Environment, Food and Rural Affairs Committee

Oral evidence: Air quality, HC 479

Wednesday 13 January 2016

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Written evidence from witnesses:

- Mike Hawes, Chief Executive Officer, Society of Motor Manufacturers and Traders
- Paul Willis, Managing Director, Volkswagen Group UK

Watch the meeting

Members present: Neil Parish (Chair); Simon Hart; Dr Paul Monaghan; Rebecca Pow; Ms Margaret Ritchie; David Simpson; Angela Smith; Rishi Sunak

Questions 89-198

In the temporary absence of the Chair, Angela Smith was called to the Chair.

Examination of Witnesses

Witnesses: **Andy Eastlake**, Managing Director, Low Carbon Vehicle Partnership, **Mike Hawes**, Chief Executive Officer, Society of Motor Manufacturers and Traders, and **Paul Willis**, Managing Director, Volkswagen Group UK, gave evidence.

Q89 Chair: Thank you for coming, gentlemen. Would you like to introduce yourselves? Andy, if you would start, please. We will probably deal in first names if you are happy with that—at this stage, anyway. Over to you, Andy, if you could explain who you are, please.

Andy Eastlake: My name is Andy Eastlake. I am currently the Managing Director of the Low Carbon Vehicle Partnership. Just in case you are not aware of the organisation, it is a part-Government and part-industry funded group, looking at the agenda for low-carbon vehicles specifically.

Mike Hawes: Mike Hawes, Chief Executive of the Society of Motor Manufacturers and Traders, which is the trade association for the automotive sector in the UK.

Paul Willis: Good afternoon, everyone. My name is Paul Willis and I am the Managing Director of Volkswagen Group United Kingdom.

Q90 Chair: You are definitely in the hot seat, so very much welcome to you this afternoon. Because EFRA deals with air quality, and because the country is suffering in certain hot spots with low air quality and a lot of that is down to vehicle emissions, then, naturally, this is why we are very keen to hear from you regarding emissions. I am going to start off the questions. Are there, or could there, be clean petrol or diesel vehicles with emissions that do not harm health or the environment?

Mike Hawes: Perhaps I should kick off. Yes, and the trajectory that the industry is on in terms of consistently improving the emission performance of internal combustion engines, which has been going on for many years, is continuing. Certainly, with the advent of the Euro 6 standard engines, which were mandatory from September last year, some changes in emissions testing will make them much better performing in the real world. Put in combination, this will go a great way to helping address some of the air quality issues that this country and others face.

Q91 Chair: We were actually saying "clean". If you were going to be a purist, you would say "clean" means there is no pollution. I am not absolutely convinced you are saying that you can create a petrol or diesel vehicle with no pollution.

Mike Hawes: I would not say zero emissions—and there are other technologies that are clearly zero emissions—but we are certainly down, with Euro 6, to trace elements. They are increasingly difficult to measure against ambient levels, but, certainly, as I said, the trajectory is going in one direction: down to very small amounts of emissions.

Q92 Chair: Why should we believe motor manufacturers when, for a long time, diesels were the way forward—diesels were the low polluters—and then, all of a sudden, it is all turned on its head? Diesel is now the polluter with oxides of nitrogen, so we have all got to convert to either petrol or electric cars. What is happening? How can you get credibility back? I am not just talking about Volkswagen now; I am talking about everybody.

Mike Hawes: There are a number of issues there. First, I would say that there is not necessarily a need to move away from diesel. The air quality issues we have tend to be in urban areas, and road transport makes a significant contribution to air quality issues across the country. It is clearly much higher in urban areas than it is in rural areas. In terms of diesel engines and their use, the key issue is making sure that consumers buy the right vehicle for the type of driving they are going to do. If you are going to be driving long distances, then diesel offers significant benefits on CO_2. Invariably, if you are doing long distances—motorways, rural areas—there is not an air quality issue, so the contribution that passenger cars would make in that area is less consequential than it is in an urban area. Diesels certainly have a role in the future.

We are also seeing a shift to alternative forms of propulsion. There is a change in the type of cars that people are buying, especially with the move towards smaller cars, which tend to be petrol powered. You can see a range of other technologies coming to market:

hybrids have been out there for a number of years; plug-in hybrids; electric; now hydrogen. This is going to continue and get greater. On credibility, I would say that the industry has responded to the challenges that have been set, of which air quality is but one. Climate change is another, and diesels make a significant benefit in terms of total CO_2 emissions.

Q93 Chair: There is a problem with your argument. Let us consider, for instance, the fact that I drive from the West Country. I drive along the motorway for 150 or 180 miles. I then come into the centre of London to park the car in the House of Commons car park. I am then in an area where those emissions are going to be quite serious. People cannot necessarily have one car to drive in the city and one to drive out in rural areas. I will probably bring you in on the next part of the question. As far as diesel is concerned—I would like all three of you to answer this—there is a way of cleaning up the exhaust. You can use AdBlue, certainly with lorries and tractors; these things are there. However, how practical is it for motorists to do this to their cars, and would there be a real benefit to the amount of oxides of nitrogen emitted from these vehicles?

Mike Hawes: The short answer is yes. AdBlue is part of a technology called SCR, which, with the ever more stringent regulatory requirements, is one of the solutions to meeting them. You are already seeing on the market cars that have SCR systems and that require AdBlue. That is going to be increasingly commonplace as the regulation gets tighter, as it is about to do. However, that is for new cars. I think part of what you are getting at is what the existing situation is. It is more difficult to retro-fit different exhaust systems to an existing car than it would be to a truck or a bus, purely because of the packaging opportunity.

Q94 Chair: Because of the size and scale of the exhaust system?

Mike Hawes: Exactly. If you open up the back of a bus, there is a bit of room there to put the chemistry set that is Euro 6 after-treatments in. In a car, it is very difficult. Certainly, with the SCR system, which involves an additional 20 litre tank, you would have to redesign the vehicle. That is not something you can do as a retro-fit or readily. There is some opportunity on a larger vehicle, but for smaller vehicles it is different.

Q95 Chair: I want to bring Volkswagen in. How many of your cars are fitted with these tanks of AdBlue and the exhaust system to clean up the diesel?

Paul Willis: All our Euro 6 models, more or less, are fitted with SCR, which is the most efficient method of controlling the nitrogen oxide. One of the announcements we made after what happened to us in September was that, going forward, as soon as we possibly can, every single diesel engine manufactured, as soon as we can fit it in the car, will have SCR technology with AdBlue.

Q96 Chair: That is with AdBlue, is it?

Paul Willis: That is with AdBlue, yes. From our point of view, that is the most efficient way of controlling nitrogen oxide in the current diesel technology. If I can just go back a step to something you said, I represent Volkswagen and we are very sorry for what we have done.

Chair: Yes, we are going to ask you some detailed questions.

Paul Willis: If I could just come back to your comments, you said, "What about me? I drive from the West Country and then I come up into urban areas." The motor industry is designing models—and we are in the lead for designing models—to deal with exactly what you talked about—in other words, plug-in hybrids. If you take a plug-in hybrid, you drive the car with a combustion engine in the rural area, where there is not such a big issue. When you get into the urban area, if it is a plug-in hybrid, it has enough energy and power to run totally on electricity. We see—it is not just us; a lot of manufacturers see—that as a solution to this issue, amongst the other issues that are in the Defra report. That is one of the solutions in order to try to overcome this NOx issue.

The problem is cost. If you take the average cost of that vehicle and compare it to a normal diesel vehicle, because you have basically got two types of power in the engine, even with the plug-in grant, it is about £2,200 more. One of the things that the Government are encouraging, the SMMT are encouraging, and we are all working towards is trying to get more scale into these vehicles, because the more scale, the more everyone sells, the more the cost of the technology comes down. A plug-in hybrid is distinct from a hybrid. There is a clear distinction between a hybrid and a plug-in hybrid. A normal hybrid will only go 10 miles without a combustion engine, roughly; a plug-in hybrid will go between 30 and 50 miles. The technology is improving all the time to increase that distance. That is what people want.

Q97 Chair: I am very happy with that particular argument, but what I am not happy with is the fact that there are many people out there who bought fairly new diesel cars; they might be almost brand new diesel cars. I am not just targeting Volkswagen; I am targeting all the makes. We have got to find a way of cleaning up those diesels. As a manufacturer of cars, it is fine to say, "Right, okay, no longer diesel; we will have a hybrid." However, that does not help anybody who has just spent £30,000 or £40,000 on a state-of-the-art diesel car. We have got to be able to clean those up. What is the solution to cleaning those particular cars up? We can talk about what we are going to do in the future, and I accept all that. I accept the space issue, to a degree. However, surely, is it not in your interest as motor manufacturers to come up with a solution that involves smaller devices that can go in there and into which you can put the AdBlue and do what you need to the engine to clean it up. What are you doing about it?

Andy Eastlake: It is worth reflecting on what has happened in the heavy duty market, which arguably is leading the light duty market on this occasion. Picking up what Mike mentioned, we have seen very successful application of the SCR system on new vehicles. We have also seen very successful application of retro-fit SCR to quite a wide range of vehicles—an increasingly wide range of vehicles, particularly in the bus and truck sector. There is absolutely no doubt that it is more difficult to package and to integrate with a passenger car, but we can step into that. Vans are an area where there is definitely an opportunity because the packaging constraints are not as significant. There may well be opportunities to look at the existing passenger car fleet for retro-fit. I think retro-fit is a part of the solution for us.

Q98 Chair: Are you doing, as an industry across the board, enough to scale down the size? The first mobile phone would have been bigger than ones we use now, and my mobile phone is probably too large for the size of phone now, and it is a computer as well. I know that I am

being simplistic, but you can get the size and scale of these things down if you put enough resources into it. What I am asking is whether you think you are putting enough resources into it.

Mike Hawes: The European automotive industry invests more in R&D than any other sector in Europe. That R&D goes into newer, cleaner technologies; it goes into safety technologies; and it goes into the development of other technology that is leading towards connectivity and so forth. The industry is at the leading edge of investment in new technologies. A significant proportion goes into, as I said, cleaner powertrains. As for what you are referring to, I have a couple of points to make. First of all, we have a very strong track record of improving the emission performances of our vehicles. The main concern from a health perspective, a number of years ago, was particulates. All cars since 2009 effectively have particulate filters, which remove 99% of particulate emissions. Now, the science is saying that the effect of NOx on air quality and human health is greater than we had envisaged, so the technology is being developed. SCR is a new technology. It has not been around for many years.

It will be a process of getting it smaller, but, at the moment, the size requirements, especially to put it into a small vehicle, are such that you would basically have to redesign part of that vehicle to cater for it. By doing so, you have then got to develop that car and put it through its type approval process, which means crash-testing and everything, which is not so much—

Q99 Chair: I understand that, thank you. I do not think we need to repeat that. I just wanted to be reassured that the industry is putting maximum into this. I have just got a couple more parts to this question, and then I know that Rebecca would like to come in. Do we actually need a scrappage scheme to get the older diesels off the road, and what age of diesel are we considering? Also, is there anything we can actually still do to the diesel fuel itself, rather than it just being about what we are adding to it? Can we do something to the fuel that we put into the car in order to clean it up further?

Mike Hawes: If I might take the first part and maybe pass to Andy on the second. In terms of a scrappage scheme, you are right. Clearly, what we need to do is see fleet renewal and get the very latest cleanest vehicles on the road for the myriad benefits that offers in terms of safety, CO_2 and other mechanisms. At the moment, we do not see it would be a good use of public money to have a scrappage scheme, for two reasons. First of all, air quality is a local issue and a scrappage scheme would have to be a national issue. You would then need to be certain that the vehicles that were benefiting were clearly the ones that were coming into the city, so I think there are better ways of doing that. Secondly, the market last year was at an all-time record for new car registrations—2.63 million vehicles—so I would suggest it is perhaps not a market that needs Government intervention at the moment.

Q100 Chair: And then on fuel itself?

Andy Eastlake: Fuel is a very, very sophisticated component within the vehicle. One of the most critical aspects is to make sure that the fuel is compatible with the vehicles that are on the road. Changing the specification is very difficult. There are fuel options. For example, running on alternative fuels—converting the vehicles to run either partially or wholly on a gaseous fuel—is an option for the existing fleet, and there are

some additives and technologies that improve the performance of the fuel. I do not think it is realistic to expect a 90% reduction in NOx by changing the specification of diesel, so I do not think the sort of step-change that we are talking about can be delivered.

Q101 Chair: Is there some scope or not?

Andy Eastlake: There is scope, but I come back to the point that we need to make sure that that fuel is compatible and is as certified on the vehicles, so that you do not start changing the fuel and it does not work with the SCR technology.

Q102 Chair: I know that motor manufacturers would be slightly concerned if it did their engines in. I can understand that.

Paul Willis: I think the customers might be concerned.

Q103 Chair: Probably, I quite agree. Is there work being done on diesel fuel?

Andy Eastlake: There is, indeed. There is a lot of work being done on diesel fuel and diesel fuel additives. You will be aware that the fuel companies themselves differentiate their products on the basis of different performance characteristics. Fuel is a very, very sophisticated piece of the equation and we absolutely have to incorporate that into our thinking in the whole.

Mike Hawes: Just one other point. The other thing to remember always is that whatever you do to the fuel, you do not want there to be any penalty in CO_2 fuel economy terms because you are substituting one pollutant, if you will, for another. To go back to your point about whether you can you make things smaller, the key driver in innovation in the automotive industry is making things smaller and lighter because it becomes more fuel efficient.

Q104 Rebecca Pow: I was interested to hear Mr Hawes saying that there is a definite role for diesel cars in the future because I believe that, by 2020, half of all our NOx emissions are going to come from diesel cars and they will still emit six times more NOx emissions than petrol cars. These are some statistics we have been supplied with. I wonder why you are not putting a lot more emphasis on the alternatives and why you are still absolutely single-mindedly pursuing diesel cars.

Mike Hawes: The industry is not single-mindedly pursuing diesel cars. On the contrary, if you look at the range of different technologies on the market, last year and this year alone, it is greater than it has ever been in the past.

Q105 Rebecca Pow: They are minuscule in percentages, are they not?

Mike Hawes: So far in take-up, because these are expensive technologies, less than 3% of the total number of sales were alternatively fuelled vehicles last year, but that is growing. The plug-in hybrids that Paul described improved two and a half times in market share last time, so huge amounts of investment are going into alternative technologies. Diesel is part of the future. We are not saying it is the only solution and it is not taking all the emphasis—on the contrary. It is taking a lot of emphasis in addressing the NOx issue, but, in terms of Euro 6, emissions are coming down significantly; they more than halved

from Euro 5 to Euro 6. With the changes that are taking place on a regulatory level, that is going to continue to be driven down even further in the real world, hopefully, subject to agreement, from 2017.

Paul Willis: I have just one point. When you speak about emphasis, please be assured that the view is that we do not particularly have an emphasis on any particular powertrain. Our belief is—and it is the belief of the SMMT and, I think, of most manufacturers, although I cannot speak for other people—that we should have a technology-neutral approach and let the customers decide. That is where the Government have a role as well. I talked at one of the other Committee meetings. Yes, maybe, during the last 10 to 15 years, the pendulum, in terms of our knowledge and our learnings, has swung slightly too far towards diesel, and maybe it has to go back the other way. However, from a manufacturing point of view, I think it is about technology-neutral. That means it puts pressure on all manufacturers to get the right package for the customer because, ultimately, it is the customer who will decide. For example, you talked about cities. Customers will make a decision if it is price competitive and it does the right thing technically.

Q106 Chair: Sorry to interrupt you. I think you are right, but, as motor manufacturers, have you not been encouraging people to go down the diesel route because it is very fuel-efficient, they do more to the gallon, and they are the very best cars to have? Then, five minutes later, they tell us, "Get a petrol car; get a hybrid; get something else." Are you going to tell me in a few years' time, "That was wrong; have something else." In the end, we have got to make a decision, and you keep moving the goalposts.

Paul Willis: I can tell you that to build a diesel engine costs a lot more than to build a petrol engine. Now, with these new technologies, it will cost even more to build a diesel engine. The profitability on a normal diesel engine, even with the price premium, is less than that on a petrol engine. Your argument that we are pushing diesels for some reason is not the case.

Q107 Chair: You were. I do not think you are any more, but there may be a reason for that.

Paul Willis: When you say "you were"—

Chair: I am not talking just about Volkswagen; I am talking across the board.

Paul Willis: No, no—I do not mean in the motor industry. We are all learning. It is an emerging science in terms of the impact of NOx. Ten or 15 years ago, everyone was emphasising climate change and there was an emphasis on CO_2. Now, as we are learning over time, it is clear that we have to reduce NOx. Just to come back to the point, you said, "Why can we not do something immediately?" I am afraid that my view is that there is no quick silver bullet. I wish I could tell you there was but, technically, there is not. We have to now embark on a trajectory to introduce new technologies, such as what you talked about earlier in terms of AdBlue. The Government, manufacturers and local authorities have to work together to make sure that these all work in unison. That is the secret.

Q108 Chair: We will get on to talk about the future, but I think you have got to accept that people must feel very let down when they felt they had the very best vehicles—

Paul Willis: I am not sure.

Q109 Chair: And then, all of a sudden, they have not.

Mike Hawes: But they are still benefiting from improved fuel economy. In terms of the regulatory regime—the fiscal regime—around it, such as VED, company car tax and other benefits, there is a financial advantage in diesel.

Q110 Chair: But should there be? If the whole emphasis has changed from carbon dioxide to oxides of nitrogen, then all those taxes will have to change.

Mike Hawes: It should not be one or the other. It has got to be both.

Paul Willis: It is a balance.

Chair: Perhaps you could argue there should be none.

Q111 Rebecca Pow: You keep saying it is consumer choice; you are mainly looking at the economic benefit, but surely the consumer will start to factor in the fact that NOx emissions and all these other emissions are dangerous to our health. I do not want a car that is dangerous to people's health. Do you not think that people consider that?

Paul Willis: That is a very important point, but I am sorry to tell you that if you all go and look at the data and what customers' priorities are when buying vehicles, you will see that they do not talk about NOx. They do not talk about these things. That might be right or wrong, and maybe we have all got a job to do to make it higher up the choice list.

Q112 Chair: We will get onto the details of emissions, but people have been sold a vehicle that they believe to be less polluting. They bought it probably because they want good performance and good miles to the gallon, but they also bought it for those reasons and, about six months later, they are told that that is not the case.

Paul Willis: It is less polluting on CO_2, it is a more efficient engine and they get more miles per gallon.

Q113 Chair: But it is not on oxides of nitrogen, which are now considered to be bad for our health.

Paul Willis: Exactly, and now we have to do something about that, yes.

Q114 Chair: And you had no inkling before that it was bad for our health.

Paul Willis: It is clearly an emerging science. If I may, I will quote you something specifically from one of these meetings. It is on the causal effect of NOx on health, from a Defra paper: "It is important to stress that significant uncertainties remain around the quantitative link between exposure to NO2 and the health impacts." I am not decrying the importance of this issue. The most important word we need to think of here is "balance", because it is not all one thing or the other.

Chair: We will get onto some more balanced questions in a minute; have no fear.

Q115 Ms Ritchie: For the avoidance of doubt—you have already referred to the recognition and acknowledgement of the need to move to a technology-neutral process—can you indicate what progress has been made on cleaning up diesel and our petrol fleet vehicles, such as buses and taxis?

Mike Hawes: Do you just want buses and taxis to start with or all vehicles?

Ms Ritchie: Yes, and then move on to cars.

Andy Eastlake: On buses, there has been immeasurable change almost, compared with the previous generation of buses. The latest Euro 6 bus technology—diesel or gas or, indeed, many ranges of the hybrids—is delivering NOx emissions well below the levels required for passenger cars under real-world conditions. If I can illustrate that, the passenger car limit is an 80 milligram limit. The buses that we have seen and tested under the latest low emission bus regime are delivering typically between 20 and 60 milligrams of NOx. So, as I say, there has been a significant 99% reduction in NOx from that sort of bus technology from the technology that had been implemented on diesel engines and is now proving successful going forward. That is the technology that we are pushing and pressing.

Q116 Chair: And taxis?

Andy Eastlake: The latest generation of taxis that are going to be encouraged in London are partly zero emissions operational—the ones that will be coming in from 2018. They are mandated to have a petrol engine currently. From a personal perspective, I do not agree with the differentiation or the identification of specific fuels because every single fuel—diesel, petrol, gas and even hydrogen—will produce emissions when burnt. It is about the way that is controlled using the after-treatment. We have very effective after-treatments on petrol engines, but if you remove that, they would be high NOx. We have very effective after-treatments becoming available across the diesel engine fleet, and it is already in play in the heavy market.

Q117 Ms Ritchie: What do you envisage will be the eventual timescale to reach zero? You mentioned about 99%.

Andy Eastlake: As was highlighted, a combustion engine will produce emissions. All of these engines produce carbon as well, and we are currently talking about tailpipe zero. I see—and the buses, again, are a great example—that the progressive electrification of more and more miles of the route is enabled by having larger and larger batteries, more efficient vehicles and a range-extended engine. In Bristol, as you are probably aware, there are now plug-in hybrid buses that are enforced—geofenced—to run in a zero emissions mode through the city centre. Then, to complete the full route, they also have a low-emission diesel engine running outside the city centre. That technology is available to progressively electrify more and more of the operation.

Q118 Ms Ritchie: Are there different technical challenges for cars since heavy goods vehicles appear to deliver reduced emissions in the real world as well as in the laboratory?

Andy Eastlake: There is a difference with the test regime. That is the material change that we have seen implemented in the heavy duty market for Euro 6. It is ostensibly the same change that is being implemented in the next round of passenger cars.

Q119 Ms Ritchie: What is the test regime? Could you give us a characterisation of that?

Andy Eastlake: In a nutshell, it is about doing additional measurements on a variable real-world cycle to ensure that the performance that is delivered in the test lab is also delivered under all of the other conditions that one might see. That has been implemented for heavy duty vehicles, and we are now seeing the evidence that that has achieved what we were after, which is the step-change reduction in NOx.

Mike Hawes: Let me be very clear about this: with the advent of the Euro standard, which goes back to the early 1990s, emissions from passenger cars in the real world have dropped significantly. Defra's own figures show that there has been an 81% reduction in NOx between 1990 and 2010. The figure is 48% for commercial vehicles. You are seeing the shift from Euro 5, which is from about five years ago, to now. Again, there has been a significant improvement in the real world. It is not as much as we need it to be—that is still work in progress—but, in terms of NOx, there has been significant progress. In terms of particulates, with the advent of Euro 5, particulate emissions are all but, excuse the pun, omitted. 99% are captured. Emissions of sulphur and carbon monoxide have also been reduced significantly. *[Interruption.]*

Chair: I apologise. We will see if there is anybody drilling a hole outside. Perhaps they are trying to listen.

Mike Hawes: At the same time, noise reduction is going on in the cars as well. There has been a significant reduction in pollutant emissions at the same time as an undeniable reduction in the amount of fuel used by vehicles, which people see at the pump.

Q120 Chair: What I think we are all slightly worried about—this goes back to a previous question—is that we are talking about reducing NOx now. You will have a hybrid vehicle that perhaps may be petrol and electric. In a few years' time, are we going to be then saying, "We are back to carbon dioxide now or carbon monoxide"? That is the problem.

Mike Hawes: No, the regulation and the challenge before the industry is to address all of those emissions, whether it be a pollutant, carbon monoxide or carbon dioxide. You are seeing each of these new developments, whether they are plug-in hybrids or electric, offer a range of benefits in total emissions. The industry is bringing that variety of technology to market, which we would hope the consumers will respond to as best they can. *[Interruption.]*

Chair: We are going to have to sort this out because you cannot be expected to give evidence with this noise going on. The Chairman has the power to stop the noise. Carry on, please.

Andy Eastlake: I think you are absolutely right to ask the question whether we are going to move. The critical thing is that we do not take our eye off any of the balls that are in play. Our organisation is focused on carbon reduction but is always keeping an eye

on air quality. We are seeing, not only from the policy makers but also from consumers, that they want greater co-ordination of these two agendas in a single way, so that we do not have a situation whereby one is countering the other. It is very important to recognise that doing the wrong thing on air quality does run the risk of worsening the carbon impact. That is absolutely key. *[Interruption.]*

Chair: We will hang on a minute. We just cannot go on like this. Somebody must be drilling a hole somewhere; it certainly sounds like it.

Paul Willis: The point is we are committed in Europe to achieve a certain level of CO_2, and everyone is signed up to that, so we have to continue on that objective. We have to achieve the Euro 6 levels and we have to improve that. We have worked very, very hard and have invested lots of money, not just VW but everyone, in reducing particulates. It is really important that we have solutions to all three, not just one or two—all three. *[Interruption.]*

Dr Monaghan: The noise is an issue.

Chair: That is true. I would like to keep going if we can. An engineer is looking at it. What we will do, if it is okay with you, gentlemen, is we will carry on, but if we get another interruption with noise, we will stop because it is not fair on you, the Committee or those who are trying to keep record of what we are doing.

Q121 David Simpson: You are very welcome, gentlemen. My question is to Paul, another Ulsterman; the accent is clear.

Paul Willis: I thought I had got rid of the accent.

Q122 David Simpson: Despite the whole issue around the defeat device, Volkswagen has said that, by 2018, they will be the world's most sustainable automotive group. How is the company taking action to regain the trust that some people feel has been lost as they feel let down? How will you restore the trust that your vehicles will perform as they say on the tin?

Paul Willis: First, we are a company that has strong values around responsibility. I know a lot of people will say, "Really? Is that what you just said?" We are a company that has responsibility as one of our core values. To almost everyone in our company, to learn what we learned in September was very difficult for us to swallow and very difficult for us to understand. Indeed, you heard the apologies that I made at that time, and I am still really sorry for that.

When you read the sustainability document, we talk about reducing CO_2 emissions in our factories. I can tell you that when we build our factories, we build significant extra cost into them to reduce CO_2. One of the examples is that, starting from 2013, we want to reduce CO_2 emissions from factories by 25%. We want to reduce waste by 25% and so forth. We will continue along that trajectory to become the world's most sustainable car company. There is no doubt about that. In fact, as a result of what has happened, we will redouble our efforts. One of the press releases that we announced just before Christmas stated that we are investing more money in modular platforms for more flexible all-electric vehicles—on one of the electric vehicles that was shown this week, the range is up to 300

kilometres. We are investing in SCR, so none of the diesel powertrains will have anything but SCR and AdBlue. I totally accept that we have to regain the trust of the citizens of Europe—and, specifically, the bit that I worry about, the UK—in order to convince customers that our cars are what they say. I totally understand that question and we have to redouble our efforts to get the trust back.

Q123 David Simpson: The second part to my question is: what is the likely impact on emissions from individual vehicles as a result of the changes that you guys will make so that affected UK vehicles are legally compliant?

Paul Willis: The target is that there will be no difference. There will be no difference in fuel consumption, there will be no difference in drivability, and so forth.

Q124 David Simpson: Can I ask just one very brief question? With regards to the whole trust issue and the issue around the tragedy that happened last year, how much has it affected your sales?

Paul Willis: We have had some effect on sales in November and December. In Volkswagen, in December, our retail orders were actually above last year. I know there are a lot of people who do not understand what may have happened. We have been working very hard to try to improve communications, so that people understand. But I think people know that there was an error in the testing regime and they understand that in the real world there is actually no real change—no difference at all. I hope—I do not know; we will have to wait as the months unfold—that we will continue to sell the number of cars that we want to sell in the UK.

Q125 Chair: Before I bring Angela and Margaret in, I just want to pin you down a bit on the difference between the level of NOx emissions recorded from a VW vehicle with a defeat device fitted and one without, in both laboratory and the real-world environment?

Paul Willis: I do not have that information. What I can tell you is that a Euro 6 car in a laboratory will be within the European limit, which is 80 micrograms, because everyone has to do that. Because there is not a pre-defined test for real-world driving and there are no averages, I do not know what that number is. However, you do not have to look very far. You can look on the internet and see what independent people say. What I can tell you is that if you look at the real-world driving and you look at 40 vehicles, we are in the middle.

Q126 Chair: Okay, but I think it is a fair question to ask you. I think we would like something in writing on that, if you can.

Paul Willis: Sure.

Chair: Because this is a lot of what the argument is about. Angela, you are coming in on question five anyway, but do you want to come in now?

Q127 Angela Smith: If you do not mind, Chair, thank you very much. I just have three short points. First of all, to Paul Willis, you have got the Jones Day investigation ongoing. When do you plan to publish the findings?

Paul Willis: We think that it will take about another six months to get the full picture—maybe a bit less, maybe a bit longer. You may ask, "Why can you not be more specific, Paul?" The reason is that there are 450 people going through paperwork at the moment. I also learned through this process what a terabyte was. There are something like 3 terabytes of information—millions of pages—that people have to go through.

Q128 Angela Smith: I do not want a justification. I just want to know how long it is going to take.

Paul Willis: It will take six months. However, there will be an interim update at the end of March, when our supervisory board will talk about this at the results time.

Q129 Angela Smith: The second question relates to something the Chair just raised with you. Broadly—I think the Environmental Audit Committee also went through this—you claimed to be unable to quantify differences between laboratory test emissions and real-world levels due to a lack of data. However, experts suggest that your vehicles would have been tested under real-world driving conditions. There is a feeling that Volkswagen have not really been very helpful in their responses on this.

Paul Willis: No, no, quite the contrary. I have answered the question at at least one other Select Committee. I have answered at least 40 supplementary questions, which I am delighted to do, and I will answer it once again. There is no prescribed one-off boundary for what real-world driving means.

Q130 Chair: So why is Volkswagen different from every other manufacturer?

Paul Willis: If you asked anyone else the same question, they would answer the same way.

Q131 Chair: Why are you in the dock and nobody else? There has got to be something different, has there not?

Paul Willis: There is not anything.

Chair: Yes, there is.

Paul Willis: However, I would invite you to go and look at the independent analysis, which has got nothing to do with us and nothing to do with the mode of manufactures. Those independent surveys may not necessarily be full real-world driving, because what is that? You and I could go to work on the same route and drive differently. There is no definition of real-world driving.

Q132 Chair: Sorry, no, I have to pin you down on this one. I am not saying that there are not other manufacturers out there that may have similar problems, but why are you in the dock? Why can you not give us a straight answer? When we drive your brand new diesel vehicle out of the showroom, in real-world terms, how much pollution is that car creating or not? You should know that—surely you do. After all the trouble you have had in America and across Europe, I cannot believe for one moment you do not know that.

Paul Willis: I do not know because there is no prescription or definition of real-world driving. However, if you look at ADAC—the German motoring association—they have drawn up a definition of real-world driving and you can access it on the internet. I invite you to do that. When you look at that, you can see exactly where we are.

Q133 Chair: You are the one that has got the problem with trust. If I buy a brand new car from you—and I do buy Volkswagen cars, so I am not against Volkswagen in any way at all—and you claim it does X and it does Y and then you turn around and tell me you did not know, I am sorry but I do not accept that. That is not a legitimate argument. ***Paul Willis***: Excuse me; I have to refute what you said. You said to me, "Why are you in the dock?" I have to answer that question. The reason I am sitting here from Volkswagen is because, in the emissions testing regime, the software did something to change the characteristics of NOx. That is clear and I apologised for that profusely. Now, let us move on to real world. There is no evidence, and it is my strong position that, in real-world driving, pre and post there is no difference. I have ADAC here. If you wish, I will leave it with you. You say I do not know. I have independent information that is in the public domain, which you can access as well as I can access. There is no definition for real-world driving, Neil.

Chair: Carry on, Angela. Obviously, you do not know. It is not acceptable for a manufacturer to market a car and then not know.

Q134 Angela Smith: No. I have a further question, but just to finish this one, why does the industry or Volkswagen not commit itself to establishing a definition of real-world driving? I cannot believe you have left it for so long, given the importance of this issue.

Mike Hawes: On behalf of the industry, we have been asking for this for a number of years—

Q135 Rebecca Pow: Why do you need to ask somebody? If you are so innovative and you have got so many scientists and technicians working for you, why do you not just say, "We would like to know this. We will set up our own study and then we will know"?

Mike Hawes: Because it has to be something that is robust and that is the same for every manufacturer, the same in every member state and the same across a range of different conditions. It is incredibly complex and we want one test cycle and then one application into real world that stands the test of time.

Q136 Angela Smith: You have asked the European Union for a definition.

Mike Hawes: We have been in discussions, along with other stakeholders, about what will constitute real-world driving emissions for a number of years. We want this resolved because, as you can see from the reason we are here, we need to do something that addresses the discrepancy between what you read about and what you get in the real world because that does our industry no favours.

Q137 Angela Smith: Okay, can I go back to Paul and ask a further question? In the letter that you sent to the Transport Select Committee, you have made it absolutely clear that there will be no compensation paid to Volkswagen vehicle owners in the UK, of whom there are about 1.2 million as I understand it. Rather, you are going to focus the moneys—the resources—available on fixing the vehicles. I have two questions. First of all, what does fixing mean? What difference will it make? Secondly, do you not think that your customers deserve not just having their cars fixed, but a degree of compensation for the breach of trust that they have suffered?

Paul Willis: First question first: what does fixing mean? We will put new software in, which means that the NOx emissions are completely compliant with the limits they are supposed to be within—that is the first thing—and within the description of the legislation. That is why we are doing it. Secondly, to pay compensation, there has to be a loss. At this stage, I see no reason for there to be a loss because, as I said earlier, regarding the adjustment of the software, so far, the engineers are telling us that there will be no difference in fuel consumption as a result of this fix. There will be no difference in driveability. The only other areas that people have talked about—I am sure you have read this—is the question of residual values. At the moment, I have seen no clear evidence that there has been any adverse impact on residual value. What I say is that, when there is no loss, then there is no need for compensation. That is why I come back to what you said at the beginning. However, we do have to make sure that we regain the trust of our customers. That is why we are going to fix the cars. As well as that, if someone lives in a rural part of the country or it is inconvenient for them to come into the retailer to have it fixed, then we will find some way to ensure they have a replacement car.

Q138 Angela Smith: Just quickly on loss and then I am finished, Chair, on this question. Two points: first, you cannot be sure that, in the long term, there will be no impact on residual value. What is Volkswagen planning on that? Secondly, some people—and I accept it may be a minority—may have bought Volkswagen vehicles because they believed that they were less polluting for the environment. As someone who is suffering from asthma today and who does get asthma, all the talk about balance and how people just want fuel efficiency and all the rest of it, is actually quite insulting because this matters. To people who have lung problems and breathing problems—diseases of the lung—such as asthma, it is quite insulting to be told that these things really do not matter.

Paul Willis: I did not say that they do not matter. I think I really have to answer those two questions; if I understand it, you are asking me two questions. First of all, about the long-term effect and residual values, Volkswagen, more or less, has the highest residual value of all products in the UK. It is something we are very proud of and it is something I am very certain we can maintain. I see no reason why that would change. I am very sorry about what you said about people with lung problems and asthma. Two members of my family suffer from asthma. To say and to connect that to Volkswagen, I have to refute that very strongly. As an air pollution committee, you must know better than anyone that when you look at the mix of constituent elements that make up air pollution, cars in actual fact are very small.

Q139 Angela Smith: No, that is not true.

Paul Willis: Forgive me, but if I do the mathematics across the—

Chair: The problem is that—

Paul Willis: But this is a very serious allegation.
Chair: The problem with cars is that—

Paul Willis: Sorry, but this is a very serious allegation that I have to answer.

Chair: There are hotspots in the city. Therefore, it is not taking the average of the cars across the country. It is in those particular hotspots.

Paul Willis: Sorry, I must come back. It was said to me here that I did not take it seriously. I do take it extremely seriously and I want to let that be known.

Angela Smith: Why did you fix the software then, with the defeat devices? Why did you do it? If you take it seriously, why did you fix those devices in the cars?

Paul Willis: Because the software has to fit within the legislation. That is why we are doing it. There is no difference—or very little difference—to the performance of these vehicles before the fix and after the fix in real-world driving.

Q140 Chair: Can I stop you there because you have got it on record that they will not increase fuel consumption and there will be no difference when they are fixed. My independent Volkswagen adviser tells me that the car will run hotter and it will actually use more fuel once this fix has been done, so I am very interested in that. You put that on record and, when these cars have been remapped, I want to see that you are right. On record, you have said they will not increase in fuel consumption. I understand they run hotter. All sorts of things happen to these cars and it will be interesting. In the end, Volkswagen has sold a product to the individual customer claiming all these things—the miles per gallon, the consumption and the pollution levels—and they are not correct. Therefore, surely, under consumer protection, you have sold the customer the wrong vehicle because it does not perform.

Paul Willis: I do not agree with you. Therefore, the evidence that you have from your Volkswagen expert, please put it on the table as well.

Q141 Chair: I will. I am very happy to do that, but you have got to put your evidence on the table that once those cars are remapped and re-jigged, they will do as you say, because that is a matter of trust.

Paul Willis: I agree.

Q142 Chair: Your vehicles are not being trusted at the moment and you have to re-establish that trust.

Paul Willis: I totally agree with you.

Q143 Dr Monaghan: On that particular point, Mr Chairman, can I suggest that Mr Willis might want to invite members of the Committee to Volkswagen to receive a demonstration or presentation on those tests before and after. That would be very helpful.

Paul Willis: Sure. I understand that the Transport Committee has invited me to a meeting in the coming weeks and also they have invited one of my engineering colleagues. We can do the same, of course.

Q144 Dr Monaghan: Just going back slightly to, I think, you said it was the ADC definition of real world?

Paul Willis: ADAC—the German automobile association.

Q145 Dr Monaghan: Who developed that definition? The German automobile association?

Paul Willis: Yes.

Q146 Dr Monaghan: Is it recognised by the German Government?

Paul Willis: I do not know.

Mike Hawes: No, it is not because regulation has to be European so it would have to be authorised.

Dr Monaghan: Okay, just a point of clarity.

Paul Willis: That is the whole point.

Dr Monaghan: I appreciate that point.

Q147 Ms Ritchie: This is again to Mr Willis. In your earlier answers, you indicated that there would be no changes beyond test conditions. What changes should be expected under those test conditions?

Paul Willis: The only changes under the test conditions will be that the software, during the test, does not adjust the NOx. That is it. It is a different software in the test. That is the only change there will be.

Q148 Ms Ritchie: Would you expect the Volkswagen vehicles fitted with defeat devices to comply with the higher emission levels that the EU is considering introducing from 2017?

Paul Willis: I cannot answer that question categorically because I think what you are referring to in 2017 is real-world driving, which is an overlay on the laboratory conditions. The boundary conditions of that test have not been fully determined. However, if the European Parliament passes that legislation, we are going to have to make sure, like everyone, that we fit within the legislation.

Q149 Ms Ritchie: Maybe you would consider—we would welcome this—sending us a note in relation to that particular issue if further research is carried out.

Paul Willis: Sure, I will try.

Q150 Ms Ritchie: On the other issue, you indicated to Angela that compensation would not be available. My understanding was that compensation was made available in the United States. Why will it not be made available in the UK?

Paul Willis: Unfortunately, the United States is a very different situation from Europe. We have a situation in the United States where, at the moment, it is not clear whether we have a fix for the cars. In the United States, the regulations are different. In the United States, you will have read yesterday—last night—that the Californian Air Resources Board, which is the regulatory body is not in agreement with our solution. Mr Müller in Washington today trying to discuss how we find a solution. That is a completely different situation to the United Kingdom and Europe. In the United Kingdom and Europe, with the KBA—the German federal transport authority—we have an agreement and a solution. That is what we are getting on with. You cannot compare the two situations.

Q151 Chair: So is the situation that the Americans are being more robust? Is it the situation that the lobbying power of the German manufacturers along with the European manufacturers in the European Union—I spent 10 years in the European Parliament—is so strong that you can have that altered to your satisfaction?

Paul Willis: I do not know what the situation in the United States is. I really do not know. I am sorry.

Q152 Chair: Surely you do because you are being sued.

Paul Willis: In Parliament—I do not know what the situation in Congress is, and I do not know what the lobbying is. I am sorry; I cannot answer the question.

Q153 Chair: Your company can answer that question.

Paul Willis: Our company works diligently to meet the legislation that is put in front of us.

Chair: If your company is able to answer that question, because I think it is a fair question, perhaps we could have that in writing.

Q154 Angela Smith: This is for both Mike Hawes and Paul Willis. How confident is the industry that Volkswagen is the only manufacturer to have used defeat devices in testing in its vehicles?

Mike Hawes: We certainly—indeed, I believe this is the position of the Department for Transport as well—have had no evidence to suggest that any other manufacturer has undertaken similar activities.

Q155 Angela Smith: Is this work ongoing or is this a fairly robust position that you are taking?

Mike Hawes: I can only have the evidence that has been put before me and, indeed, the assurances we have had from our members.

Q156 Angela Smith: I do not want to disbelieve them, but is there any data available to demonstrate that this is actually the true state of affairs?

Mike Hawes: The only data that would be available and that would be on public record would be the test data from the homologation of the vehicle. We know there is an investigation going on by the VCA and other similar type approval authorities across Europe across a range of different tests to double-check on the veracity of those tests.

Q157 Angela Smith: But is your organisation, and are you yourself, satisfied that these devices have not been used by other manufacturers?

Mike Hawes: On the evidence before me, yes.

Q158 Angela Smith: Paul, do you have anything to say on that?

Paul Willis: I completely agree with what Mike just said. I know that the VCA are carrying out a very robust investigation across all brands, testing independently, and we await their report.

Q159 Angela Smith: Do you think that the industry is culpable for accepting for far too long a testing regime that produced inaccurate results?

Mike Hawes: There are a couple of issues. First, I do not believe it is culpable, and secondly, the testing regime produces the results that are expected of the test. The test, as we have said before, is not fit for purpose. The test cycle dates back to a 1980s level of technology; the way we drive and everything else has changed significantly over those 30 years, but the test has not changed to keep pace with those changing conditions. It is in the process of being changed now, with a likelihood that it will come into effect as something called the WLTC in 2017. I would not suggest that we are culpable, because, as I was saying earlier, in terms of the figures that we publish as to the emission performance of our vehicles as set out in regulation, we have to use those figures in any advertising, and the caveat goes in that in the real world, you may get a different driving performance. That does us, as an industry, no favours.

Q160 Angela Smith: If I am honest, Mike—and I will finish on this point—what is coming over to me, both from Volkswagen and from the industry, is a sense of, "Well, we have not got any standard for real-world driving conditions, and we have been pressing the EU to deliver that", but I do not get the impression that you have really driven that agenda. Secondly, I do not get the impression that you have been particularly driving hard on modernising and updating the testing standards in the laboratory. It would be really good, for the record, to have a clear sense of exactly how hard the industry has been working to inform legislators as to whether or not the standards in place, in the lab and in the real world, are good enough. You have the inside knowledge of how these things work.

Mike Hawes: The first point I would make is that the test that exists, the NEDC—the New European Driving Cycle—was created to allow for comparison purposes between vehicles, so that no matter what the vehicle, no matter where the test was undertaken, it would be the same test, and consumers could effectively compare apples with apples. It still succeeds in doing that. Now, the key issue that you are raising is the relationship between that test cycle output—what the figures are—and what people actually experience

in the real world. The technology and other matters have progressed over the years, and I make no apologies for the industry: they are putting their efforts into technological development.

Angela Smith: That was not the question, either—that really was not the question.

Q161 Chair: Angela, would you mind if I chipped in? You were saying just now that you did not really feel that the testing process was fit for purpose.

Angela Smith: Exactly.

Chair: And yet every person who is going out to buy a new car now will be given a set of criteria of exactly how polluting or non-polluting that car is, and most manufacturers will be making much of the fact that they will be less polluting. So then you are saying to me, and to the consumer, that that is not fit for purpose, so surely it is not worth the paper it is printed on.

Mike Hawes: It was designed for comparative purposes, and it is still good for that. You can compare one vehicle to another. It is the same test, no matter where it is undertaken.

Q162 Chair: Even if it is a Volkswagen.

Mike Hawes: Even if it is a Volkswagen. Clearly, what the consumer wants is to see that those figures are as close as can be reasonably expected to the real world, and that discrepancy has got worse over the years due to the changing technology.

Q163 Angela Smith: But my question was exactly about how hard the industry has worked to put meaningful input into the legislators' in-tray, to ensure that their knowledge and their expertise is taken into account. How hard have you worked to put pressure on legislators to make sure that the standards are updated?

Mike Hawes: Considerable effort has been put in over a number of years, around both the test cycle and, now, around the development and ultimate introduction of a real-world driving cycle. This is something that, as I said before, is incredibly complicated, and must stand the test of time.

Angela Smith: Could we have a written note on that, as well, with some evidence?

Q164 Chair: When you drive your car, you are going to drive it in the real world, so therefore when you buy your car, you expect those emissions to be in the real world, not just in a laboratory. It does not give you a health warning on the packet saying, "This car worked under a test in a laboratory, but when you drive it out into the real world, we have not got a blasted clue what it is going to do, and it could be 13%, 15%, or 18% different from what you claim". Nobody says that. There is no health warning on there at all.

Mike Hawes: There is a health warning that basically says, "The performance in the real world may not be the same as the performance in the laboratory". There are two points to make. First, if you are looking at CO_2 fuel efficiency, that depends on a number of factors, which is what makes a real-world driving test that much tougher to develop. It depends on climate, on terrain, on load, on how you drive, and a number of different variations. As

Paul said, you and I could go out and drive the same car in the same conditions, and have two different results. There is no perfect real-world solution that will guarantee you that you, the customer, will get that. There are infinite variations.

Secondly, in terms of developing the test, we certainly want something that will stand the test of time. We must ensure that it gets much closer to what people can expect, but—and this is the key issue—the technology that allows you to test vehicles in the real world, outside of the laboratory, is very new. It has not been there for more than two or three years, so the regulation can only now be drafted to allow you to test a vehicle on the road, and be repeatable.

Paul Willis: Can I make a comment, as this is the air quality Select Committee? I took the trouble to read the Defra report, and I have to say that, on balance, it is a very considered and wide-ranging document. It looks not only at cars but at buses and power stations, and it is an integrated approach. You may want to talk about cars, and I know I am here to talk about cars—

Chair: Yes, that is why you are here giving evidence.

Paul Willis: I just want to make the comment that we welcome some of the initiatives that are introduced in this document on ultra-low emission zones. Mike has been involved in putting that together. The extension of that to five more major cities in the UK is to be welcomed, and that is to supplement all the changes in technology as well.

Q165 Rebecca Pow: That is interesting. We are going to get to those points in a minute, because they are a very important part of what we are discussing, to move us on, and I totally agree with you. I wanted to talk about the proposed new EU limits for the tests, which you say you have been involved in. I gather that what they are thinking of is still well below what we would like the emissions to be, and that these real-world standards are still not going to be good enough to get us the lower pollution that we want. I am wondering what you have to say about that. I think they are still going to be 50% higher by 2020 than we might want.

Mike Hawes: First of all, the Commission has written its initial response to the proposals, acknowledging the challenge of air quality in Europe. It said that it believed that the issue of air quality emanating from road transport would be addressed through the development of real-world driving emissions for light duty diesel, because that is where the problem is. This has been a matter of much discussion, and it has not been an ideal example of good regulation, given how long it has taken.

We are now in a situation where a proposal has been approved by the member states. It now has to go to the European Parliament for ratification. We hope it will be ratified, because we need something that is effectively the recipe to which engineers design the products agreed as soon as possible, to get these vehicles on the road. What you are referring to there are conformity factors, which are there to define what constitutes real-world driving; the performance of a car in a city driving around Westminster is going to be very different from towing a caravan up a hill, to give you two extremes. The regulation of internal emissions remains the same. There is something called a conformity factor to allow for those variations and the development of the technology will address the extreme examples.

Rebecca Pow: Surely you take the strictest—

Q166 Chair: This has not been done. You are a very advanced industry, selling us vehicles with very advanced engines, and yet these tests have not been done on the difference between a vehicle pulling a caravan up a hill and driving in Westminster. I cannot believe that has not been done.

Mike Hawes: There is not a test for that extreme example. The test, as I said before, is very benign; it dates back a number of years, and it does not reflect real-world driving. There are two elements to the conformity factor. Part of it is to address the limitations of the testing equipment, which is why in 2021 it is going to be 1.5, because the accuracy of the equipment—given how new it is—gives you a margin of error up to about 0.5. Secondly, it is to allow for the complete range. We would have to demonstrate that the vehicle will perform to within 2.1 times the European limit in the city and in those extreme driving conditions. In the majority of cases, most drivers will be well within the limits of that 2.1, because it is only in extreme circumstances that that additional conformity factor is involved.

Q167 Rebecca Pow: Is it not right, that you have been lobbying for lower emission standards? Are you lobbying for the tightest, most stringent tests that we can have, so that our health is going to be protected and that we meet these targets that the UK failed to meet recently for its air emission limits, because we are pouring out all these particulates?

Chair: I understand that you have been lobbying to go in the wrong direction.

Mike Hawes: We want something that we can deliver. We want something that will address the issue, and we want something that will stand the test of time.

Q168 Chair: And something, perhaps, that the public might believe.

Mike Hawes: That too, given recent events.

Q169 Chair: Because they are not believing it now, are they?

Mike Hawes: That proposal that is on the table now before the European Parliament is very, very tough. It will require significant further investment, and it will effectively mandate the technologies that we described earlier to address the air quality issue.

Q170 Rebecca Pow: I believe our own Government are supporting these new proposed test standards.

Mike Hawes: The test standards are not changing.

Q171 Rebecca Pow: I mean these limits for the tests. Is our own Government pushing enough to make sure that we get the ultra-ultra-best that we can get? What is being done?

Mike Hawes: They are. They are certainly on record as being a vocal advocate of the importance of this issue, and ensuring that there is a solution agreed and in place as soon as possible.

Chair: Can I bring Paul in now? Angela, if you have finished your questions, would you be able to take over the Chair at that stage?

Angela Smith: Yes, Chair, I would.

Chair: We need to go and sort a few greyhounds out. It is another inquiry that a subcommittee is doing.

Q172 Dr Monaghan: The UK Government's strategy currently assumes that vehicles of the future will be powered by a mix of fuels. Do you think developing such vehicles is the most effective way of shifting reliance towards ever-cleaner vehicles?

Mike Hawes: The industry has to develop. The industry has set some very strict targets on CO_2 and emissions. Again, the good thing about this is that this has been a technology-neutral approach.

Q173 Dr Monaghan: It is a question that is probably more about Government policy.

Mike Hawes: The Government policy has been, and should remain, technology-neutral. It should let the industry develop the technologies that will meet the long-term goals for climate change and air quality, because the innovation will come from the industry and the supply chain. I could not say, hand on heart, that in 10 years' time there is going to be a breakthrough on hydrogen, on battery technology, or on internal combustion engines. The regulation is appropriate, in that it is letting the market decide, but it is a tough challenge and the market has to find the solutions.

Q174 Dr Monaghan: Is Government strategy letting the market decide? It is encouraging those vehicles with a mixture of fuels, so that is not exactly technology-neutral, is it?

Paul Willis: It is clear to me that unless we have some framework like we have today, Europe and the UK will not meet their CO_2 targets. Whether we like it or not, it is a fact that a diesel power train is 15% to 20% more efficient in CO_2, so one of the priorities that we have is that we all have to achieve 95 grams per kilometre CO_2 by 2020. Unless we have a significant diesel mix in Europe within our fleet, we will miss that target; not Volkswagen, but the industry will miss the target. That is the first point.

However, at the same time, more learning and testing regimes on NOx are emerging, and there is a big testing regimes industry building up as we stand here, because it is not complete. We will be able to get more and more accurate information on what NOx has been emitted from these cars. All this discussion brings NOx more to the centre of the table, and it is important that we in the industry develop technologies to reduce that. With Euro 6, we have taken the first step; with real-world driving, we will take the second step. These are all important incremental developments. It is absolutely vital that the industry continues to invest in new technologies like plug-in hybrids, and the Government continues to encourage this investment. Neil, when you come into London in a plug-in hybrid with a 30-mile or 50-mile range, you will emit no NOx, whereas today you emit some NOx. All of these technologies come together in a patchwork, as well as Mr Johnson's.

Q175 Chair: I do not necessarily disagree with you, but the reason I want to go back to Mike is that you say that Government should be neutral on technologies, but neither the last Labour Government nor this one have been neutral. They have lowered taxes on diesels that are supposed to be emitting lower amounts of carbon. Now, it has suddenly turned on its head, and oxides of nitrogen are the problem. Should the Government now be reversing the way they have reduced taxes on road fund licences? Governments do not act neutrally; Governments act on the science that is before them, and then people buy based on that science. The science has been turned on its head, and now we have various manufacturers who are not meeting the targets, so what is the solution? Governments do not stay neutral.

Mike Hawes: I would argue that they have. The fiscal framework around VED and company car tax was set on CO_2. It did not matter which technology you used to reduce your CO_2—be it gasoline, diesel, or alternative fuel—if you got a lower CO_2, you got a reduced VED or a more beneficial company car tax, so the industry had a range of technologies to meet it. Yes, given that it was just based on CO_2 and, as Paul said, the benefits that diesel has over petrol in terms of CO_2, that is going to implicitly favour diesel. There was, and there remains, a 3% penalty for diesel over petrol on company car tax, to take into account some of those pollutant issues, but again it is up to the industry. If you are going to set a framework around taxation of cars on CO_2, I would argue that that is potentially a good thing, because that affects things nationally. Remember, we are going back to air quality being a local issue. There are other solutions for local areas to address air quality.

Q176 Dr Monaghan: The industry might be learning lessons from the events of September and afterwards. Do you think that the UK Government has learned any lessons from that?

Mike Hawes: Given the level of interest in this issue, the potential implications, and the amount that they are committing to validation and testing, I think they are very aware of the impact of this

Q177 Dr Monaghan: So have they learned any lessons?

Mike Hawes: You would probably have to ask them.

Paul Willis: Mr McLoughlin has invited me on numerous occasions, and I have gone to visit him on numerous occasions. He has asked me some very probing questions and put me under enormous pressure to explain, and he has come out from the customer point of view, ensuring that I work extremely hard in order to deliver solutions within a timely frame. I would say that they are, from what I have seen, anyway.

Chair: Gentlemen, I am sorry that I have to leave along with three other members in order to go and look at another inquiry that we are doing on greyhounds. We are going to the north of England to see a track. Angela Smith will carry on chairing. I thank you for your evidence, but I would say when parting that there really is some need for clarification in writing on various questions that I do not feel have been answered adequately. I am sure Angela will pursue that, and I am sure that our clerks will pursue that. We would very much like that in writing, but I apologise for having to leave before the end of the meeting.

Q178 Rebecca Pow: How effective do you think Government policies are, or have been, in encouraging consumers to drive cleaner vehicles? Perhaps that is a question for Mr Hawes first.

Mike Hawes: They have been successful, but they need to continue. As I said, if we look at the take-up of alternatively fuelled vehicles, it is still a very small proportion of the market—less than 3%—but it is accelerating much, much faster than the market itself. Pure electric vehicles doubled last year. Plug-in hybrids are up 2.3 times. Alternatively-fuelled vehicles as a whole were up some 60%, so it is having an effect. This is still a new technology; it is still an expensive technology, and it still needs a range of policy measures to encourage it. The plug-in car grant, for instance, is one element that has been very useful in helping to address the additional cost of those technologies. Having the VED and company car tax predicated on CO_2, again, has helped stimulate take-up of those vehicles. We are on record as expressing concern about the future changes to VED due to come in in 2017, which will remove some of the incentive around plug-in hybrid vehicles, particularly.

Q179 Rebecca Pow: Can you explain that a bit more?

Mike Hawes: Currently, you pay vehicle excise duty proportionate to your car's CO_2 emissions: the higher the CO_2, the more you pay. From 2017, this will change. There will continue to be a zero rate for pure electric vehicles—if you have zero emissions, you pay zero—but instead of having a graduated rate, it will be a one-size-fits-all, standard rate. Once you are emitting five grams per kilometre, you will be paying the same as if you were emitting 105. Given that plug-in hybrids can be between 30 and 60 or 70 grams per kilometre, which is significantly better than the average, that incentive is removed.

Q180 Rebecca Pow: The Chancellor announced a grant of 35% of the cost of a car with low carbon dioxide emissions in the Autumn Statement, I believe. Are you seeing that? Has that come through yet?

Andy Eastlake: The plug-in car grant has been in place for some time, and it is being revised as of March. The amounts available, particularly for the plug-in hybrids, are being significantly reduced. There are incentives in place, and they have certainly been working to stimulate the market, but as Mike has highlighted, that market is still very fragile, and in fact—although the number of plug-in cars has doubled this year—it has been almost flat throughout the year, at 1% of sales.

Q181 Rebecca Pow: So you have not seen a massive boom, with all this concern about diesel.

Andy Eastlake: December was up significantly.

Mike Hawes: The number of alternatively fuelled vehicles has been increasing gradually over the past few years. I will mention a particular brand here: what is salient, when looking at the introduction of hybrid vehicles, is that the Toyota Prius was launched in the UK market in 2000. It was very, very steady for a number of years, and then there was a very significant change. First of all, it became more accepted, more common, but also the advent of the London congestion charge with an exemption that was effectively worth around £1,200—and has since become worth a lot more than that—meant significant

savings to customers. That really helped stimulate the market, and with hybrids, you begin to reach that tipping point where they are much more common. It takes a long time to shift from only early adopters buying these new technologies to their becoming mainstream.

Q182 Rebecca Pow: So do you think these new clean air zones—of which there are going to be five in the UK—will make a difference to the swap-over of people trying to get more low-emission vehicles?

Mike Hawes: It has the potential to do so; it depends on how they are implemented, and there is a degree of local discretion. As I understand it, while there is a national framework for what these local clean air zones might be, which we really do support, there is a degree of local discretion about how they implement it and what they target. As I understand it, for some of these zones, they may just look at measures to address emissions from commercial vehicles—buses, trucks, and so forth—and meet the targets that way, rather than looking at passenger cars as well. Certainly, for passenger cars, these will focus attention on a wider set of emissions, which will benefit both zero-emission and low-emission vehicles and, indeed, the very latest internal combustion engines that will meet Euro 6.

Q183 Rebecca Pow: I gather that there is a £550 million package of money from the Government for development of these new alternatively fuelled commercial vehicles. Are you using any of that money?

Mike Hawes: Yes.

Q184 Rebecca Pow: What are you doing with it?

Mike Hawes: That package is split in three ways, as I understand it. It is to do with the take-up of vehicles, the development of R&D, and also infrastructure. It is all being fully utilised, potentially at a faster rate than was initially envisaged, given the interest in this. One of the clear things that we want, as the SMMT—and I know we share this with Government—is getting the development of these technologies in the UK. There is a potential competitive industrial advantage for the UK in this area.

Q185 Rebecca Pow: Is it not happening in the UK at the moment, then?

Mike Hawes: It is happening, but it is a hugely competitive area, and we want to make sure the UK stays amongst the leaders.

Q186 Rebecca Pow: So how can we do so?

Mike Hawes: It is about creating the right framework for investment in R&D, and having a strong market. If there is a strong market, it puts global attention on the UK as a place to develop and test these vehicles.

Paul Willis: When I look at the reasons for buying a car—and this is not a Volkswagen survey; this is just a market survey—the top reason for buying a car is because somebody is loyal to a brand. 33% of respondents said that. The second reason is that they like the styling of the car; that is 24%. The third reason is reputation and brand; that is 10%.

Fourth is general durability, with 8%. The fifth is price; the sixth is equipment level, with 10%; the seventh is economy in general, with 8%. Fuel consumption is the eighth or ninth, and, as I said when I was giving evidence to a previous Committee, when you ask customers, "Are emissions one of your reasons for buying the car?" it is 5%.

A lot of people may not agree with what I have said. I am not giving any personal judgment; I am just giving you some facts. It occurs to me that there is a responsibility in Government and in the industry generally to promote awareness. You are all very enthusiastic about this subject, rightly so. We are enthusiastic about the subject, but this data says to me that there is clearly an awareness issue. For example, the Government at the moment are spending about £4 million or £5 million on advertising; we pay half, and they pay half. Last year, for the first time, seven or eight brands got together. We put in X million, they matched it with Y million, and we did some awareness communication. We all need to do more of that, because getting a message through to the general public on awareness takes more than £4 million or £5 million.

Q187 Rebecca Pow: But you could say the Government did do that by lowering the fuel duty on the lower carbon dioxide-emitting vehicles—

Paul Willis: Yes, they did.

Q188 Rebecca Pow: Certainly as a buyer, that ticked a massive box for me. I thought, "Great, I am not paying duty, and I am not pouring out pollutants."

Paul Willis: You are right; it did. What I am saying is that the Government have taken a very solid first step. We have cost-shared in that first step. The question is: are we cutting through? How much more do we need to cut through on general awareness?

Q189 Chair: Mr Willis, you have just given us the headlines on the data that you are referring to, and you have a piece of paper in front of you. Can I ask you to submit to the Committee in writing the evidence base for the headlines that you have just given to us, and the source?

Paul Willis: Yes.

Chair: There is no need to refer to it now. Could you just write in to us with the evidence base and the source?

Paul Willis: Angela, I would be delighted to do that, but I must say to you that I also made that comment when I was asked that question by Mrs Ellman, and I gave her the same numbers, as well as in my written evidence. However, I will do it, of course.

Q190 Chair: If you could just give it to us as the Defra Select Committee. Can I just ask Mr Hawes, before we move on from this question: we are talking here about fiscal policy, capital grants, and low emission zones; which of these areas of public policy do you think have most impact on consumer choice?

Mike Hawes: The consumer fiscal grants.

Q191 Chair: On that basis, surely Volkswagen knew what it was doing when it put those devices into those vehicles for testing purposes? Because, of course, when it comes to fiscal grants, when you are looking at emissions, you are actually helping to sell the car. I am a diesel driver; we bought our diesel car, like many people, because of the fiscal grants that it made available and the fiscal levers that were being used to sell it.

Mike Hawes: Again, I am not totally au fait with Volkswagen; there might be some confusion. My understanding is that what happened in Volkswagen related to emissions of NOx. The fiscal grants were all built on CO_2, where, as I said, there is a negligible effect. The Euro standards that govern the emissions of NOx, particulates and so forth, are pass-fail; they are not graduated like CO_2, which is 100, 105, and 110. It is straight pass-fail, so if you pass the test, you can put the car on the market. I do not see a connection between the fiscal grants and what happened in Volkswagen.

Q192 Chair: If it had been known that the NOx standards were failing, and were higher than was being shown in the lab test, then perhaps the Government may have given thought more quickly to looking at its fiscal policy.

Mike Hawes: I am not quite sure what you are driving at there.

Q193 Chair: If the evidence had emerged more quickly, because the cars were failing the tests in the lab, then maybe the Government would have been encouraged to look more quickly—some time ago, in fact—at whether or not the fiscal levers it was using were appropriate.

Mike Hawes: This is one company that, as I understand it, did something that affected a test in the US. It would be unfair and wrong to tarnish the entire industry, and hence Government policy, on that basis.

Q194 Chair: Let us move on to the next question, which is about future fuels and technologies. Mr Hawes and Mr Eastlake, what is your evaluation of the potential of electric, hydrogen or natural gas-powered vehicles for being commercially viable in the medium to long term? This is a really big question, of course, but if you could answer it as succinctly as possible, because I am afraid we have to adjourn at about 4.00.

Andy Eastlake: Absolutely. If I could take gas first, there is currently a strategy, and we are working on the evidence base to endorse that strategy for gas use, particularly for heavy duty vehicles. It is commercially viable right now, with the current regime, to run a gas vehicle or a gas truck. We are now ensuring that the emissions—particularly carbon emissions—are continuing to deliver with the latest generation to that level. Electric vehicles and plug-in hybrid vehicles—and I will come back to that spectrum of electrification—are commercially viable for people to operate now. I will hold my hand up; I run a plug-in vehicle at the moment.

Hydrogen vehicles are certainly starting to emerge. We have a handful on UK roads, available in very limited quantities. We have a handful of hydrogen stations, and that is an important point: the infrastructure to support all of those vehicles—electric, gas, and hydrogen—is an equal part of the issue, in making them operable and commercially viable. All of these need further support, investment, activity, and policy in order to transition towards those technologies.

Mike Hawes: I will very quickly add that it is important to remember that we have different sorts of customers. For the pure retail consumer, the individual, as I said before, the most influential thing is likely to be the grant, and that would help sway them between particular technologies. A fleet customer, for instance, might be more incentivised by another mechanism, and will choose a technology according to that, because they will do very high mileage; they might be operating on a point-to-point basis—in other words, depot-to-depot—so they might lean towards one particular technology more quickly than the general consumer. It is not necessarily one-size-fits-all, but, as Andy said, all of those options will fit different types of consumers.

Andy Eastlake: That is the critical point. We need that range of options to deliver the best solution for each different application. An electric vehicle is not the right tool to be driving up and down the motorway all day, every day.

Q195 Chair: Is it the hydrogen fuel association or the hydrogen association?
Andy Eastlake: There are a number of hydrogen associations.

Chair: I cannot remember what it is called.
Ms Ritchie: UK Hydrogen and Fuel Cell Association.

Q196 Chair: Thank you, Margaret. They have made it clear that they believe governments should be investing in the supply chain—not just in the technology itself, but in the whole supply chain, if the technology is to succeed. Do you agree with the association on that point?
Mike Hawes: It is a bit chicken-and-egg. The industry is already putting hydrogen fuel cell cars on the market; there were at least two brands as of last year. We are selling hydrogen in very small numbers. The appeal of that particular technology will depend not only on the individual but on your access to refuelling infrastructure. There is not a widespread infrastructure, so the fuel industry needs to develop that. There needs to be an infrastructure. It is a costly infrastructure, but certainly it has, as Andy said, the potential to offer zero-emission driving for many, providing you work these things through together, which is why a collaborative approach is critical for the advent of these new technologies.

Andy Eastlake: To add to that, in the way that we have been talking about making sure the air quality and climate change agenda are pulled together, it is very important from a transport perspective to look at the vehicles themselves and their efficiency; the supply chain to supply those vehicles; the infrastructure; and, significantly, the fuel and energy that go into it. At the moment, the bulk of the hydrogen here in the UK is not necessarily generated from a low-carbon source, so if we look on an holistic basis, it is probably not lower-carbon than our existing vehicles.

Hydrogen and electricity all have a low-carbon pathway; importantly, so does liquid fuel. Liquid fuels have a low-carbon pathway, initially through bio but certainly sustainable, advanced fuels and synthetic fuels, and that is partly why we should not pick winners or losers. A highly sustainable liquid fuel, with the conventional combustion engines that we have on the road right now, can actually deliver a low-emission and very low-carbon

solution in the near term, as well as an electric vehicle can. That technology neutrality is critical from a Government perspective, to allow the engineers to meet those targets.

Q197 Rebecca Pow: That is an interesting point. There is a lot of talk about hydrogen, and yet I believe, for example, the hydrogen for the London buses is actually imported on a tanker from Rotterdam. One would suggest we should consider the sustainability of that, and take, as you say, an holistic approach.

Andy Eastlake: We should consider the sustainability and the lifecycle impact, if you like, or the "well to wheel" in the case of what we are talking about here. One of the key things is that we are not in a situation where you can paint a broad brush across hydrogen, or indeed electricity. You are right; there is some hydrogen that is imported on tankers, but equally in Sheffield, there is a highly renewable hydrogen station with renewable electricity. It is the same with electricity: electricity from coal is at one extreme, but there is also renewable electricity. We have that pathway, the trajectory, and we, the Low Carbon Vehicle Partnership, and all of our stakeholders are working towards that in a holistic way. That is the critical thing.

Chair: I knew about the work in Sheffield, and that is exactly the point. New technologies should not be closed off in any way.

We will draw the Committee's session to a close. Can I thank the witnesses for their attendance, but can I also, in finishing, just underline the point that the real Chair, Neil Parish, made about the importance of gathering together the written evidence that we have asked for today? The Clerk will pursue that with you. We have the record, obviously; we will be pursuing you for the written evidence that we have asked for, because, of course, this inquiry is ongoing. I hope you will remain open and willing to share as much as you can with us. Thank you very much.

Q198 Ms Ritchie: It may be useful if Volkswagen could provide us with up-to-date information from the United States about what actions have been taken, because we can carry out our own independent research vis-à-vis Government there, but also what Volkswagen is doing.

Chair: Is Volkswagen willing to do that, via Mr Willis?

Paul Willis: Of course.

Chair: Okay. Thank you very much. Thank you, everybody.