the target. What you are really dependent on is waste fuels—used cooking oil for biodiesel. That is what delivers the vast majority of the target.

Q28 Rushanara Ali: Does anyone else want to come in on this one?

Christopher Snelling: Yes. From our point of view as users and so on—we are talking about the setting of targets—to be honest, we are not focused on the renewables target. It is not directly of interest to us. What is of interest to our members is their carbon efficiency and their local air quality efficiency, and they are taking whatever package of measures they can to try to address that. I think the complete switch to an alternative fuel, certainly at the heavier weights, is still, as I said, a fairly niche operation. It is issues like managing drivers and aerodynamic devices on vehicles that get much bigger returns at the moment, particularly for us I would say in the short term.

A big factor to consider in this period to 2020 is the focus in our industry will almost all—in terms of spending within companies—be on the local air quality side of things, partly because people, because of the increasing public attention, want to meet that target, but also because we have a series of regulatory restrictions coming in between now and 2020 in different cities in the UK. So the game for most of the companies is about upgrading their existing diesel fleet to Euro 6, which will achieve about an 80% gain on the particulate matter kind of issues. That is where a lot of the spending is being focused. So the debate about the renewables is not felt directly within our industry, particularly, as at the lighter end we are looking at electrification, which obviously depends on your definition of whether it is renewable or not.

Q29 Rushanara Ali: Thank you. Our understanding from part of the evidence that we have had is that the Government intends to use the RTFO to contribute towards 9.5 percentage points of the 10% target. Earlier on somebody mentioned that it is likely to be way off that. Can you comment on whether you think the Government is being unrealistic in the light of what you said?

Paul Blacklock: Well, our concern about the renewable transport fuel obligation, the targets, is that, as I said earlier on, the Government is in the process of, and will be consulting on, changing the rules of the scheme. Certainly, from what we can see they are taking a piece of Brussels' legislation that they are then going to gold-plate in style. Jonathan mentioned about used cooking oil: we have seen some analysis that suggests that it would require the UK to hoover up all the used cooking oil in Europe and then have to go outside Europe and get even more used cooking oil. If Sir Humphrey was here he would say something like, "Courageous, Minister", so you have to wonder. To be changing the rules—

Q30 Rushanara Ali: That might make it more challenging if we are out of the European Union as well.

Paul Blacklock: Yes, I was going to say I didn't want to get into Brexit. I am not a no on this. We still have two weeks to go.

But in terms of creating that level of certainty for industry and end users to operate within, with only three years of the target to go, the thought of moving the goalposts at this stage is daft.

Q31 Rushanara Ali: So the 9.5% is daft?

Paul Blacklock: I think getting there, especially with these possible changes in the rules, is going to be challenging.

Q32 Rushanara Ali: Earlier it was mentioned that it is likely to be half the 10%, so you think about 5%?

Paul Blacklock: I would not like to put—

Rushanara Ali: You do not have any sense of how close?

Paul Blacklock: Jonathan would be better placed.

Jonathan Murray: Yes. The RTFO as it stands is 4.75% and we are at that level and, unless the RTFO is changed—and there will be a consultation we understand this summer with a view to changing it next year—it will remain at that level and we will miss the target on the transport side. If the changes are brought in, in the task force that we help DfT lead the consensus was it was achievable even given that timeframe. Right from the start it was recognised that the timeframe would be a go flag or the go pistol would be April 2017, so it would have to be done in a compressed time. We are fortunate to have in this country as the major fuel supplier Green Energy, who are specialists in renewable energy and experts in sourcing waste streams. If you took evidence from them they would quite clearly be of the view that they could supply those fuels and those feed stocks were available. However, it is challenging in the timeframe that we have left, and that is as a

result of the timescale that the Government has given us to work within. It is achievable. It will be challenging. It can be done.

Q33 Rushanara Ali: Could you say a bit more about what additional actions would be required?

Jonathan Murray: I think the key challenge that we face is introducing a new grade of petrol, E10. There is an issue there. E5 petrol, the current grade of petrol, has all the vehicles in the UK. All petrol vehicles have been compatible with that fuel and have been able to run on that fuel very successfully. There has been a planned transition, which the automotive industry has been aware of and has been preparing for, for decades, of moving to E10. However, there are a number—about 9% as we stand at the moment—of petrol vehicles in the UK that would have difficulties running on E10. So there will need to be a public information campaign to explain which vehicles cannot use E10 successfully. That will be a critical element of deploying and meeting the target, because moving to E10 would deliver a significant percentage point; about a percentage point of the target would be delivered by bioethanol.

Q34 Rushanara Ali: In terms of meeting both the heat and transport targets, can you expand on the balance between Government policies driving change and the role of consumers? I know earlier on there has been really helpful reflections on how we raise awareness among consumers and help to change behaviour, but what do you think is the policy balance between Government and consumer action in terms of opting for a green vision of renewable transport?

Philip Sellwood: Perhaps I can respond to that. I think it has to be led in that order. I think on a couple of points that Juliet made earlier, one of the things that we have failed to see in the transport arena generally, let alone the renewable transport arena, is consistency and continuity of policy. Many of those policies, of course, are out of the hands of DfT and more in the hands of the Treasury. So we have seen in the last 12 or 15 months a complete turnaround in terms of the attitude of Government with regard to VED and company car tax, with regard to ultra low vehicles. That sent a signal not only to the manufacturing community but also to consumers that this is not something to be trusted. Why would I buy a car like that if three years down the road I suddenly find the resale value has collapsed because the Government has withdrawn its support? So consumers will follow clear, consistent signals of policy. Inconsistent, unclear will lead to where we are at the moment, which is an electric vehicle penetration that at best, Jonathan, is probably under 2%—

Jonathan Murray: Yes.

Philip Sellwood: —and going very, very slowly. Yet, if you looked at the amount of coverage in the press, you would think that it was actually 20%. The reality is customers are very wary at the moment because they are not seeing that leadership, that consistent policy leadership. If that were the case I think you would see—again, to Juliet's earlier point—a sea change in terms of the uptake of those technologies.

Q35 Rushanara Ali: Would anyone else like to—

Juliet Davenport: Yes. I would reinforce what Philip said. If you are making consumer choice, first of all it needs to be something that works. So it comes back to confidence and the whole idea of range anxiety, which I know that we have had, with consistent work trying to make sure, for example, that electric charging point networks are put in place. But to be honest we have not thought about it very well, so we have put them along the motorways. Now, I don't know about you but generally I don't want to hang out on a motorway for an hour to wait for my car to charge. Where I actually want them is at a destination, somewhere I am likely to end up for a couple of hours, either a meeting place, a supermarket, a destination visitor point. So we need to think more carefully about consumer behaviour and how they are going to use transport, and I don't think we have tried to do that, from a policy point of view, really look at it in terms of—

Q36 Rushanara Ali: Why do you think that is? Why is it so—

Juliet Davenport: Because I think we have tried to fit electric vehicles into the mode of petrol vehicles and, "We have this infrastructure, therefore, this infrastructure must overlay that infrastructure" and we have not thought about the behavioural side. I think we need to look much more closely at the behavioural side. If we look at that then it is going to make it much easier for adoption. Car manufacturers are doing their best, in terms of the actual vehicles they are producing and what they look like, but we need to think about the overall structure as well.

Jonathan Murray: I think also on the infrastructure side there is a genuine disagreement as to the strategy, and so you will see people like Tesla have their own recharging capability, which is about superfast charging. We have looked at recharging at strategic points on the motorway network, as Juliet pointed out. I have been involved in a lot of electric vehicle projects and demonstration trials going back 20 years, and typically they are charged at people's residences or at work, slow charged—you can do it from a 13-amp socket, so there are not that many infrastructure issues around that—on street parking and the capability of on street parking and recharging, and opportunity charging. So there are a number of different options there and there is a genuine difference of opinion in terms of strategy, and that has mainly been driven by commercial interests.

Q37 James Heappey: I have been sort of grappling with this and I have asked the House of Commons Library to look at which came first, the chicken or the egg. When petrol cars started to come did the petrol pumps come first or the cars, and at what point did they catch up with each other in terms of rollout? It seems to me the cars very much came first and that very similarly, 100 years ago, people were concerned about the fact they were going to run out of fuel because there weren't places to refuel all over the place. I think we need to come at the problem of promoting electric cars for the advantage of having electric cars, for the desirability of having electric cars, and know that—just as with petrol before it—if the uptake on the car is significant enough the charging points will follow very quickly. If you look back at what they did 100 years ago to try to pave the way for the petrol engine, it is inconceivable that they could have considered putting out the petrol pump network first in order to incentivise people to buy the cars.

Christopher Snelling: I think it is slightly different, because obviously back in those days the car was a new invention completely, as merely an alternative to the horse. It started out with leisure usage and short-term usage from home.

Q38 James Heappey: But from the contemporary reporting at the time people were showing exactly the same concerns, "What happens if I run out of petrol?" or "My horse isn't going to run out of petrol because it just eats some grass by the side of the road", so stuff that was in newspapers 100 years ago when people were talking about the advantages of going for a petrol engine are exactly the same debate as people are having now, whether or not they should get an electric vehicle.

Christopher Snelling: For us as operators—and if we are looking at heavier vehicles and the gas side of things—it is still the lack of confidence not only that there is the sufficient refuelling infrastructure to get around the UK to wherever you need but it is also this issue of will it be there for the next 20 years. We have talked about the occasional changes in fashion; it is a safer choice to stick with diesel at the moment.

Q39 James Heappey: Presumably the quicker the uptake on the vehicle, the quicker the deployment of the charging points. If you look at the statistics for charging points coming out over the last few years, they do correlate very closely; the more and more electric vehicles that have been bought, the more and more charging points have been put in. More recently there seems to be an acceleration in the fast charging points, which would indicate that people are getting on to it.

Philip Sellwood: I want to answer one of the Chair's original challenges about thinking systemically as opposed to about a better technology. We have the opportunity with the development of electric vehicles, with the development alongside aligned with storage, with renewables in the home, to look at a different solution that is not reliant on replicating a petrol infrastructure of 100 years ago. It could very well be done in our own homes. You could see the vehicle being the driver for energy storage, a host of issues; if we address it systemically, I think we will come at it in a different way.

To Juliet's point, what we do not want to do is decide that was our version of the horse; let's try to replicate that version now. It will not work. I think we have to do it differently.

Q40 Chair: James was telling us that what you read in the papers 100 years ago is much the same as you are going to read in the papers today.

Before we move on to the electrification of heat, Jonathan made a point—and it has been gnawing at me since—about E10 and I think it was 10% of vehicles you said would not be able to run on those. If I was watching this Committee from afar, I would be wondering what type of vehicles exactly. Can you briefly mention that?

Jonathan Murray: Yes. The anticipation of petrol with higher blends of bioethanol has been in the automotive industry for a long time and has been mooted and been involved in various regulations and international standards coming forward over the last couple of decades. The first vehicles that were E10-compatible probably came out of Scandinavia, Volvos and Saabs.

Q41 Chair: Which vehicles would not be E10 compatible?

Jonathan Murray: It is about transition. It started way back in the mid-1980s. The first vehicles that were compatible with these fuels started to appear then.

Chair: So anything older than that might have a problem.

Jonathan Murray: Yes. About 2005 was the last time a major brand of vehicle declared compatibility with E10. Since about 2005 it has only been individual engines in individual model lines. As of 1 January 2011 all vehicles sold in the UK and Europe had to be compatible with E10. So what are those vehicles that are not compatible? They are older vehicles that tend to have come from either a high performance background or from smaller manufacturers from outside Europe. There is a database that the Society of Motor Manufacturers—

Q42 Chair: Can you put an additive in the fuel? When lead stopped, there was an additive you put into fuel.

Jonathan Murray: You would be looking at taking something out rather than adding something. The favoured solution would be to have a protection grade of E5 petrol, the current grade of petrol available, as the super grade, on petrol forecourts. That would be the preferred option.

However, about 9% of petrol vehicles are not compatible at the moment. They are coming to the end of their economic life. By the time we get to 2020 that will be down to 3%. The number of those vehicles on the road will have reduced by two-thirds. We have done a lot of work with the AA and with vehicle manufacturers looking at who owns these vehicles and how they are used. We believe by that point the vast majority of those vehicles will be cherished vehicles rather than cheap vehicles.

Q43 Chair: So the Morris Minors Owners Club, for example—

Jonathan Murray: Exactly

Chair: —could be quite upset by this?

Jonathan Murray: Yes.

Q44 Chair: We will expect moves towards Government on that.

I want to move on to the impact of heat electrification. How much can UK expect the electrification of heat to contribute to its 2020 targets in the longer term? I speak as somebody who has an air source heat pump in my house. It is a new build, though, and it has had all the modifications with that. I am interested to hear either side of all these arguments.

Paul Blacklock: In terms of the electrification of heat by 2020 I do not think you are going to see any major uptake beyond the sort of scale you have had until now, which is in the thousands. Particularly, as Juliet and Philip have said, for highly insulated houses such as your own, obviously it is an ideal technology but in terms of the vast majority of the 24 million homes in Britain, if their boiler breaks down or if they need a new heating system, will an electric heat pump be the right thing for them: probably not.

The big elephant in the room on all this—I think right at the beginning you opened up by saying you wanted observations on cross-cutting issues—is that if you electrify both heat and transport that is going to cost an enormous amount of money. I can remember being at conferences up until about a couple of years ago where it was said that electrifying heat was going to cost £200 billion by 2020 in terms of investment in new generation

infrastructure and all the rest of it. At the time people like National Grid were saying that if you believe in the full electrification of heat you are talking about 45 Hinkley Points—and we can't even build one at the moment—and 40 million homes with solar panels on.

Q45 Chair: But isn't one of the advantages of the heat pump—a ground source heat pump, which is better than an air source heat pump—that you put in a kilowatt of energy and you get out about 4 kilowatts of heat?

Paul Blacklock: Yes, when it works it absolutely does that. But in terms of being able to deploy that sort of technology across the existing housing stock—most of the buildings that are standing now will still be there in 2020, most of them will still be there in 2030—you need solutions that will not just deal with new build but will deal with the existing build as well, but also you still need to address how this electrification, rewiring Britain, is going to be paid for and who is going to pay for it. One of things I think the Committee is very concerned about is impact on consumers. If we electrify everything, that is going to mean a multi, multi, multi-billion pound investment. The International Energy Agency have put a price on it of €1.3 trillion by 2025. That is not an insignificant amount of money. Somebody has to pay for it. Backing more horses: to pick up on Julian's point, there has been an overreliance on just electrifying heat, whereas now what you start to see is much more discussion around green gas. I think Juliet's company is involved with this as well. If you can decarbonise gas, whether it is through hydrogen or biomethane, you have an implicit storage solution there anyway in terms of the gas grid as a store, and in our case gas tanks with bio LPG in them as a store. So I think there needs to be a much more systems-based approach but not just looking at it being all electric, which is what it has been to date.

Q46 Chair: Is there an argument for having heat pumps in houses that are very off-grid and very rural—and very newly built, I should say—as well?

Paul Blacklock: Ernst & Young did a piece of work where they said if you electrify heat and you put in a high density of heat pumps, that was going to cost about £300 per property in urban areas but £1,300 per property in rural areas. So you are going to start at the furthest end of the grid—I can remember somebody from National Grid saying it is the bits that are attached by a wet piece of string often—reinforcing that before you even go to where you have the density of houses and certainly by reinforcing the local infrastructure, you would be able to cover far more houses rather than focusing on off-grid in the first place.

Philip Sellwood: I have a couple of observations in terms of where this ties all these things together. First, this is not one size fits all. There is no question that heat pumps are appropriate in many circumstances but we have to take it on a case by case basis rather than saying this is one policy that fits all. Secondly, and it is an obvious thing to say, to get the consumer acceptance, these technologies have to work in situ. I replay what I said earlier, that the experience thus far is while the theory is that you put one unit in and get four out, the reality—through all the field trials we have done very extensively over the five years—is that you put one in and you probably get 2.7 or 2.8 out.

Q47 Chair: Is that for air source or ground source?

Philip Sellwood: That is for ground source. Air source is slightly better. None is really hitting the sort of targets that we take for granted in Germany and Scandinavia, for example.

Q48 Chair: Why is that?

Philip Sellwood: The evidence seems to suggest there are multiple reasons for that but I think of the two that stand out—I would be happy to hear others' views on this—one is quality of installation. It is not something that is readily installed every day by installers, and it is not always sized appropriately for the property, so therefore you do not get the optimum output from the technology. The other is that no one talks to the customer about how to use the thing. Going back to my earlier analogy, you would not ask somebody to fit a shower if they had never seen a shower, without telling them how to operate it and that is what is happening. You are getting a combination of not very good installation plus not very good engagement with the consumer. There are other reasons, too, but I think if we are to get that level of consumer acceptance, where it is in appropriate locations, that is the answer.

Q49 Chair: Did you see any difference in your installations between those installed in new builds and those that were retrofitted to existing houses where they might have had underfloor heating or large radiators or whatever?

Philip Sellwood: One of the upsides of doing it in new builds—to Juliet's earlier point about the disappointment about the scrapping of the zero carbon homes initiatives—was that notwithstanding Paul's earlier points, there is no question that when you are building from scratch you can build at a scale and to a level of quality because you are replicating the same technology many, many times as opposed to retrofitting to one property where sizing it to the size of the radiators, all the issues that are there for good installation, are not necessarily replicable. There is no question that there is a place for that in terms of new build. But again it is not a one size fits all.

Juliet Davenport: Can I come in and talk a bit about grid and how we see that balance, particularly in heat but also in transport, with some of these questions?

Q50 Chair: I think you said at one point in your evidence that it is better than biofuels? I would be interested in that. Can you expand on that as well?

Juliet Davenport: One of the challenges with electrification of both heat and transport is that we begin to look at how much pressure that puts on the system. I remember talking to the local grid in Bracknell, who said that if on one particular avenue everybody installed an electric car and charged it up when they got home they would blow the grid in that area. So there are these serious issues in terms of making sure that we are thinking ahead in terms of how this is going to work.

Dare I mention smart metering at the moment with what potentially we are trying to face in terms of rolling that out?

Chair: Another target for 2020.

Juliet Davenport: One of the interesting things is that we should be looking at building in these technologies so they do not put pressure on the grid. If you have a low grade heat system essentially there is no need to run it between 5.00 and 7.00 in the evening because the incumbent heat in the house will stay there during that period. You will not see a big impact. So you can take a lot of pressure off grids if you are not charging or you are not heating at that point in a day.

My personal view is every single electric car we produce in the UK should have a big button in the front of it or basically when you plug it in it should automatically wait to start charging unless you override it. So we should have these systems built into mechanisms so they do not start to create other issues. We should be thinking about that kind of legislation now, that is my personal view, because at the moment with most cars you can make sure they do it but I have to admit in my own car I still have not worked out how to get the wifi to work and I still have not worked out how to get my app to tell it to charge later at night. Now I should do; I agree. I should spend some time and sit down and do it. But so far it has taken me about two hours of my life to try to figure it out and most consumers just do not behave like that. They are not going to take those actions.

Coming back to the consumer point of view, I do think there is more space for electrification in both the heat and transport markets. Under the UN guidance on greenhouse gases that the UK has now adopted you can call that zero carbon so as long as it is qualified and accredited, that is fine.

The issue becomes how do consumers behave as a result of doing that and that is what we need to start thinking about in terms of making sure that they do not then start to put additional pressure on the grid. The fast charging systems we were talking about in terms of the roll out are a huge draw on the grid and potentially a real issue in future. They may work in certain places, but we are going to get these massive spikes. We need to think much more cleverly about how this looks and make those the exception rather than the rule.

Q51 Chair: I think with existing heat pumps, speaking from personal experience, to fit new technology on to it so it was going to be able to interface with a smartphone was going to cost about one third of my annual electricity bill. It was a couple of microchips so Atria, from Sweden, were clearly making some money, when the shift—looking at technology—should have been selling that technology in a different way. It was disappointing. That was my personal experience of a company in this area.

Final question from me: do you think the Government's low-carbon heat strategy is well integrated into its general energy efficiency strategy?

Philip Sellwood: No. When you think about what has happened in the last two years with regard to the demise, for instance, of the green deal, or indeed with the previous ECO, and other schemes, the question of renewable heat, particularly, let alone transport, was barely mentioned in the same breath as the energy efficiency policies.

Q52 Chair: You have mentioned system thinking a few times this morning. Are you about to say that DECC have not got system thinking going on?

Philip Sellwood: I think they feel that they do have a systems approach but I would say that they have single-system approach. They do not have a systemic approach.

To Juliet's point: unless we start to weave in what customers do in terms of their behaviour for instance, whether it is with regard to renewable heat or renewable transport, actually just asking them—again without over-making the analogy, just looking at one particular technology and divorcing the absolute importance of energy efficiency as the base of the pyramid before we start doing some of these other things, it just illustrates there is a fracture between those policy asks.

Juliet Davenport: Can I add to that? Coming back to the consumer—and I am going back briefly to the electricity market—we work with a lot of consumers who have put solar on their roofs, a technology that is very simple, very easy to install, and most people get it; they understand it now. I think if you did a survey of anybody who knows what a solar panel is, you would probably get a much bigger hit than with a heat pump. What has been really interesting about that is where consumers start to have a conversation about energy. We should not be too precious about where they start that. We should be welcoming where they start that conversation about their energy use at any place.

Coming to Philip's point, what we found was that people who installed solar, up to 56% of them went on to do energy efficiency afterwards because what they recognise is that they are generating this power and they want to make it much more efficient and use it better. I think we need to have a bit of flexibility in terms of thinking about this from the consumer angle because that is a brilliant celebration. The other statistic that came from that survey is about 60% of them changed their behaviour.

I did have an example of that. I was in Swansea recently, at a talk, and this guy said to me that he rings his wife now when it is sunny and asks her to do the ironing. I am not sure I completely agree with that.

Chair: Sunny days are for ironing.

Juliet Davenport: Yes.

Chair: Sexism is not dead yet.

Juliet Davenport: But the point is that it is a technology that allows people in; it allows them to start thinking about where their energy is coming from and when they are using it.

In terms of all these technologies we have talked about today, we should be thinking about the consumer angle and asking the consumer to be part of this conversation, not trying to subject them to very complicated forms that go on forever. We want them to be part of this, wherever they start the journey.

Chair: Your friend from Swansea seems to be both very energy savvy and a very courageous individual.

Paul Blacklock: In terms of carbon and energy efficiency—certainly from a rural, off- gas grid point of view—the renewables saga got in the way because DECC decided renewables was the solution to off-gas grid. They excluded off-gas grid from the green deal home improvement fund. There was no drive to make sure that any of the ECO

efforts were delivered. For me the most outrageous part of ECO was the affordable warmth part, which is supposed to be aimed at people whose boiler breaks down and they can't afford to repair it, so they are able to get an installer to come along to try to repair it, and if they can't repair it they get a new one. But if you were off-gas grid, you were excluded from it because the people who were providing that service under ECO refused to do heating oil or LPG. So you had 1.7 million or the best part of that number of houses excluded from social justice as much as anything else. If their boiler had broken down and they lived in the city, they would have got a repair or a brand-new one. Because they lived in a rural area, they could not access that support.

In terms of customer focus, the green deal was a rubbish deal. It was not designed with consumers in mind. It had an outrageously high interest rate and the administration that was attached to it, both for the consumer and particularly for the installer, was at a level that meant that it was difficult to access and then difficult to deploy. There was no effort to try to make the green deal consumer friendly.

Chair: Thank you, Paul. I am going to move on to our Committee workhorse now; James Heappey.

Q53 James Heappey: What a description. Thank you. I am going to come back to electric cars. I am conscious that we have been drawn to it in previous sections but it would be interesting to know what contribution you think electric cars will make to the 2020 renewables targets, and in the longer term what you think realistically is the uptake for electric cars in the United Kingdom.

Philip Sellwood: Could I respond quickly, before the real expert at the table?

At the moment we are at under 2% penetration. We have had 30 models come on the market in no time at all. There is no sense that the automotive industry are not up for the challenge. If we are to see the appropriate impact of electric vehicles in the medium to long term—2030 to 2050—at the level that really is needed, notwithstanding some of the things that we have just been talking about, about the sustainability of the grid, it is really very important we go back to that earlier question, which is what comes first; consistency of policy or consumer behaviour change. If there is consistent policy in this area and there is no mucking about with VED and other charges, then I think fleets will get behind it—notwithstanding Paul's earlier point about financial constraints—the public sector will get behind it.

Q54 James Heappey: All the questions I was hoping to ask, was going to ask, you are going to answer upfront. Before we go back into exactly how you enable it, I am keen to get a sense of how confident you are as a panel about what the uptake could realistically be?

Jonathan Murray: The uptake at the moment is escalating rapidly but from a very, very low base. In fact I think it is lower than 2%; I think it is closer to 1% of new car registrations that are electric vehicles.

Q55 James Heappey: What is possible by the end of the decade?

Jonathan Murray: We did a piece of analysis to look at what would have to be achieved to meet the Climate Committee's target for 2030 and it would be an annual increase from now until to 2030 of 30%.

Q56 James Heappey: I am asking a different question. I am not asking what we need to achieve to hit the target but what is realistic by the end of the decade.

Jonathan Murray: Realistic by the end of the decade? I do not have a number off the top of my head in terms of the number of vehicles that could be deployed. It will still be in the single percentage points. Electric vehicles, in terms of road transport, will not provide a significant proportion of—

Q57 James Heappey: Do you have a sense of what the critical mass is? What sort of proportion of vehicles on the road do you think needs to be electric before people start to consider it normal?

Jonathan Murray: I think there is an artificial divide here. People talk about normal vehicles and electric vehicles. The highest selling plug-in vehicle at the moment is a plug-in hybrid. It has a petrol engine on board and it can deliver very good fuel consumption and very low CO2. I think we are going to see a transition of technologies; it is going to be moving to hybrid, plug-in hybrid. Then what is an electric vehicle and what is not? A hydrogen fuel cell vehicle is an electric vehicle; it is converting that hydrogen to electricity to drive an electric motor. That is what it is. There is a continuous spectrum of technologies that move us towards purely electrification.

Q58 James Heappey: The point has been very effectively made all morning that it is about creating the right system, but in the eyes of the consumer, in terms of desirability, there will come a point where you see these things so often, your mate has one, your neighbour has one, and all of a sudden it just starts to happen—

Jonathan Murray: If you look at how they deploy new technology in the automotive industry, the way they do it is into high-spec halo vehicles at the top end of the market. So the starting point for this has been Tesla. When James Bond drives an electric Aston Martin, I think that will have quite a big impact. Seeing Formula E in Battersea Park and on the streets of London, it will start to have that impact. That is how technology traditionally has been rolled out for the automotive industry, at the top end of the market, and then it cascades down, rather than bottom up. That has tended to be the approach to a certain extent.

Q59 James Heappey: Other than the financial assistance currently available, is there enough being done to encourage domestic and business consumers to switch, other than the stuff you have spoken about—that by osmosis it just becomes desirable? Is there enough being done to actively promote people to switch?

Jonathan Murray: The work that has been done through the Office for Low Emission Vehicles and the Go Ultra Low has been very effective in terms of stimulating interest and providing education and opening the experience of electric vehicles to consumers. That has been very effective at starting the ball rolling.

Q60 James Heappey: Do you think the tax framework drives these decisions? Do people really choose their car based on how much the tax disc is going to cost?

Juliet Davenport: It sends a message.

Jonathan Murray: Yes, it does send a message. There is a fundamental disrupt here between electric vehicles and other vehicles. If you look at the traditional vehicle, the vehicle people buy, there is a very strong link with taxation and its link to CO2. That has been a very strong driver over the last decade. I don't think you could carry that across to the electric vehicles at the moment because—

Q61 James Heappey: What would the tax regime for electric vehicles look like in your mind's eye?

Jonathan Murray: The consistent approach has been taxation based around CO2 emissions and that should continue with a low end for electrification. I think you have to accept that while electric vehicles have no tail pipe they should not be zero taxed, but should be considered as ultra low; at the low end of the spectrum. That should be part of the taxation system, whether it is company car taxation, VED, that it would be linked to CO2.

We have talked about the lack of consistency. We have had consistency of policy and taxation around CO2 and low carbon over the last decade and it has delivered. The rate at which average CO2 in the UK has dropped has been faster than anywhere else in Europe. We started off this process being the third highest emitter of CO2 per kilometre. We are now well below the average. It has provided a link to investment through research councils, through Innovate UK, through OLEV. It has drawn inward investment to this country. The linkage of growth and low carbon has been very successful on the manufacturing side in the UK where we now back up to record levels in the manufacturing of cars in what is supposed to be a high-cost economy. That is a real testament to a policy that has worked and been consistent over a period of time, and that should not be forgotten. That is something we have potential to replicate.

Q62 James Heappey: The final thing I want to raise with you: DfT and the Treasury have robustly denied this but it has not escaped my notice nor, I know, the notice of many people in the industry, that the loss of petrol duty is going to be a pretty significant blow to the Treasury. Do you believe that the Treasury is full square behind the electrification of vehicles, knowing the loss of revenue it is going to bring?

Philip Sellwood: They can hold two contrary and differing opinions simultaneously without blushing. They can say they are actively supporting the electrification of transport on the one hand, but on the other hand they are very clear that the £4 billion or thereabouts that they are likely to lose as a result of the electrification of the fleet does have a significant impact.

I want to turn to your earlier question. I firmly believe that if you are really to get consumers and indeed—we have not mentioned them much—commercial fleets onside, we have to make positive discrimination in favour of electric vehicles and alternatively fuelled vehicles if that is what we choose to do as a policy. What we are doing at the moment is holding those two views simultaneously, which is to say we are in support of electric vehicles or alternatively fuelled vehicles but at the same time we are giving no fiscal signals that give strong enough positive discrimination. Until that changes we will see—Jonathan's point—the very slow creep from 1% to 2% to 3%.

Paul Blacklock: I am sure I have seen somewhere that the automotive industry has estimated that by 2040 30% of vehicles will be electric. So that gives you an idea of the direction of travel. On the taxation point, we will have to have road pricing at some stage because if you have all the vehicles running around on electricity—they are not paying at the plug—the Government either gives up that money in taxes elsewhere or there are still things related to transport that need paying for, and you have to look at, or imagine that we are looking at, a road pricing model at some stage.

Chair: We need to get some tax expert in.

Q63 Rushanara Ali: HGVs contribute 21% of surface transport CO2 emissions, even though they only make up less than 1% of road vehicles. You mentioned air quality earlier; obviously in cities like London this is a major issue. Yet the FTA has said that their electrification is currently not viable. What can be done to address that initially and in the long term?

Christopher Snelling: The first point I will make is that while it might be 1% of vehicles, they are carrying 80% of the nation's freight. The advantage of the HGV is it is a very efficient vehicle in terms of load, so for the job it does in society it is the equivalent of a bus rather than a car and, in the same way that a bus can carry 60 people, it has intrinsic efficiencies that should not be ignored. Yet electrification is not an option for the heavier HGVs. For the lightest of the HGVs, up to 7.5 tonnes, electrification is a very good option. For vans and the lighter HGVs, it is very viable and we are very supportive of that. Above that weight the leading option that members support now is forms of gas. There was a lot of work done on this. Up to the last few years it was quite a growing area. It was then held back by the advent of the Euro 6 requirement, which partly meant that for a while there were no gas vehicles available that could match the performance requirements, but also it meant a lot of the point of switching to gas was taken away because people were switching to gas for the local air quality benefits and then the Euro 6 diesel was so much better that there was no need. Even now for some of the natural gas vehicles on the road it is questionable as to whether they have any local air quality benefits over the Euro 6 diesel. However now, for the medium to longer term, for alternatively-fuelled vehicles we think that moving to dedicated forms of gas for HGVs is the most promising route. That is where members want to see Government support. It is where we have the most interest in investment. There are some who are looking at hydrogen but again that is at the smaller, mid-size range.

Q64 Rushanara Ali: What is your definition of long term? What sort of time in years?

Christopher Snelling: We are looking beyond 2020.

Q65 Rushanara Ali: So how many years?

Christopher Snelling: Through the 2020s. What are we talking about? I think through the 2020s is when we will see a move away from pure diesel power for the largest vehicles to purely gas. Our preference is to have us use as much of the biomethane as we can, then you will get a very substantial carbon improvement, around the mark of 80%, which makes a substantial step change for us, which is the kind of thing we are looking for.

Q66 Rushanara Ali: The new London Mayor has proposed tackling air pollution in the capital by including the possibility of bringing forward the introduction of ultra low emission zones to begin earlier than 2020 and potentially extend that to the north and south circular roads. There is a recent report commissioned by TfL that shows there is quite a lot of confusion about what constitutes low emission and ultra low emission. What do you think could be done to address that confusion? What should the Government do to provide more clarity?

Christopher Snelling: Yes, I think it is a confusing piece of terminology, which should have been avoided. It is not an ultra low emission zone; it is the next generation of a low emissions zone. It is saying that the standard for HGVs will be that you will have to have an HGV that was sold after the beginning of 2014. If you are looking at even a couple of years from now it is quite a demanding standard for the industry to meet but it is the established norm. It is just a new diesel HGV; the same for cars and buses and so on. So in terms of the context we are talking about today, alternatively fuelled vehicles, for me the definition of ultra low would be beyond what a 100%-diesel vehicle can do and probably beyond what a 100%-petrol vehicle can do.

Q67 Julian Sturdy: Back to electric vehicles. We know that price will drive consumer choice. One thing with electric vehicles that we have not touched on, which could be seen as a bit of the elephant in the room, is the depreciation value that is built into electric vehicles now. I just had a look on the internet and we are talking at some levels electric vehicles are worth 20% of their initial cost after three years, which is a huge level of depreciation on those vehicles. Partly that is because of the technology moving so fast, as we have discussed. That surely is going to be a real brake on consumers moving further into electric vehicles.

Philip Sellwood: A quick response.

Chair: Unless you want a second-hand electric vehicle, of course.

Julian Sturdy: But then technology is moving so fast that people are not going to buy second-hand electric vehicles.

Philip Sellwood: The fact that there is not a robust and significant resale value currently is due to the market pricing-in the risk and consumers responding to that risk. Going back to our earlier conversations about continuity and consistency of policy, whether it be fiscal or automotive, if we were seeing that consistency we would see that residual value growing because the risk would be seen to be less, both by the industry that is insuring those products and reselling them and the consumer who is looking at that and saying, "Would I really hold on to that car for three or four years?" I think it just illustrates the point we have been making all morning that until we can have that level of continuity then I think we will see that risk priced into the resale value.

Paul Blacklock: Is that at about the time that it needs new batteries? The batteries do not last forever. At some stage the batteries need to be replaced. If somebody has let go of the car just when the batteries need replacing and whoever buys it has to put new batteries in, that may well affect the resale value.

Juliet Davenport: One of the things that has been shifting in the automotive industry, particularly in responding to this, you saw some of the early Nissan Leafs and those types

of technologies that came through and there were very short guarantees on the batteries. You were looking at two to three-year guarantees so you can imagine that over a three-year period you would expect an 80% depreciation.

One of the things that is shifting, and I think the industry is doing a good job of responding, is you are seeing much longer guarantees on batteries. You are seeing 10 to 15-year guarantees on batteries and at that point it becomes within the life cycle of how long a consumer would own the car and they would see that, so I think depreciation will change as we go forward. If you look at the early tech adopters in the mobile market, they would have had those huge pieces of infrastructure that you had in the back of your car. We are seeing something very similar in this market. What is interesting about the uptake, what I think will be interesting to see, is what is happening in Norway where the fastest-selling car now is a Tesla. The largest new car sales they have are Teslas. What has made that difference would be interesting to see.

Q68 Julian Sturdy: Is that not the main point?

Chair: Time is getting the better of us. We are running out of charge. Final question, please.

Jonathan Murray: Can I respond on the residual value? What is the residual value, the depreciation, that you are talking about? Are we talking about what has been priced in by a leasing company? Are we talking about what "Glass's Guide" is predicting, which probably drives that? Are we talking about the actual market value in an auction house in the Midlands? There are different things here and they do not necessarily bear any relationship to each other.

Q69 Julian Sturdy: The point I was trying to make is that technology is moving so fast with this, so the range is growing, which is great news, but it is a bit like your iPad or your iPhone—the value of your phone in three years' time is very limited because technology moves so fast no one wants it; everyone wants the next new thing—whereas with the old combustion engine the technology is pretty much the same so the residual value is still there. Surely it is about that technology. The key thing must be that the initial price has to come down.

Jonathan Murray: True. You would hope that as the volumes build that would be the case. One of the important elements of that is production of batteries in mass markets, mass production, and that is starting to happen, which will drive battery prices down. But at early stages in new technologies the second-hand market is not very liquid, so marrying up somebody who wants to sell a vehicle with somebody who wants to buy it is quite difficult when they are quite a small proportion of the market.

Chair: Panel, thank you very much. Time has run out, unfortunately. Can I thank you for your time this morning, for being open with us and for giving us information and instruction that we certainly did not have in the past? Thank you all.