

**Budget and Performance Committee – 2 September 2015****Transcript of Agenda Item 5 – Transport for London Investment Decision Making - the New Routemaster Bus**

**Mayor John Biggs AM (Chairman):** Our main item then, which is Transport for London's (TfL) investment decision-making on the new Routemaster Bus. Can we welcome our two guests, Leon Daniels, Managing Director, Surface Transport, and Mike Weston, Director of Buses, and our invisible guest Mr Johnson [Mayor of London] - whose idea this was - who is not here today.

If I could start with the first question. We have a quite comprehensive briefing note on this. This is quite a matter of topical interest. The more I read the briefing note the more interested I was in this as a project because it was held up as ground-breaking. It has possibly broken different bits of ground in different ways to the ones I had expected. So, Mr Daniels or indeed Mr Weston, with more time to design, develop and manufacture the new Routemaster, what would you have done differently? What have you learned, in other words, and what would you have done differently? More curvy, different colour, fewer wheels?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It is interesting you should say "more time" because of course the classic Routemaster bus, which we all love, was envisaged in 1947 and it took seven years to build one.

**Mayor John Biggs AM (Chairman):** You see the counter argument is that this one was done in a bit of a rush, driven as much by the political timelines of our Mayor.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I think there is a different slant, which is that after seven years they built one, after another three years they had four. It was 1959 before there was any significant production and by that time some of the technical advances had almost overtaken it. While the classic Routemaster bus - which we love, now has fallen into everybody's picture postcard of London, I think we have to face the fact that technology is moving so quickly - developments in battery technology, in exhaust after-treatment and use of different sorts of materials - that in fact if you take too long over projects such as these, by the time they actually get to production and by the time they get into service some of the technical advances are already starting to get 'old hat'. One only has to look at the Apple webpage to know that these days you only have to have a phone that is a year old before it is out of date. I think we would have to say - for the context of this - that the speed of putting this project together was in itself miraculous. In any case it is necessary to do these projects briskly in order to make sure that the technical advantages which are available at the start of the project are still valid and worthwhile when you get it into production.

**Mayor John Biggs AM (Chairman):** Is that not another way of saying that the technology changes so quickly that it would have made better sense for people elsewhere to develop permutations of that, and for London to pick up a bit later on rather than be driven by the vanity of a particular Mayor.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No. I think the evidence is that what London did with the Routemaster caused the industry generally to pull its socks up and get a bit of a wriggle on because some of the advances that were made on the new Routemaster clearly had commercial opportunities. Manufacturers got on with it because if they wanted to sell their products into London they

knew there were new minimum standards to meet, and other cities with problems not dissimilar to London might well be commercial markets for them to follow.

**Mayor John Biggs AM (Chairman):** OK, but most of those innovations are in engines and emission technologies and they are being promulgated in buses that look identical to the ones that were used ten years ago. Can you give five examples then – I will make it easy for you – of how the Routemaster has broken ground and which has set the trend for future buses.

**Mike Weston (Director of Buses, Transport for London):** Yes, on the emissions though it is worth --

**Mayor John Biggs AM (Chairman):** I've taken your question have I?

**Tom Copley AM:** That's my question; you are stepping on my toes. Get your Routemaster off my lawn!

**Mayor John Biggs AM (Chairman):** OK, we can wait, give me five quick ones, then we can go to --

**Tom Copley AM:** It does not matter.

**Mayor John Biggs AM (Chairman):** Five sentences, in what way has it broken ground?

**Mike Weston (Director of Buses, Transport for London):** Off the top of my head, one, we designed a bus unique for busy central London routes.

**Mayor John Biggs AM (Chairman):** Certainly unique.

**Mike Weston (Director of Buses, Transport for London):** We have one of the busiest bus networks in Europe, if not the world. We have some very, very busy bus routes and this vehicle was designed to cope with those. We have clearly produced a bus with a very stunning design. Our customer satisfaction results show that the passengers' reaction to this bus is three points in excess of the rest of the network and the rest of the buses. It is pretty clear from the amount of media coverage it has, it clearly is a very iconic and stylish design. The attention to detail in the design is a major step forward. I think it has reawakened passengers' interest in buses generally in London because it is so distinctive. How many is that?

**Mayor John Biggs AM (Chairman):** That will do, but to my mind that sounds all a bit sort of tenuous. If we go back to the TfL Board, and I appreciate neither of you are -- Mr Daniels, maybe you are an executive Board Member?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I am afraid none of us are.

**Mayor John Biggs AM (Chairman):** None of you are, OK, but you observed it. When I was on the London Development Agency (LDA) Board, when the Mayor was suggesting something innovative – which did not mean it was a bad thing, but it was breaking ground – we often sought a direction from the Mayor's Office to clarify that it was a clear political priority. Although it might not have fitted into the mainstream planning of the LDA – as indeed this might not have fitted into the mainstream planning of TfL – it was nevertheless something worth doing. Can you tell us whether you gave any advice that TfL should seek a Mayoral Direction on this one?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It is before my time. To the best of my knowledge – and Mike [Weston] may know more – there was no suggestion of a Mayoral Direction. It was very clearly, however, a manifesto commitment and our job is to deliver against those manifesto commitments. A manifesto commitment was to produce an iconic new Routemaster for London and we did.

**Mayor John Biggs AM (Chairman):** I am not convinced that we do. If I became the Mayor of London – I am already labelled as a Mayor here – and in my manifesto I said I wanted to give everyone a bouncy castle or something, and then I went to the TfL Board and said, “You have to buy bouncy castles because they are in my manifesto”, you would come back to me and say, “That is not really what TfL is here for”.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It might have to be a transport route as a way of getting from A to B.

**Mayor John Biggs AM (Chairman):** I am thinking of a pogo stick, everyone gets a pogo stick.

**Mike Weston (Director of Buses, Transport for London):** There are two things bearing in mind, by the officers at the time it was seen as an opportunity to improve bus design. Until then, bus manufacturers and effectively engineers had designed buses and this was an opportunity to up the status of that. You also must remember that the 600 buses, and 800 by next year, are not buses we would not have bought. It has been part of our natural replacements. Instead of buying the standard bus that had become a bit like a box on wheels and did not have much passenger appeal, we have gone and bought something that has been designed specifically for London. Instead of buying 800 standard buses we have bought 800 new Routemasters. It is buses we would have replaced with something else instead.

**Mayor John Biggs AM (Chairman):** We can explore this a bit later on, but the phrase “designed specifically for London” is another way of saying, “No one else has bought it”.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Nobody else bought the classic Routemaster either, apart from Northern General, and they only bought 50. Nobody else bought the classic Routemaster.

**Mayor John Biggs AM (Chairman):** Therefore, in 100 years’ time this will be seen as an iconic bus for London.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Almost certainly.

**Mayor John Biggs AM (Chairman):** It certainly will I suppose, yes. Like the pyramids, but no one rides around on the pyramids, do they?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** To be clear, one of our jobs is to deliver against the manifesto promises of the elected Mayor and we did.

**Mayor John Biggs AM (Chairman):** That is an interesting doctrine you have adopted there.

**Gareth Bacon AM:** It is called democracy.

**Mayor John Biggs AM (Chairman):** No, I am not sure.

**Gareth Bacon AM:** It was a leading proposal in the manifesto.

**Jenny Jones AM:** Yes, because he did not know what he was talking about.

**Gareth Bacon AM:** It does not matter; TfL is a Mayoral agency.

**Mayor John Biggs AM (Chairman):** There is a credibility test, I think, in a manifesto.

**Gareth Bacon AM:** That is fine but, to be fair, beating up TfL for implementing Mayoral policies is --

**Jenny Jones AM:** Having a stupid Mayor, no, you cannot do that.

**Mayor John Biggs AM (Chairman):** No, I am not beating them up, I am suggesting --

**Jenny Jones AM:** No, I am with Gareth, you cannot do that.

**Mayor John Biggs AM (Chairman):** I am suggesting that if it was innovative then they should require the Mayor to direct and say, "This was my manifesto. It is innovative. I want it to happen."

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** If it had been your bouncy castle we might have asked for a Direction. Since it was a bus actually we were ok.

**Mayor John Biggs AM (Chairman):** OK, so there is a novelty qualification here. This was not so novel; it was a problem.

**Tom Copley AM:** My question was precisely what the circumstances were where you would want to seek a Mayoral Direction? Val [Shawcross CBE AM] has whispered to me that there was a Direction for the estuary airport. That falls within transport, although obviously air travel is not a specific remit of TfL. In what circumstance would you have asked for a Direction?

**Mayor John Biggs AM (Chairman):** Is the Garden Bridge directed by the way?

**Tom Copley AM:** I do not know, is it?

**Valerie Shawcross CBE AM:** I think that fits in the walking --

**Mayor John Biggs AM (Chairman):** You can walk across it, OK. So you can buy swimming trunks on the basis you can swim across the Thames; that would be transport as well. OK, go on. Can you answer the question?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Every case of course is on its merits. There are Mayoral commitments in the manifesto. Those things are baked into our business plan. Things that are Mayoral commitments that are baked into our business plan which are budgeted and are consistent with the Mayor's transport strategy, and which are consistent with what we normally do and are not illegal, would not need a Mayoral Direction. If, on the other hand --

**Mayor John Biggs AM (Chairman):** If it was illegal you might need a Mayoral Direction.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** If it was illegal we would not be allowed to do it at all. If the Mayor wanted us to do something, for example, for which there was no funding and no clear way of how that funding would be received, then of course we would be asking for a Direction because it would be impossible to go to the TfL Board and ask for the approval.

**Mayor John Biggs AM (Chairman):** OK, we had better move on, and the next bit of my question is about your decision to choose the Wrightbus over Alexander Dennis. What was your thinking about that?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The thinking was it was a straightforward open competition that Wrightbus won. It is a piece of public procurement that is in the public arena.

**Mayor John Biggs AM (Chairman):** It is always the case when you do procurement. I could win a bid to build the next underground train. I do not know how on earth to build them but I could put in a bid for 40 pence or something. You would have a test of credibility.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Indeed you could. Wrightbus has a long track-record of building buses internationally and for London, as for that matter does Alexander Dennis Limited (ADL).

**Mike Weston (Director of Buses, Transport for London):** As you would expect, there was a lot of interest in tendering for the contract. That went down to four bidders eventually who put bids in and tendered. That was then shortlisted down to two on commercial and technical grounds, and then Wrightbus won that procurement process.

**Mayor John Biggs AM (Chairman):** Yes, however, this links into one of the other many interesting points about this bus, which is that you had a design competition. Then the thing that was built was not the winner of the design competition, which we are going to explore a bit later on. What was the purpose of the competition? Simple question, given that you did not really follow the competition outcome in procuring a bus.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The term used at the time of the competition, what you have to remember, at the time was very much a blank sheet of paper. The intention of the competition was to harvest ideas, which it did do. All the ideas we received from the competition - both from professional organisations and members of the public because there were two sections to the competition - were made available to the tenderers who could then use them to influence their final ideas. We had some wonderful ideas from the competition but clearly some of them were technically impossible to deliver because you could not actually productionise it, for example. It was an exercise in harvesting ideas from both the public and other organisations to influence what the vehicle may eventually look like.

**Mayor John Biggs AM (Chairman):** That is why I did not submit my bouncy castle. You are saying then, to some degree, when people travel on this bus they are experiencing a little bit of Aston Martin? Can you explain to what extent that is the case?

**Mike Weston (Director of Buses, Transport for London):** I would have to go back and look at it. They came up with one set of ideas. They were not involved in the design of the final bus.

**Mayor John Biggs AM (Chairman):** OK. It may not be absolutely true to say you have harvested a lot of really innovative ideas and they have all been used?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Certainly there were some ideas that were not used. Some of them were not practical and some of them were not legal.

**Stephen Knight AM (Deputy Chair):** At the time when the contract was awarded to Wrightbus for the new bus for London with the Siemens hybrid system, were you aware that Wrightbus were about to dump their relationship with Siemens for all their other buses? In 2010 they switched from the Siemens hybrid to the Volvo hybrid system for all their other buses. Were you aware that was going to happen?

**Mike Weston (Director of Buses, Transport for London):** I do not think that “they dumped Siemens” is the right analysis.

**Stephen Knight AM (Deputy Chair):** All their subsequent hybrid buses used the Volvo hybrid system, not the Siemens one.

**Mike Weston (Director of Buses, Transport for London):** That is predominantly a customer choice as opposed to a manufacturer’s choice. Operators who want to buy buses – either in London or outside London – will decide which manufacturer they want. They will also decide which hybrid system they want. Wrightbus had already been embodying the Volvo chassis for a number of years. That was then made a hybrid product and they had started to develop some --

**Stephen Knight AM (Deputy Chair):** They had nonetheless been using the Siemens hybrid system on their buses up until then, had they not?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** There is a mixture of two things here. Wrightbus were essentially a body manufacturer who over time started to produce the chassis componentry and buy in other proprietary items to make it go. They have to make some business decisions about whether they want to be in the market of whole vehicles or whether they want to be putting bodies on other people’s chassis. What you are describing is a business relationship that they made with Volvo. Again, this is perfectly normal in the marketplace. Manufacturers effectively get married to each other to take advantage of each other’s benefits to sell into the market. What you are describing is Wrightbus having concluded that there would be wider customer appeal for a Wrightbus’ body Volvo product, which is a reasonable business decision for them to make, and is in no way connected with whether the Siemens propulsion unit works or not.

**Stephen Knight AM (Deputy Chair):** OK. It is just that there is some discussion in the industry about why it is that the new bus for London is stuck with the system which seemingly Wrightbus had dumped for all their other production buses and moved to a different system.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** They were not dumping it. There is nothing wrong with the Siemens equipment whatsoever. Wrightbus made a choice. Volvo is a Swedish company that is very proud. Proud Swedish companies work very hard to make sure they have the very best proprietary units, preferably of their own manufacture, in their equipment. The position is Wrights made a reasonable business decision with Volvo to sell a Wrights-Volvo product. The Volvo product comes with as much Volvo technology and as much Volvo equipment as it is possible to have. That is no reflection on Siemens.

**Stephen Knight AM (Deputy Chair):** It was not because there had been any problems with the Siemens system that you are aware of?

**Mike Weston (Director of Buses, Transport for London):** No, and they are still one of the biggest suppliers of hybrid bus systems, not just in the UK, but in Europe and North America.

**Tom Copley AM:** I wanted to ask about the design and the use of Heatherwick Studios. They did not win the design competition but were appointed anyway. TfL also appointed them to design the Garden Bridge, and when [Councillor] Daniel Moylan [Transport for London Board Member] was at the Royal Borough of Kensington and Chelsea<sup>1</sup> he gave them a no-contest contract there. That looks rather strange and suspicious to an outside observer. What is the obsession with Heatherwick Studios?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We are not in a position to comment about Thomas Heatherwick's appointment at Kensington and Chelsea or on the Garden Bridge. Heatherwicks, as you rightly say, were appointed for the new bus for London because it was believed that they had the strongest credentials to be able to take all of the elements that had been harvested from the competition, to look at the product and produce something that looked beautiful and iconic.

**Tom Copley AM:** None of the other designs that were in the competition lived up to that?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** If the question includes the fact that it was capable of being put into production and capable of being made legal and so on, that is correct.

**Tom Copley AM:** Did Daniel Moylan have any influence over the decision to appoint [Thomas] Heatherwick? He is on the TfL Board, or was for a time, am I right in thinking? Did he have any influence over the decision to appoint [Thomas] Heatherwick to design the new bus for London?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Not to my knowledge. It pre-dates me, I have to say. Unless Mike has any other observations, not to my knowledge.

**Mike Weston (Director of Buses, Transport for London):** Not to my knowledge.

**Tom Copley AM:** Thank you.

**Richard Tracey AM:** Can we just go on to the question of designing a bus and having the possibilities of other cities of the world buying it? The first question that we would like some answer to is, is it possible to have an iconic London bus but also want other cities to buy it? I mean Mike [Weston] has already talked about the design apparently fitting the use in central London. What are the similarities between London and other places?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Actually there are very few similarities because we have the densest urban bus network anywhere. We cannot really have this both ways. Either London takes a compromise and buys a standard bus that is used internationally around the world - which means that some of the requirements for London, I am afraid, are compromised - or it has something that is really designed for itself that takes full advantage of features that are particularly for London. We

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<sup>1</sup> Councillor Moylan remains a councillor at the Royal Borough of Kensington and Chelsea.

cannot then say it is a failure because it has not been sold anywhere else because actually the principal job for the new bus for London was for the London market.

It is a binary argument to say, "It has not been sold anywhere else" or "Might it be sold anywhere else?" Many of the features of the bus are now being incorporated into other buses which are being sold commercially in this country and elsewhere. I very much doubt - given the shortage of right-hand drive left-hand door markets in the world - whether we will see this bus in this form sold elsewhere internationally.

What is true, is that the features of it - which have been demonstrated internationally - are rapidly being included. Hong Kong, for example, is now making some big progress on hybrid. Dubai is going to run a competition for an iconic bus. It wants expert help from us and elsewhere. It does not want to buy the London iconic bus. It wants to run a competition for itself and make the same sorts of advances and so on. That is what is happening in the market as a result of the new Routemaster.

**Mayor John Biggs AM (Chairman):** Could you tell me how many millions each year TfL are making in royalties out of this?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We are not in the business of making royalties, as you know.

**Mayor John Biggs AM (Chairman):** Well, you should be. It is a serious point. It is a unique design, which has been copied elsewhere, why did you not --

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No, hang on. This is not a unique design that is being copied elsewhere. This is a unique design which is a catalyst for other people to want a unique design and for some of the benefits, such as --

**Mayor John Biggs AM (Chairman):** Like a sort of international act of charity then.

**Richard Tracey AM:** I do recollect from the discussions - whether it was in Mayor's Question Time or elsewhere - the point being made that this bus was going to be tremendously attractive to the rest of the world. Now you are rather contradicting that, Leon. You are saying in fact this bus is unique for what London needs and really not for other parts of the world.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I am saying the priority for this bus was to find one suitable for London, which it is. There are elements of the whole project - including a design competition, including the way it looks, including the features on the bus and the drive line and the progress that has been made in terms of air quality, pollution and fuel economy - that are attractive to people elsewhere for sure.

**Richard Tracey AM:** Yes, but I mean surely to develop a hybrid that did not require this bus to do that. You are saying that the hybrid model is being adopted in Hong Kong. It really is simply unique and it is unlikely that you are going to sell any of these buses elsewhere in the world, other than bits of them?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It would be fair to say that the industry has pulled its socks up and made some huge advances as a result of new bus for London. That has helped them achieve some commercial success elsewhere. The numbers of hybrid buses in this country, and the numbers of hybrid buses elsewhere, was very small until London proved that widespread hybrid buses could be deployed on to the streets with great success in terms of emissions and fuel economy.

As a result of which some more challenging climates – of which Hong Kong is one because of its temperature and its gradients – are now starting to come to the party in terms of hybrids. The bus has demonstrated that it is possible to make big progress in these markets. As I say, I do not expect a right-hand drive, left-hand three-door, double-decker that looks like the new Routemaster to be sold as a single product elsewhere.

**Richard Tracey AM:** Mike, do you have anything to add to that?

**Mike Weston (Director of Buses, Transport for London):** What I was going to add is that there are some indirect benefits. For example, the dramatic increase in the uptake of hybrids in other big cities; both in Europe and North America and, as Leon said, Hong Kong. That is helping people like Siemens and BAE [Systems] reach economies of scale, which is allowing them to be more competitive in the market which means that we can now buy hybrids cheaper than we probably could five years ago, ten years ago. Just the fact that we have helped promote the concept of hybrid buses for urban city buses has helped the economies of scale of that technology. There is then a benefit back to London because we are seeing the premium for that technology come down on newer and newer technology.

**Mayor John Biggs AM (Chairman):** The curviness and the use of plastics is a bit of a red herring then. The real innovation was the hybrid technology?

**Mike Weston (Director of Buses, Transport for London):** No, that is another issue. The new Routemaster used composite lighter-weight materials for the rear. With the arrival of electric buses which by default – because with pure electric buses you have lots of batteries on them and they are getting heavier – manufacturers, not just Wrights but all the others, are having to work harder and harder to make buses lighter with composite materials so that they can carry both the batteries and the passengers. The whole use of composite materials is becoming more and more the standard across the industry, because they are having to work harder to make buses as light as practically possible.

**Mayor John Biggs AM (Chairman):** I am impressed by your assertion. It would be useful if there was some evidence we could find outside the meeting of how the innovations in Wrightbus have been ground-breaking across the world.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We will seek to do that.

**Richard Tracey AM:** You mentioned that particular aspects of it have been picked up in other parts of the world. That is what we would like to know, which aspects? You mentioned hybrid. If there are other things about this particular bus design that have been picked up elsewhere then that would be helpful for us to know.

What elements of the design meant that other cities were most certainly not interested in it? You mentioned the right-hand drive bus of course, well that is pretty self-evident, but what other things? The other point is that if you did perhaps know what other cities did not like about the design for the new Routemaster, what was passed on to the builders?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The principal difference, as you know, outside London where the bus network is entirely commercial is that some of the requirements for bus operators are different. Principally, outside London, they do not have the dense simultaneous boarding and alighting that London has, which is why all of our buses have at least two doors, and these ones have three. Outside London, for example, typically buses only have one door. In turn that gives passengers more seats on the lower deck. It gives them more seated capacity. They are able to do that because they do not have the large numbers boarding and alighting at some of the stops. The ridership in London comprises

quite a lot of very short distance customers whereas outside London the journey times are slightly longer. Other cities are only starting to come to terms with their air quality issues. Many places outside London have air quality issues but they do not quite have the pressing air quality issues that London does. Those are typical of the sorts of differences that makes London special and the reason why we end up with a unique bus for London.

**Richard Tracey AM:** Did anybody outside London or outside this country suggest having a third door? That is one thing that is very specific to this bus.

**Mike Weston (Director of Buses, Transport for London):** Three-door buses are not unusual in mainland Europe on predominantly single-deck buses. Not just 'bendy' buses, there are a lot of 12-metre single-deck low-floor buses in Europe that have three doors.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Indeed four.

**Mike Weston (Director of Buses, Transport for London):** Yes.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Some of them they are all doors.

**Mike Weston (Director of Buses, Transport for London):** Multi-door boarding is not unusual in a lot of other cities; not in the UK but in other European cities it is not unusual.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Do not forget, only London has Oyster. In every other city and place in this country the driver is still involved in the fare collection. We do not take cash. All of our customers have one form of prepaid ticket or another. That is completely different outside London. Of course, three doors, for example, outside London is of no value because you need to get all the boarding passengers past the driver so that they can pay their fare. As Mike says, London is much closer to Europe in that respect in terms of having a very, very high proportion – 100% in London's case – of off-bus ticketing.

**Richard Tracey AM:** Do other cities' buses have conductors as well as drivers on them, or is it the same as London where there is simply the driver?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** There are hardly any other examples of two-person operation outside London. Some, but hardly any.

**Richard Tracey AM:** Can you tell us where? I mean not necessarily now, but can you tell us in a note?

**Mike Weston (Director of Buses, Transport for London):** There is a bit in Blackpool. There is a bit in Scotland.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Stagecoach in Scotland in Perth. That is Scotland not Australia. Those are the ones that spring to mind.

**Richard Tracey AM:** The other point I would just like to draw out with you is what elements of the new Routemaster are particularly attractive to the public to start with? I see certainly tourists queuing up to get on this particular bus.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** For the passengers, firstly it is beautiful to look at. Secondly, all of our customer satisfaction scores – which Mike [Weston] will describe in a moment – are superior on the new Routemaster to standard buses in London. They like the wide doorways, they like the ease of access, they like being able to get on and off at any of the doors. They like the fact that because there are two staircases it speeds up the boarding times. They are not fighting with people on the staircase going in both directions. They love the look and feel upstairs. They love the fact that it has these curves. They enjoy the slight hint of the old Routemaster in the moquette and in the flooring. Where it is run with a crew of two they like the ability to hop on and off whenever they like.

**Mike Weston (Director of Buses, Transport for London):** Yes, our recent customer satisfaction survey – which is an ongoing quarterly survey, and we can then break the results down depending what route the passenger or customer last used – showed that overall the new Routemaster had a score of 87 and all other vehicles was a score of 84. Three points extra which is significant. Then when you break that down –

**Richard Tracey AM:** That is not enormously significant though, a difference between 84 and 87?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The point is every single customer satisfaction indicator is higher. It is not just one or two of them, every single customer service indicator is higher on the new Routemaster than it is on a standard bus.

**Mike Weston (Director of Buses, Transport for London):** Yes, so the vehicle itself was 90 instead of 85; bus information was 89 instead of 84. For this type of survey that is quite significant.

**Mayor John Biggs AM (Chairman):** My esteemed colleague Baroness Jones wishes to ask a question.

**Jenny Jones AM:** I speak as a customer who actually does use these buses and who is deeply dissatisfied with them for all sorts of reasons. I am sure you have sat in all the seats. The elevated seats on the lower deck, you actually do not have enough headroom to stand up properly on those. Therefore it is iconic obviously because you are doing it for shorter people or something, a variety of shorter –

**Mayor John Biggs AM (Chairman):** I do not have a problem with it!

**Jenny Jones AM:** I have a problem. You must have a problem.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I am afraid a feature of bus design – which is locked into a whole series of legal requirements – has meant that the lower we make the floor in order to make it easier for people to get on, there are some bits of the bus that have to be where they are, including the wheels. If we are going to put seats on the top of the wheels and the floor has to be lower, I am afraid as a result some of those seats are perched on those.

**Jenny Jones AM:** It strikes me this is a design flaw. It does not happen on other buses. I use buses a fair amount, Leon. I know what they look like. I know that you do not have elevated seats on many other buses, or, if you do, they actually have the headroom. It is the headroom I am talking about.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** In fact those seats are on other sorts of platforms that you have to get there. I am afraid it is a piece of physics. The lower the floor goes, the more the intrusion of the wheels will be in the saloon.

**Jenny Jones AM:** You are talking about an iconic design that is, I would argue, inadequate. I look forward to filling in one of your customer satisfaction surveys.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** To be fair, Jenny, the large majority of our customers are indicating to us their satisfaction with the design. I accept your point entirely. Every bus design is a compromise between the legal requirements and our desire to have the floor as low as possible, to have seats near the door for people who need them, but also space for the wheelchair access and room for enough standing passengers so that people do not have to wait at stops. Frankly the overall height is a compromise because physically the bus cannot be any taller than about 4.4 metres. We would like to build them taller so everybody could stand up in all of the seats, but frankly then they would not go under the bridges. The whole thing is a compromise. This particular compromise has come out really well.

**Mayor John Biggs AM (Chairman):** I am aware that there has been quite a lot of innovation in recent years on kneeling buses which improves accessibility without having them so low to the ground. It can improve other aspects of the ride but you did not follow that in this design. Now, again, we are not the Transport Committee --

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** These kneel.

**Mayor John Biggs AM (Chairman):** My learned advisor told me that they do not.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** These kneel and they kneel beautifully.

**Mayor John Biggs AM (Chairman):** OK, one new job.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** They kneel beautifully.

**Mayor John Biggs AM (Chairman):** Do they? All right, OK.

**Richard Tracey AM:** There was one final question which of course is the one about air flow and temperature within these buses. We do hear a lot about that from our constituents and others. What is your answer to this problem, because clearly there is a problem?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The bus is fitted with air chill, which is not air conditioning because the air conditioning would be too heavy and take too much fuel. The bus is fitted with air chill that blows colder air. Like in your car, if you have air conditioning in your car, you do not drive your air-conditioned car with the windows open because you are defeating the object of the air-conditioning. The bus is built with no opening windows in the hope of keeping the cool air in and the ambient warm air out. That is quite a hard job with a bus that has three doors in it because every other lamp post, when you open the door, some of the ambient air by definition comes in and some of the cool air goes out. The design of the new Routemaster has no opening windows in the hope of keeping as much cool air in as is possible.

It is fair to say that for the air-chill system on the new Routemaster to work effectively, it has got to work very hard. Therefore any system that is working hard, as soon as it starts to lose any efficiency for any reason, then the air cannot be cooled quite as much as we might like.

The alternative is to fit opening windows. The downside of fitting opening windows is that the cool air goes out and the ambient air comes in and the benefit of the air-chill is lost. The upside is there is clearly a perception from passengers that the sound of air rushing past makes them feel cooler even if actually the absolute temperature on the bus is the same. I can assure you that the absolute temperature, in degrees centigrade, on the new Routemaster is about the same as on a standard bus. I fully accept that people feel that it is not as cool because they do not have the breeze, they do not have the sound of the air rushing past from the open windows.

We would have to say that whilst the temperature on the new Routemaster is broadly the same as on a standard bus, if passengers are feeling warmer then that is something we have to take account of.

**Jenny Jones AM:** They are not really warmer, they are just feeling warmer?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Correct. If we fitted a thermometer you would see the same degrees centigrade as you would on a normal bus.

**Mayor John Biggs AM (Chairman):** An alternative would be to have stronger chillers but that would screw up the energy-efficiency of the bus.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It would. Let me be clear, what I am saying is if passengers believe that they are feeling warmer and more uncomfortable because of the lack of opening windows that is something we are prepared to address.

**Mayor John Biggs AM (Chairman):** Just tell them to go downstairs.

**Jenny Jones AM:** It is hot there. It is baking.

**Tom Copley AM:** On the way down here I bumped into a friend of mine on the Tube. I said to her that we were going to be looking at the new Routemaster today. She looked at me confused for a moment and then she went, "Oh, you mean the sweat bus". You have designed an iconic bus, it is just iconic for the wrong reason. The number of times I get complaints on Twitter or whatever about this; it is not just the sound of air, it is the fact that airflow itself does cool you down particularly when you have been sweating. I have been on these buses and it feels like you are sort of hermetically sealed in. It is difficult to detect any kind of airflow. Even if you were to fit a couple of fans at either end of the bus just to get the air flowing around that would help.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** As you know, the heat from the electric motor on a fan puts the temperature up, not down.

**Tom Copley AM:** Again it is a bit like the whole thing about letting warm air in; it is like when you are on the Tube and someone opens a window at the end and you get the rush of air going through. The temperature in the carriage might remain the same, however you feel cooler and it is a nicer experience.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** That is exactly my point and we are prepared to address it.

**Mayor John Biggs AM (Chairman):** If you have air then it might actually assist the evaporation of sweat from your skin, which might help you to cool.. It may be exactly the same temperature but you may be cooler. Have you tested these things with people on them?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We are going to do so.

**Mayor John Biggs AM (Chairman):** You are going to? You have not done so yet?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We have heard very clearly, through several summers, complaints from passengers that they feel uncomfortably hot.

**Mayor John Biggs AM (Chairman):** We are not trying to pick on you by the way.

**Jenny Jones AM:** Yes we are. Well I am.

**Mayor John Biggs AM (Chairman):** Apart from me and Jenny.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I am happy to be picked on.

**Stephen Knight AM (Deputy Chair):** We have heard that it is an air-chilling system and not an air-conditioning system. Could you clarify the difference?

**Mike Weston (Director of Buses, Transport for London):** An air-chilling system is designed to reduce the temperature from its ambient by say 4 or 5 degrees from whatever the ambient is.

**Stephen Knight AM (Deputy Chair):** I have got a heat pump with a compressor that works like an air-conditioning system.

**Mike Weston (Director of Buses, Transport for London):** An air-conditioning unit, and buses in Hong Kong for example are fully air-conditioned.

**Stephen Knight AM (Deputy Chair):** So it is an air-conditioning type unit, it is just a weak one?

**Mike Weston (Director of Buses, Transport for London):** Yes, an air-conditioning unit would bring the temperatures down to a set limit. In your car you can set it at 18 degrees, 19 degrees, and that is what air-conditioning will do. The air-cooling system effectively will chill the air by say about 5 degrees against ambient. Clearly on hotter days it will chill the air but not as much as a full air-conditioning.

Now, the result of that in Hong Kong, for example, and Singapore, fully air-conditioned double-deck buses, wonderful to ride on but probably miles per gallon half of what we get for a bus in London. A significant increase in fuel consumption and a significant increase in emissions. We could not justify that level of fuel consumption and emissions in London.

**Mayor John Biggs AM (Chairman):** We have made slow progress with those first two questions, now another three questions are coming along straight away.

**Tom Copley AM:** Thank you.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** If I may say, I appreciated the joke, even if others --

**Mayor John Biggs AM (Chairman):** I am here to entertain.

**Tom Copley AM:** That is the best thing about having John in the Chair!

Could you tell us what transport needs the new Routemaster fulfils that could not be delivered by other buses?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I hope I am not being dim here, the transport needs is moving people so both of them move people.

**Tom Copley AM:** Right, but what additional benefits does a new Routemaster give us over an ordinary hybrid double-decker bus that you could have ordered off-the-shelf?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We have been through some of these already. The beautiful iconic look that people love. The fact that we can build it with three doors and two staircases in order to speed up the boarding and alighting. People have a sort of tension that, for example, on ordinary two-door bus some people do not like to go upstairs in case they cannot get downstairs and through the scrum at the bottom of the stairs and get off before the bus goes away. The fact that it has more doors and more staircases reduces the anxiety that people have about being able to get on and off properly. Increasingly people are treated to improved ambience, if you like. They go to the supermarket. They go on trains, all sorts of walks of life. It would be possible to build a sort of cheap bus out of Dexion [steel strip construction system], but they have a nice travel experience when they are on the new Routemaster.

**Tom Copley AM:** I mean I suppose a part ambient experience is the ambient temperature which we have already covered. On the three doors, I do not want to go on to Val's [Shawcross CBE AM] question because Val is going to be asking about this, but am I right in thinking that the third door is now going to be shut on these buses or on many of them?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No.

**Tom Copley AM:** I was under the impression that they were.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** For the avoidance of doubt, the bus has three doors. When the bus is operated with a crew of two all the doors are open at the stops. When the bus is in motion doors one and two - the front and centre - are closed and the one on the platform is open. It is permanently locked open. When the bus is operated with a crew of one, all of the doors are open at the stops and all of the doors are closed when it is in motion.

**Tom Copley AM:** OK, I see. I am with you.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** So the back door is always used whether or not the bus is --

**Tom Copley AM:** It is just that it is not always open when there is not a member of staff there. Right. I am with you now. The main advantage is that this is an iconic bus that looks nice and that is nice to travel on?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** As far as the passengers are concerned - so we are not talking about air quality or fuel economy or other things - as far as the passengers are concerned they are having a nicer experience than they would have had.

**Tom Copley AM:** For three extra percentage points overall to the level of satisfaction, would perhaps simply a nice new hybrid bus have achieved the same on the basis that it is a nice new shiny bus and not one of the old buses?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The operators are buying nice new hybrid buses continuously so this is against a fleet that includes nice new ordinary hybrid buses too.

**Tom Copley AM:** Do you have the figures specifically for those hybrid buses as opposed to an aggregate of the other buses?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The customer satisfaction scores do not distinguish between hybrid buses. Given that many buses are fairly route-specific we could probably isolate new standard buses in customer satisfaction scores.

**Tom Copley AM:** That would be interesting because of course otherwise it is simply comparing the new Routemaster against an aggregate of all the other buses on the network, which is perhaps not a fair comparison.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Except of course that is what the passengers experience because as the passengers travel randomly on the network they get whatever bus comes next, and therefore that is their experience.

**Tom Copley AM:** Of course it is inevitably easier for a passenger to distinguish between a Routemaster and the new Routemaster.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Because of its iconic look.

**Tom Copley AM:** Because of its iconic look!

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Another advantage I had not thought of is it makes the whole customer satisfaction allocation much easier

**Tom Copley AM:** The 2013 business case shows that the greatest benefit over the other hybrid buses is how quiet it is. At what point did you realise that the new Routemaster's noise-reducing benefits would be more valuable than its environmental or passenger-convenience benefits?

**Mike Weston (Director of Buses, Transport for London):** In the business case we use standard TfL value-for-money measures for each of the benefits. In our business case we have not come up with the financial benefit ourselves of the noise.

**Tom Copley AM:** Say that again, sorry.

**Mike Weston (Director of Buses, Transport for London):** When we put the business case together, the team working on the business case did not effectively value noise themselves. They have taken the values from the standard methodology used by TfL for all projects. Within the standard methodology there are values for time savings, there are values for noise reduction and there are values for emissions benefits. We have

taken those and applied them to the business case. Obviously in this case noise reduction was seen as a significant benefit, as were the emissions and as were other things.

**Tom Copley AM:** You did not realise at the start that the noise reduction was going to be the most valuable of those benefits?

**Mike Weston (Director of Buses, Transport for London):** No, because it was not driven by that. We do know from our postbag that noise is a significant issue not just from buses but from all traffic. Things you can do to reduce noise have significant benefits to all residents of London, not just bus users. That is probably why it is valued quite highly. It is not just the bus passenger that is benefitting, it is residents along bus routes and along busy traffic corridors.

**Mayor John Biggs AM (Chairman):** Why is it so quiet? Because it is electric?

**Mike Weston (Director of Buses, Transport for London):** Because it spends --

**Mayor John Biggs AM (Chairman):** It still has a diesel engine though.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It has a diesel engine generator. The generator only runs --

**Stephen Knight AM (Deputy Chair):** So does the Alexander Dennis hybrid. It has a diesel engine generator and an electric motor.

**Mike Weston (Director of Buses, Transport for London):** The new Routemaster runs more time in zero-emission mode so it will run more time just without the engine running, 30-35%. Also, when the engine is running it is running more constantly. You are not getting the acceleration and deceleration of the engine so it is a more constant quieter noise.

**Stephen Knight AM (Deputy Chair):** Although it has bigger batteries than other hybrids.

**Mayor John Biggs AM (Chairman):** Having praised you, our briefing says, curiously,

*"In calculating the noise reduction benefit TfL does not distinguish between the relative noise levels on diesel and hybrid buses."*

You do not distinguish between the relative noise levels on diesel and hybrid buses. We are identifying it as a big deal and you are saying it was never actually part of the intention.

**Mike Weston (Director of Buses, Transport for London):** That is one of the benefits.

**Mayor John Biggs AM (Chairman):** Just an accident.

**Mike Weston (Director of Buses, Transport for London):** Well, it is one of the benefits of hybrids

**Mayor John Biggs AM (Chairman):** Accidentally it has a benefit.

**Mike Weston (Director of Buses, Transport for London):** It is one of the benefits of hybrids.

**Mayor John Biggs AM (Chairman):** I sort of wonder whether it is because the engine does not have to be anywhere near the wheels anymore. You can stick it somewhere --

**Jenny Jones AM:** Under seats.

**Mayor John Biggs AM (Chairman):** Under seats. Under Jenny. Surrounded with insulation in a way that an old bus engine would just be under the bonnet.

**Mike Weston (Director of Buses, Transport for London):** As we roll out more electric buses there will be even more noise benefits.

**Mayor John Biggs AM (Chairman):** Anyway, we are digressing, we are becoming a Transport Committee here.

**Tom Copley AM:** Yes, I will move us back on to the money questions or the value-for-money questions. The Surface Transport Panel did recommend that you undertook some analysis of how the bus was performing now it is in use. Why has that research not been undertaken?

**Mike Weston (Director of Buses, Transport for London):** How the bus is performing is a constant process between us and Wrights and the bus operators. We are constantly reviewing how the bus is performing in service with both the operators and with Wrightbus.

**Tom Copley AM:** In terms of the benefits it was expected to bring, there was a recommendation that a piece of work be carried out. At the moment we have the business case which anticipates what the benefits will be. Has a large piece of work been done on how the buses are performing against that now they are in service?

**Mike Weston (Director of Buses, Transport for London):** We have not yet pulled together all the feedback from how the bus is performing and compared it with the original business case.

**Tom Copley AM:** When do you expect to do that?

**Mike Weston (Director of Buses, Transport for London):** No timescales but we can do that. We have no timescales for that.

**Tom Copley AM:** However there is no timescale on it. We could come back to this Committee in a year and there still would not have been any assessment and you could still say there is no timescale?

**Mike Weston (Director of Buses, Transport for London):** There has been assessment.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** There is constant assessment. There is continuous assessment. I think what you are referring to is some sort of deep-dive ring-fenced go-look project.

**Tom Copley AM:** So we can see how it is performing compared to how you thought it was going to perform overall. You cannot put a date on when that will happen? OK, it might be useful if you could at some point.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We will take it on board.

**Tom Copley AM:** My final question, how many of the 800 buses due to be in service by April 2016 will be able to carry 87 people and how have forecast benefits been affected by the reduced capacity of the buses in service?

**Mike Weston (Director of Buses, Transport for London):** Overall weight is a challenge for all bus manufacturers at the moment. As the Euro standards are getting more and more tight, there are heavier engines and more exhaust after-treatment. Overall weight of the vehicle is a challenge, both for this and for all other double-deck buses in London or anywhere. It is even more of a challenge for electric buses going forward, which is why the European Union (EU) are looking at increasing the gross vehicle weight for busses by a tonne to help manufacturing overcome this problem generally.

On the new Routemaster the number of seated passengers is clearly the same. What happens with the weight is that the certified number of standing passengers it can carry varies by two or three, depending on which generation of new Routemaster it is, depending on which engine it has. In reality it is the standing passengers that are affected. The number of standing passengers that are allowed is set - it is probably academic because you generally will not squeeze that many people on anyway - so when it is full it is full, if that makes sense. In operational terms, one with the technical capacity of 84 will be no different from one with a capacity of 85 or 86.

**Tom Copley AM:** Sorry, I am slightly confused by this. There is no technical difference in terms of capacity if a bus is going 84 passengers or 87 passengers?

**Mike Weston (Director of Buses, Transport for London):** One of them will be certified to carry probably 24-25 passengers, one might be 23 passengers. It will not be seen to be different.

**Tom Copley AM:** Can you tell us how many of these that will be in service by April 2016 will be able to carry 87?

**Jenny Jones AM:** The promised 87.

**Tom Copley AM:** Because that was promised, yes.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It is unlikely that any of them; the technical developments make the bus slightly heavier, as Mike [Weston] says. The Euro VI developments make it heavier, and the manufacturer has to find other ways of taking weight out to compensate for that.

**Mayor John Biggs AM (Chairman):** The way they do it is take passengers off.

**Jenny Jones AM:** Yes, their primary function.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It is unlikely that we will get to 87 anywhere in this production run. Since the passengers being carried out are 84, 85, 86 the difference is - as Mike [Weston] describes - immaterial because frankly buses can be physically full with 77 very large people and all their shopping and equally could still have space on it if there were 90 on it. In practical terms it makes no difference.

**Tom Copley AM:** It is likely at rush hour in the morning when it is unlikely you have got lots of people with their shopping, and it is lots of people trying to get to work, that you might well get up to 87, or it might be helpful to get up to 87.

**Mayor John Biggs AM (Chairman):** I think the point being made is that the licensed number of people that can be carried is 80, however that does not physically stop 146 people from getting on it.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** As has always been the case.

**Mayor John Biggs AM (Chairman):** There is no regulation of the number of people who can get on it. The driver does not say, "I am sorry, I cannot go any further, my passenger meter has gone over to the red and you have to get off".

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** In London it is the passengers who decide when the bus is full.

**Mayor John Biggs AM (Chairman):** Right, OK.

**Mike Weston (Director of Buses, Transport for London):** The calculation of standing passengers is a calculation of square metreage available and overall weight of the vehicle, therefore, if you are familiar with the 507 and 521 - which are the single-deck vehicles with no seats in the front area - they are, under the rules, licensed to carry 99 passengers. There is no way you can physically get 99 passengers on, however, that is what they are licensed to carry because there is enough weight and space, technical space. The amount of space they give each passenger is unbelievably small, but that is the legislation. The fact they are licensed to carry 99 is academic. We plan that service on the basis they carry about 70, and it is the same with this, it is a --

**Mayor John Biggs AM (Chairman):** This is an interesting observation because, increasingly, if you are on Southeastern trains down where Gareth [Bacon AM] lives, there was a controversy because they took a lot of the seats out to squeeze more people on to it. Yet, on the Routemaster it feels like it has more seated areas and less standing areas.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It is back again to the compromise, I am afraid, which is that --

**Mayor John Biggs AM (Chairman):** However, people quite like that.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Yes, but there are people with mobility impairments who want as many seats as possible as near to the doors as possible. There are people who are able-bodied and want to get to work who frankly would stand on the outside if it got them to work on time.

**Mayor John Biggs AM (Chairman):** If you wanted to pick a bus that could get the maximum number of people from London Bridge Station to the Bank of England in the quickest possible time you would not use one of these because it has too many seats on it.

**Tom Copley AM:** You would use a bendy bus.

**Mayor John Biggs AM (Chairman):** Yes, you would use a bendy bus.

**Mike Weston (Director of Buses, Transport for London):** At the moment we use the 12-metre 521 one that has no seats on the lower floor area, yes. Bear in mind that is because most people are only standing for five to ten minutes.

**Mayor John Biggs AM (Chairman):** We had better motor on.

**Tom Copley AM:** Chairman, another bit of advice.

**Mayor John Biggs AM (Chairman):** No, it was not intended, the first one was. Yes, there we are.

**Valerie Shawcross CBE AM:** It falls to me to ask you some questions about the benefits and disbenefit to calculations of open platform operation, which is where you were saying that the third door is open during running on I think 240 of the 600 buses in operation at the moment. I was surprised that there had been a calculation done at all on that really, but there we go. How realistic do you think have TfL's business case estimates been for the benefits and costs, which in this case is calculated as the potential dangers of having an open platform bus? I will run through the little calculation we have been given if you need it.

**Mike Weston (Director of Buses, Transport for London):** The business case, page 47 is where you are?

**Valerie Shawcross CBE AM:** Yes.

**Mike Weston (Director of Buses, Transport for London):** Is that where we are looking at? I think those were the assumptions at the point in time. Remember this business case was done prior to the vehicles being designed and delivered, and what the business case shows, and the benefit-cost ratio (BCR) is only one aspect of the business case, is that there time benefits of having a second crew member, there are safety improvements as a result of that as well, and it shows you some of the safety disbenefits because obviously there is a disbenefit because you in theory will get a few more accidents from the rear platform. I think that is what we knew at the time. As we have said earlier, it has not been revisited in any great detail yet, however that should --

**Valerie Shawcross CBE AM:** OK, I am looking, according to this, to the new bus for London rollout business case, which was November 2013, and there was some information on page 19, so I think that is where data has been drawn from. Basically on the figures going into the benefit of the open platform, it assumes a reduced walking-time benefit of £0.82 million. Therefore there is an assumption that a large number of people, 40% I think, are not getting on and off at the bus stops but are having a reduced walking time to get the bus because they are hopping on or off in between stops.

**Mike Weston (Director of Buses, Transport for London):** Closer to their destination.

**Valerie Shawcross CBE AM:** Is that 40% realistic?

**Mike Weston (Director of Buses, Transport for London):** It is what was achieved on classic Routemasters in their day.

**Valerie Shawcross CBE AM:** Is that a rule that you are allowed to operate, because on all of the other buses the bus drivers are extremely clear that people should not get off or on unless at bus stops.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Again it was a Mayoral commitment. He very clearly said that passengers had to be able to have their freedom and to board and alight anywhere where they chose, yes.

**Valerie Shawcross CBE AM:** OK, so how do you cost in the walking time benefits of something where obviously TfL has a health promotion strategy, which sees walking as a health benefit across the system, and also a lot of the users on these buses are leisure users, so there is not a direct economic benefit from them. How do you do that?

**Mike Weston (Director of Buses, Transport for London):** The walking time benefits will be based on the value of time.

**Valerie Shawcross CBE AM:** The value of the time.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The standard value of time, yes.

**Valerie Shawcross CBE AM:** Is there any sense in which TfL can make that assumed figure a cashable benefit? Is there any impact on the number of buses you run or the number of bus stops you need to have or the frequency of the routes?

**Mike Weston (Director of Buses, Transport for London):** I am sure there must be examples of people who are now hopping on the new Routemaster because they know they can get off in traffic if they come to some traffic. We are getting the benefit of that fare, for people that now know they can hop off between stops.

**Valerie Shawcross CBE AM:** Right, so your assumed financial benefit there is that it saves people a smidge of time.

**Mike Weston (Director of Buses, Transport for London):** Times, yes.

**Valerie Shawcross CBE AM:** OK, so no cash benefit from that. The security benefits are assumed at 1.01 million. That comes from having the extra staff member on the door. How come that is not offset in the calculations against the cost of employing an additional person? It is an assumed benefit without the cost disbenefit being put against it. Because those people are not earning more than -- you know, they are not generating --

**Mike Weston (Director of Buses, Transport for London):** The cost of the conductors will be in the business case.

**Valerie Shawcross CBE AM:** OK, so at the moment --

**Mike Weston (Director of Buses, Transport for London):** I cannot find them offhand now, but they will be in there because clearly it is a cost of operating the bus in that way.

**Valerie Shawcross CBE AM:** All right, however, in TfL's calculation of net benefit of operating open platforms, security benefits of having an extra staff member are only shown as in improved security, they are not netted off against the cost of those people, I do not think.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** In the isolated section we are reading from, no.

**Valerie Shawcross CBE AM:** Right, OK.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The net benefit here is not net of the cost of the conductor. It is the security benefit.

**Valerie Shawcross CBE AM:** That is the way I read this little table I have been given in here. The biggest disbenefit that is given is the safety disbenefit. There is obviously an increased incidence or likelihood of accidents as a result of people hopping on and off this open platform. Its safety disbenefit is given as minus £1.86 million. In actual fact, how many accidents are we having? Are many injuries are reported? Have we had any deaths associated with open-door platforms?

**Mike Weston (Director of Buses, Transport for London):** Thankfully we have not. The data we used was from the last - I cannot remember quite how many years - five or six years of Routemaster operation. Within that data there were one or two fatalities of passengers falling off the rear platform. We have not had that. The number of rear platform incidents - I have not compared the data completely - is a lot lower. We get very few incidents. That is partly because one of the key things in the training of conductors --

**Valerie Shawcross CBE AM:** Do you have some data that perhaps you could get back to us on?

**Mike Weston (Director of Buses, Transport for London):** Yes. If we revisited that table we would find that the safety disbenefit was a lot, lot less than the Routemaster's, partly because safety and advising passengers has been fundamental within conductor, or customer assistant, training.

**Valerie Shawcross CBE AM:** If we did have a fatality, which is entirely possible, that figure would therefore have to be significantly adjusted.

**Mike Weston (Director of Buses, Transport for London):** Depends over what period of time and how many --

**Valerie Shawcross CBE AM:** How many people die.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Let us be clear, one fatality is one too many. This is terribly sterile but the number of fatalities per million passenger journeys or whatever would clearly change. As Mike says, the difference between this and the old Routemaster is that the conductor, the customer service assistant, is --

**Valerie Shawcross CBE AM:** Also there were thousands and thousands more of the old Routemasters.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The conductor was away from the platform with fare collection.

**Valerie Shawcross CBE AM:** Fare collection, OK. Has there been any impact on TfL's insurance cost as a consequence of operating a bus which has an increased accident risk?

**Mike Weston (Director of Buses, Transport for London):** We do not insure the vehicles, they are insured by the bus operators. They are big companies. There is a lot of self-insurance anyway.

**Mayor John Biggs AM (Chairman):** There must be a public liability issue.

**Valerie Shawcross CBE AM:** Yes, there must be a cost.

**Mike Weston (Director of Buses, Transport for London):** Yes, there will be. The feedback from the operators is yes, but marginal. You are talking about relatively small numbers. I cannot remember the exact numbers but Arriva in the UK operate probably 5,000 buses of which they operate a hundred-odd of these.

**Mayor John Biggs AM (Chairman):** There is a question of the reputation issue. Say a relative of mine fell off one of these and was killed or something. Unless it was one I recommended for that course of action – which is unlikely – I would want to sue TfL. I would want to see [Mayor] Boris Johnson in court. I would cite as evidence the minutes of many meetings of the Assembly when Ken Livingstone was Mayor where he said, “The old Routemasters were death traps and that is why I had to get rid of them”.

**Valerie Shawcross CBE AM:** People regularly, once a year at least, say that.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** He also said only a dehumanised moron would get rid of the Routemaster, so he was a little conflicted on this.

**Mayor John Biggs AM (Chairman):** I think he might have accused me of being a dehumanised moron at that stage.

**Valerie Shawcross CBE AM:** Has there been any calculation of the cost to other road users of the risk? For example, if somebody hops off in front of a cyclist you could have a dangerous incident. Has there been any calculation on that?

**Mayor John Biggs AM (Chairman):** Yes, absolutely. That is the sort of thing that happens; it is not just people falling.

**Mike Weston (Director of Buses, Transport for London):** No, that is not included in the business case.

**Valerie Shawcross CBE AM:** It is not included in the business case. How much less time are the new Routemasters spending loading and unloading passengers due to having the extra doors and staircases?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I am afraid it has been impossible to calculate because in the last years of the introduction of the new Routemaster has also been against an increase in ridership. On a steady state basis it might have been hoped to demonstrate less dwell time at stops because of the faster boarding and alighting. Over the currency of the new Routemaster we have had an increase in ridership and we have actually now, more recently, had a worsening in traffic speeds. There has not been a steady state over the period that would have allowed us to demonstrate the grossed up benefit of the faster boarding and alighting. Frankly the slack, if you like, has been taken up by increased traffic congestion and more boarding and alighting. I am afraid we cannot demonstrate that.

**Valerie Shawcross CBE AM:** Do you have a different assumption therefore? If you are putting a route in, do you have a different assumption of dwell times between the new Routemaster and the conventional Dennis double-decker?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No.

**Valerie Shawcross CBE AM:** Do you make an assumption?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No.

**Valerie Shawcross CBE AM:** There has been no impact at all on the timetabling of the assumed improved slack that you get?

**Mike Weston (Director of Buses, Transport for London):** The benefits we would have had from quicker boarding have either been absorbed, as Leon said, because that route is now busier than it was a year ago so we may have had to put more buses into the schedule; or because of increases in traffic we may have had to put more buses into the schedule to make the timetable more robust which we no longer have to do.

**Valerie Shawcross CBE AM:** If you were changing back from a new Routemaster to a more conventional bus, are you saying you know for sure you would have to put more buses on the route?

**Mike Weston (Director of Buses, Transport for London):** I think it depends on how big the route is and how many vehicles it has currently got.

**Valerie Shawcross CBE AM:** There are no figures whatsoever to show improved loading and unloading times?

**Mayor John Biggs AM (Chairman):** When you replace a route with a new Routemaster we obviously need to see all the performance figures.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** What Mike [Weston] was describing is that - subject to all other things being equal - they are replaced on a like for like basis.

**Mayor John Biggs AM (Chairman):** Do they perform better?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It is against the background of increased ridership and worsened traffic congestion.

**Mayor John Biggs AM (Chairman):** Say this week it is a conventional Dennis and next week it is a Routemaster, you should be able to get some performance figures for this week and next week and see whether there is a change?

**Mike Weston (Director of Buses, Transport for London):** Last week's traffic will be totally different to this week's because of the schools, for example. There is no way of knowing.

**Valerie Shawcross CBE AM:** If you did a really silly Benny Hill challenge experiment where you got a conventional bus and a Routemaster and you stopwatched it - time them on, time them off - what difference do you think you would see?

**Mike Weston (Director of Buses, Transport for London):** The difference you will see - at busy stops when there is perhaps more than ten people boarding or alighting - is the new Routemaster will be faster.

**Valerie Shawcross CBE AM:** A bit faster?

**Mike Weston (Director of Buses, Transport for London):** Yes, it will be faster. At each stop that may be seconds, but obviously on a long busy route the seconds can mount up to a minute or so each way.

**Valerie Shawcross CBE AM:** At the moment you have got no idea, in fact, how many seconds you might assume on a route?

**Mike Weston (Director of Buses, Transport for London):** We have done some *ad hoc* observations which seem to support that. However, as Leon [Daniels] said, there are so many other variables. Every day is different, every week is different.

**Valerie Shawcross CBE AM:** How would it compare to a bendy bus then?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Again, this is tricky to answer because we have not had any of those now for four years and the ridership and traffic conditions four years ago were different to how they are now. It is impossible to tell.

**Valerie Shawcross CBE AM:** What we are hearing is there is basically no data to show us whether or not it is true that they load and unload faster.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We have evidence that they load and unload faster when there are, as Mike [Weston] says, ten or more people at the stop. None of that has been converted, if you like, into a material saving of resource because the traffic speeds are slower and the bus patronage is higher.

**Mike Weston (Director of Buses, Transport for London):** It may have avoided having to put more resources in.

**Jenny Jones AM:** This question is about this 40% of all passengers who get on and off between stops. This is presupposing a second crew member. Admittedly I do not use these buses on a regular basis but I hardly ever see a second crew member. I am assuming you are going to have to change that 40% figure because the door is more often closed than open between stops.

**Mayor John Biggs AM (Chairman):** There are only about four routes that have second crew members, all the others just have one.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Some of the earlier routes were operated with a crew of two. Since then all of them have been operated with a crew of just one. The routes that had a crew of two still have a crew of two. If you went on the 11 or the 24 you would always see the second person.

**Jenny Jones AM:** This 40%, is that based on all the buses or only on those routes?

**Mike Weston (Director of Buses, Transport for London):** Just the ones being crewed with a conductor, a second crew member.

**Jenny Jones AM:** That figure is not going to change. OK.

**Mike Weston (Director of Buses, Transport for London):** Clearly on the ones that have not got a conductor you cannot get on and off between stops.

**Mayor John Biggs AM (Chairman):** Those are specifically the central London ones where Mary Poppins would hop on and off the bus or whatever, as distinct from Tottenham High Road where it would be a pretty stupid thing to do.

**Valerie Shawcross CBE AM:** I am interested to go back to that thing about how the loading and unloading, the dwell times, varies. We were talking about whether the bus is in open-platform mode or not basically, are we not? You are saying it is easier and unload three doors, two stairs.

Very often, as Assembly Members, we get involved in campaigns around pedestrian crossings. I have been told that you cannot have a pedestrian crossing at this point because it will add a few seconds onto a bus route. TfL guard jealously the performance of its bus service, to some extent understandably. Yet it does seem that on the one hand when there is a challenge to the performance of a bus from a traffic light designed for pedestrians that that is seen as an issue. Whereas we have got a question whether or not these perform better or not which seems not to have any data behind it at all. I think it is a double-standard actually. Do seconds matter or not on unloading and loading? That is a comment, you can respond if you wish.

Can I just talk about fare evasion? There has been some data we have had at Mayor's Question Time which has suggested that the three-door Routemaster has performed quite well on fare evasion. A fare evasion rate of 1.3% on the new Routemaster has been reported as against a network average of 1.2%, whereas the old bendy bus had allegedly a much higher rate of fare evasion. Why is it that you think the fare evasion performance is better on the new Routemaster as compared to the bendy bus?

**Mike Weston (Director of Buses, Transport for London):** Clearly for the ones that have got a conductor, the presence of a conductor acts as a deterrent at the rear platform and encourages people to touch in. The other significant thing is that our method of collecting fares has clearly significantly changed since the bendy buses. In those days you could --

**Mayor John Biggs AM (Chairman):** Just cash.

**Mike Weston (Director of Buses, Transport for London):** They did not take cash but the passenger was still paying cash on other buses. We have seen a wholesale movement to prepaid, Oyster or contactless cards that are linked in with daily capping. That is why we are not seeing the levels that we saw on the bendy buses.

**Valerie Shawcross CBE AM:** The fare evasion levels on bendy buses could have been improved by the improvement in the ticketing that we have already seen?

**Mike Weston (Director of Buses, Transport for London):** The ticketing improvement was an evolution of improvement. The majority of people now need some form of prepaid ticket to use the transport network. With capping there is less incentive not to pay your fare on some bus routes.

**Mayor John Biggs AM (Chairman):** Behaviourally the temptation - if I am a slightly stropky teenager or something - to not touch your Oyster card when there is someone watching you has got to be higher when you are not walking past the driver through the front entry.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Stropky teenagers are free.

**Mayor John Biggs AM (Chairman):** Is that because they are stropky or because they are teenagers?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** If you can get an exemption for being stropky that is really good.

**Mayor John Biggs AM (Chairman):** I would go for that.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Let us be really clear, since we are now on cashless and since Oyster is widely used across the network a very large number of our passengers firstly were admitted into the zone through ticket gates at railway stations, whether that is mainline or Underground. They have permission, freedom, and authority to travel inside that zone. They are never going to be fare evaders because whether they have tapped on or off anyway they are inside the zone. Same with freedom pass holders and so on. Secondly, as Mike [Weston] says, for people who are making journeys across the network capping cuts in after the third journey on a bus. Frankly, if you are making two journeys in one direction and two in the other you catch the cap anyway.

**Mayor John Biggs AM (Chairman):** That is a very thoughtful way of saying you really do not know.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No, it is not at all. These are all social and behavioural reasons as to why fare evasion is at a historic low.

Finally, there is the enforcement activity where there is a very high level of enforcement activity. It is very high profile. People who are caught are prosecuted. Everybody knows somebody who has been found and prosecuted for fare evasion. It is a really good attribute to the system that across the network fare evasion is at a historic low and on the new Routemaster it is broadly comparable. What more could you want?

**Stephen Knight AM (Deputy Chair):** We could have saved a lot of money by simply having enforcement on bendy buses then.

**Mayor John Biggs AM (Chairman):** Let us go on to the next question.

**Stephen Knight AM (Deputy Chair):** I was just going to say on the enforcement issue, does not having a door open make it more difficult to enforce? If somebody sees the ticket inspectors get on board they can very easily hop off.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No, they work on pairs. One gets on at one end and one at the other.

**Stephen Knight AM (Deputy Chair):** I am going to move on to emissions, in particular the Euro V. The 300 Euro V new Routemasters have been delivered and the fact there is no intention, as I understand it, to convert them to Euro VI in order to be able to drive within central London and the Ultra Low Emission Zone (ULEZ).

**Mike Weston (Director of Buses, Transport for London):** Correct.

**Stephen Knight AM (Deputy Chair):** From 2020 they will effectively be given an exemption, that no other Euro V bus will have, to operate in that zone.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Technically that is true. That is because, of course, they are so high up the Euro V band that the difference between Euro V and Euro VI is so small that on a value for money basis you would not spend the money on that.

**Stephen Knight AM (Deputy Chair):** You say it is so small but actually they emit about five times as much of the nitrogen oxide (NO<sub>x</sub>) pollution as a Euro VI bus. You might say the difference is small but if it is a factor of five that is actually quite a big difference, is it not. Certainly from 2020 onwards the new Routemaster will be by far the most polluting bus in central London.

My question really is that TfL assessed the business case for converting from Euro V to Euro VI engines at that point presumably, and made the decision that the business case does not stack up because of the cost of doing so against the environmental benefit. Have you looked at the cost-benefit analysis of converting those original Euro V buses to fully electric operation, run on batteries alone? Clearly the business case will be rather different in that case. The environmental benefits will be that bit more, particularly given TfL has announced it is going to trial a fully electric double-decker bus.

**Mike Weston (Director of Buses, Transport for London):** The challenge with double-decker electric buses will be packaging enough batteries into a vehicle to allow it to run for a reasonable length of the day without having to go back to the garage. I think converting existing vehicles - whether it is the new Routemaster or other hybrids - to pure electric I suspect when you look at the business case it would be better value to buy a new vehicle. By the time you re-engineer a vehicle to that degree - it would be a massive re-engineering exercise - you would quickly come down in terms of buying new vehicles. That is not just compared with a new Routemaster, that would be compared to any diesel or hybrid bus.

**Stephen Knight AM (Deputy Chair):** OK. I know the city of York has some converted double-decker electric buses running already. Some people have been doing this already.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** If only we had the traffic conditions, the passenger demand and the territory that they have in York.

**Stephen Knight AM (Deputy Chair):** I am sure of that. Some people would have said when you are designing an iconic bus for the future - and electric buses are just around the corner - to build a bus which will only operate with a diesel generator running perhaps is missing the point.

**Mike Weston (Director of Buses, Transport for London):** We need to be realistic. Double-decker electric buses, yes, we will have some trial vehicles later this year. They have still got a long way to go to get to the operating performance in terms of length of day to a diesel-hybrid bus. Most of our double-decker buses are out in service for 18 to 20 hours a day, even longer in some cases. At the moment pure electric double-decker technology would not perform to that degree.

**Stephen Knight AM (Deputy Chair):** You do not even think that the chassis of the new Routemaster has the space or the design to enable it to operate in the same way that the new BYD electric bus is?

**Mike Weston (Director of Buses, Transport for London):** As we are constantly replacing the fleet anyway, the logic would be that you would be better off investing your money in - whether it is more new Routemasters or the next generation of bus - replacing the 14-year old bus that is coming out of the fleet as opposed to spending money on conversion.

**Stephen Knight AM (Deputy Chair):** One of the issues with the new Routemaster is you are not constantly replacing it, are you? You bought it outright and you are going to keep it for 14 or 15 years whereas most buses on London streets will be phased out within five years.

**Mike Weston (Director of Buses, Transport for London):** In terms of upgrading, I am sure we will see upgrades to those at some point as we do with other vehicles.

**Stephen Knight AM (Deputy Chair):** Emission upgrades?

**Mike Weston (Director of Buses, Transport for London):** Potentially, yes. We are just about to finish the upgrading of the Euro III vehicles with emissions reduction technology. We will have done 1,800 vehicles over the last few years which reduced NO<sub>x</sub> significantly. As part of the ULEZ we are starting next year to trial the retrofitting of standard hybrid buses with exhaust-type treatment. That whole retrofit industry is growing, getting to be better value for money and more sophisticated. As the opportunities arise I can see us doing other vehicles in that way.

**Stephen Knight AM (Deputy Chair):** You think in time those vehicles will be retrofitted to Euro VI standard?

**Mike Weston (Director of Buses, Transport for London):** I am sure there will be potential for it, yes.

**Stephen Knight AM (Deputy Chair):** You think they will be retrofitted to Euro VI standard in time.

**Mike Weston (Director of Buses, Transport for London):** Potentially, yes. I can see that at some point in the future.

**Stephen Knight AM (Deputy Chair):** That is interesting.

**Jenny Jones AM:** It is on fuel efficiency.

**Stephen Knight AM (Deputy Chair):** OK, yes.

**Jenny Jones AM:** In your 2013 business case it estimated fuel efficiency savings of £6 million by 2029. On the Millbrook test track - which you based those savings on - the bus did something like 18 miles per gallon, but only 7 miles a gallon on the road. Presumably those fuel efficiency savings are overstated.

**Mike Weston (Director of Buses, Transport for London):** Millbrook is a very established way of testing buses on a standard test cycle. What we then see in service is that some bus routes are as good as Millbrook, if not slightly better, and some are slightly worse. We see a variation because every bus route is different. Millbrook is just a standard test protocol for comparing different technologies. Every type of engine technology we have we will put through the standard Millbrook test cycle which is part of route 159. It is done on a rolling road. It is a very sophisticated way of capturing emissions. It is a benchmark. It is clearly not an accurate reflection of every single bus route in England. It cannot be because every bus route is different, and every bus route could be different next week as compared to this week.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The right comparison is the before and after comparison between the standard vehicle and the new Routemaster.

**Jenny Jones AM:** Are you disputing this figure of seven miles per gallon in real life conditions on the road for all the buses? You are saying it is not true for all of these routes.

**Mike Weston (Director of Buses, Transport for London):** There are some figures in the pack that show you the variations we have seen in new Routemasters compared with previous routes. Route 111 - before we

converted - was 4.7 miles per gallon, it is now 7.4 miles per gallon, as an example. That is a 57% increase in fuel efficiency.

**Jenny Jones AM:** It is still not the 11 miles per gallon that was done at Millbrook.

**Mike Weston (Director of Buses, Transport for London):** No.

**Jenny Jones AM:** OK. If they are burning more fuel they must have higher emissions. You do not seem to have taken that into your calculations.

**Mike Weston (Director of Buses, Transport for London):** No. In terms of air quality, burning more fuel does not necessarily mean you have more NO<sub>x</sub> and particulate matter (PM) emissions. A lot of modern engines have been using more fuel to reduce the emissions. They will have more carbon dioxide (CO<sub>2</sub>) emissions but not more PM and NO<sub>x</sub> emissions necessarily. As engine technology has got more and more sophisticated a lot of engines are burning fuel to keep the temperature up to reduce NO<sub>x</sub> and PM.

**Jenny Jones AM:** Using more fuel must come into a cost-benefit ratio as well. Can someone help me out here?

**Mike Weston (Director of Buses, Transport for London):** It does, yes.

**Jenny Jones AM:** I just do not understand how you have delivered all these efficiency standards but at the same time they do not stack up.

**Tom Copley AM:** Do you mean the figures that were used in the business plan?

**Jenny Jones AM:** Yes.

**Tom Copley AM:** Now that they go on the road they might still be better performing than the other buses but they are not as well performing as they were in the business plan, therefore the benefits are not as --

**Jenny Jones AM:** Did I not say that? That is fantastic.

**Mike Weston (Director of Buses, Transport for London):** The point in time that the business case was done that was the assumption on fuel economy. The fuel economy in practice, in service, is not at that level so, yes, the benefits would be different.

**Jenny Jones AM:** The benefits will be fewer, not just different.

**Mike Weston (Director of Buses, Transport for London):** Fewer, yes.

**Jenny Jones AM:** Fewer.

**Mike Weston (Director of Buses, Transport for London):** Still significantly better than the vehicles they replaced.

**Tom Copley AM:** Does that still mean that in terms of emissions they are still going to 15% more efficient than the Euro VI?

**Mike Weston (Director of Buses, Transport for London):** As an engine burns more fuel, it does not necessarily produce more NO<sub>x</sub> and PM. It can actually produce less.

**Mayor John Biggs AM (Chairman):** There are emissions and there are emissions. You might get more global warming but you might get less local poisoning.

**Mike Weston (Director of Buses, Transport for London):** Yes, burning of fuel and CO<sub>2</sub> emissions are proportional.

**Mayor John Biggs AM (Chairman):** Bad news for polar bears, good news for old ladies in central London or whatever, in terms of crude outputs.

**Mike Weston (Director of Buses, Transport for London):** The example I can remember, when we went from Euro III to Euro IV - which was a step-change in emissions of NO<sub>x</sub> and PM - the bus operators were reporting back to us a few years ago that fuel economy had gone up quite a bit between the two types of engine technology. The way in which the engine was designed was burning more fuel to help the regeneration and to help PM filters work properly to reduce NO<sub>x</sub> emissions.

**Tom Copley AM:** Based on how they are actually performing - rather than how you predicted they would perform in the business plan - how much more efficient are they than a standard Euro V hybrid?

**Mike Weston (Director of Buses, Transport for London):** It depends on what route. In the pack you have got route 11, for example, is 57% better than the previous vehicle.

**Tom Copley AM:** The previous vehicle was a hybrid?

**Mike Weston (Director of Buses, Transport for London):** No, route 11 was a standard diesel.

**Tom Copley AM:** This is the thing, I want to know how they compare to other hybrid buses.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Give the [Route] 24s.

**Mike Weston (Director of Buses, Transport for London):** Yes, the 24 - which was hybrid - went from 5.4 to 7.4, so that was 37% better.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** That is, for the avoidance of doubt, from standard hybrid to new Routemaster.

**Mike Weston (Director of Buses, Transport for London):** On that route. You will find different results on different routes because of topography, because of the average loads of vehicles, because of traffic.

**Tom Copley AM:** Could I, in theory, find that a new Routemaster on other routes performed worse than a standard hybrid that it replaced? Is that theoretically possible?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We just plucked out a case that we know where we were replacing relatively new hybrids with the new Routemaster, which is unusual, it just so happened.

**Mike Weston (Director of Buses, Transport for London):** Normally it would be replacing the older diesel.

**Jenny Jones AM:** You have picked a figure out that could be one of a variable number of figures? Who is to know that you have not picked the best possible figure and there are much, much worse figures.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We picked the one that was the nearest comparison of new hybrid to new Routemaster. That was the genesis of the question, which is how much better than a standard hybrid is the new Routemaster.

**Mayor John Biggs AM (Chairman):** Where I have got confused about this is the distinction between CO<sub>2</sub> emissions – which is a global warming issue – and the local air quality issue which is about NO<sub>x</sub> and PM. We may be better on one and not better on the other one.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The European standards through Euro I, II, III, IV, V, VI have, for very many years, been chasing particulates. In the pursuit of reducing particulates there has, in some cases, been a worsening of fuel consumption and a commensurate increase in CO<sub>2</sub>. There has been some expense to global warming in order to reduce particulates is the generality.

**Mike Weston (Director of Buses, Transport for London):** The Euro standards at the moment do not make any reference to fuel economy and CO<sub>2</sub> emissions. They will probably in the future. Now that the emissions from the Euro VI engine are so low on PM and NO<sub>x</sub> the expectation is the EU will now start to focus on CO<sub>2</sub> emissions. If you look at the emissions level from an Euro VI diesel engine – whether it is used in a new Routemaster or a standard bus – we are now down to very, very small levels of emissions. What will happen is they will focus on CO<sub>2</sub> emissions but not let those low levels of NO<sub>x</sub> and PM increase. That will be the next challenge.

**Jenny Jones AM:** Your business case is still wrong because of the 2020 ULEZ. The ULEZ was not part of your 2013 business plan.

**Mike Weston (Director of Buses, Transport for London):** No, because it was not envisaged.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It was not born then.

**Jenny Jones AM:** You are going to have to redo the business plan anyway. That is fair to say, is it not?

**Mike Weston (Director of Buses, Transport for London):** Business plan?

**Jenny Jones AM:** Based on new events.

**Mike Weston (Director of Buses, Transport for London):** That is not policy.

**Stephen Knight AM (Deputy Chair):** The emission benefits that have been claimed for the new Routemaster, I am told, come from comparing it with other Euro V hybrids over the business planning period up to 2030. Whilst that might be true in outer London, in inner London – during most of that period – the comparison is going to be with Euro VI hybrids, not with Euro V hybrids because they will not be allowed to operate. Would that not be fair, that you ought to be comparing the emission benefits with the alternative, not with an alternative which has been ruled out by policy? Sorry, have I put that question in a way which is understandable.

**Jenny Jones AM:** I understood.

**Stephen Knight AM (Deputy Chair):** The emission benefits of the business plan compare it with other Euro V hybrids, which might be the case now because those are the alternative buses that are available. The business plan runs to 2030. For the last ten years of that the comparison will not be with Euro V hybrids. It will be with Euro VI hybrids because that is the only thing that will be allowed to run, with the exemption of these new buses, in central London.

**Mayor John Biggs AM (Chairman):** You might as well own up, it was ground-breaking but it is now bit of a dinosaur.

**Stephen Knight AM (Deputy Chair):** Are you going to amend the business case to look at the obviously rather reduced environmental benefits or emission benefits?

**Mike Weston (Director of Buses, Transport for London):** As with any business case, it is done at the point in which a project is initiated. Things clearly change for any business case, which could be a positive or negative on the business case. As we said earlier, you do a business case to justify a project, which was done. If you revisit this business case – as we said earlier in response to Val’s [Shawcross CBE AM] question – we would probably soften the safety disbenefits because the evidence suggests it is safer than a Routemaster for a number of reasons. You may slightly soften the emissions benefits. There would be pluses and minuses in that.

**Stephen Knight AM (Deputy Chair):** If you had known about the ULEZ policies when you were doing this business case it would have come out rather differently.

**Mike Weston (Director of Buses, Transport for London):** If the ULEZ policies had been known then they would not have been as ambitious as they are now because it would probably have only been at a Euro V, for example.

**Jenny Jones AM:** They are good, aren’t they? They are very good.

**Mike Weston (Director of Buses, Transport for London):** You only know what you know at the point at which you do the business case unfortunately.

**Stephen Knight AM (Deputy Chair):** I suppose the wider point is you are building in a bus which you are going to keep for 15 years. Clearly as technology moves on it is going to be old technology quite quickly.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** That was the first thing we said. The question was had this project been too hasty. Our answer was that you have to go very briskly because the rate of change of the technology is so great that if you do not go briskly then you end up not catching the ball.

**Mike Weston (Director of Buses, Transport for London):** One of the projects I did many years ago was re-engineering the old Routemasters with Euro II engines which, at the time, everybody thought was absolutely fantastic. Now Euro II is old hat, isn’t it?

**Mayor John Biggs AM (Chairman):** Later on we are going to revisit bits of this question. Now to batteries; the sunny question of batteries.

**Stephen Knight AM (Deputy Chair):** The problem of batteries. How has the poor performance of batteries affected fuel consumption and emission levels on those buses affected?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Can we just clarify the issue to do with batteries. Forgive me at the moment for the description. Please do not think of the batteries in this bus like the one you have in your car. The batteries that are fitted in --

**Stephen Knight AM (Deputy Chair):** I drive a hybrid car so maybe they are similar.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Maybe they are similar. These batteries are in fact made up of lots of cells. The cells are clustered together in modules. The modules form - in the dictionary sense - batteries. Because of imperfections in the mass manufacturing of cells some of those cells degrade faster than others. If they start to degrade they start to pull their nearby friendly cells down with them. It is possible to replace those cells. The way to replace those cells is to have the batteries out, the modules out, get the cells replaced and go back.

Across the fleet of hybrids this is a problem. This is not a new Routemaster problem. This is a battery issue across the whole fleet. Depending on the characteristics of when they were manufactured, how they were first charged, how they are then used in service, how the battery management software works and how the batteries are cooled, some cells fail earlier than others.

**Stephen Knight AM (Deputy Chair):** Has it been a greater problem in the new Routemaster than in say the Alexander Dennis or the Volvo?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No. We have a fleet of identical Alexander Dennis hybrids on two separate routes in London that were made in one production run where they are physically identical, apart from the imperfections in the manufacturing technique. On one route hardly any of those cells failed, and on the other route many of the cells failed and had to be replaced. That is a feature of operating characteristics; the charging and discharging cycles and the cooling. A whole series of things.

The only reason why the batteries on the new Routemaster are of interest to anybody, of course, is that the Routemaster is associated with the Mayor. Therefore anything that happens to the bus becomes a political issue. The battery problem on the new Routemaster technically is the same problem that hybrid buses have generally. It is just they get less airplay.

**Stephen Knight AM (Deputy Chair):** If I ask you for statistics of how many hybrid batteries have failed across the entire fleet of hybrid buses, you could produce a table showing exactly the same proportion of other hybrids are failing as new Routemasters?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Of course not. As I explained, the batteries do not fail. Individual cells and modules fail.

**Stephen Knight AM (Deputy Chair):** The number of cells within the batteries.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No.

**Mayor John Biggs AM (Chairman):** OK. It is a dumb question then.

**Stephen Knight AM (Deputy Chair):** You cannot produce any evidence to support what you have just told me, that for other buses cells within their batteries are failing at the same rate?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We can produce you some information that demonstrates the thrust of the explanation I just gave you. There is not a simplistic question that says, "How many batteries have failed?" No batteries have failed. Cells within modules in batteries have failed.

**Stephen Knight AM (Deputy Chair):** The overall effect of those is the battery becomes less effective and less serviceable.

Is the battery technology within these buses the same as other hybrids on London streets?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** A range of technologies, but broadly yes. They are all lithium ion.

**Stephen Knight AM (Deputy Chair):** They are all nickel metal hydrides or lithium ion?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** They are lithium ion.

**Stephen Knight AM (Deputy Chair):** They are lithium, are they?

**Mike Weston (Director of Buses, Transport for London):** They are different suppliers. Battery technology is probably changing and developing even more quickly than diesel engine technology. It is changing so rapidly which is why Wrightbus took the decision to change the supplier of batteries because something else they had tested had come along which they found performed better.

**Stephen Knight AM (Deputy Chair):** Presumably they come with a guarantee because batteries will last a certain number of years.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** To be clear, all of the changes on the new Routemaster in respect of batteries have been undertaken by Wrightbus under warranty. There is no cost to us.

**Stephen Knight AM (Deputy Chair):** How long are they supposed to last, these batteries, without these faults developing?

**Mike Weston (Director of Buses, Transport for London):** They have a two-year warranty. Some of the operators have bought extended warranties. They paid extra, as you could for a washing machine or whatever for five-year warranties. They envisage they will last between four and five years.

**Stephen Knight AM (Deputy Chair):** Is that the same on the other hybrid buses, they all have two-year warranties?

**Mike Weston (Director of Buses, Transport for London):** Unless the operator decides to buy an extended warranty.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Let us be clear, on the non-new Routemaster hybrids, those buses are the property of the private sector operators. The deal they have done is more a matter for them.

**Mayor John Biggs AM (Chairman):** That leads brilliantly into my question, yes.

**Stephen Knight AM (Deputy Chair):** They are all going to be done at Wrightbus's expense?

**Mayor John Biggs AM (Chairman):** Maybe not yet.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Any failure under warranty is covered by the manufacturer. Let us be clear about the big advances in technology. Energy density is improving, the understanding of the cooling, the understanding of the cycles, the software that controls it and all the rest of it, will prolong battery life. Every problem we are having with a hybrid battery is also a problem on a pure electric battery. It is the same thing. The science is travelling at a remarkable speed.

**Stephen Knight AM (Deputy Chair):** Let us hope so. The final thing, just to clear this up, presumably - although the first two years of its life the battery is under warranty - you have built in your assumed cost of replacing batteries and cells within batteries in years three, four and five as these buses get older at an assumed rate of failure. Does experience suggest that that assumed rate of failure is actually likely to be higher in years three, four and five than you budgeted for or not?

**Mike Weston (Director of Buses, Transport for London):** The operators would do that. They had to make those assumptions.

**Stephen Knight AM (Deputy Chair):** Presumably that will be passed on in some way into the next round of bidding.

**Mike Weston (Director of Buses, Transport for London):** If they got their assumptions wrong it would not during the contract, but clearly at some point they would have to recover it.

**Stephen Knight AM (Deputy Chair):** It will be higher costs.

**Mike Weston (Director of Buses, Transport for London):** What we will probably see is there will be a point where we will see the battery technology leapfrogging so you will end up taking the business decision to replace batteries with newer battery technology before these get to the stage where they are failing too frequently. That is where you would make a decision to replace batteries.

(short adjournment)

**Mayor John Biggs AM (Chairman):** We may reconvene and move swiftly on to a question about cost. The standard model in the UK bus industry is buses are leased. You disagree with even that. In London they are. At what point was the decision made to buy these buses?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Let us be really clear. We pay all of the operators' costs, one way or another. No matter what happens in the longer term we pay all their costs. Many of the bus operators in London have a market for vehicles which are surplus in London elsewhere on their network. By TfL purchasing these vehicles we eliminated from the operators' calculations

the risk that they would add for any loss that they might make on the sale of these vehicles if they were retired prematurely.

**Mayor John Biggs AM (Chairman):** That is a brilliant answer, I must say.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Thank you.

**Mayor John Biggs AM (Chairman):** From now on you are going to buy every single bus in London?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** You could run an argument that says the organisation should own the entire bus fleet and eliminate that risk. Of course, the new Routemaster is a different animal to the standard vehicles. The standard vehicles which are used in London operators are able to redeploy elsewhere in the country on their networks.

**Mayor John Biggs AM (Chairman):** You are saying there is great merit in this, but really the reason you did it is because when they start failing London emission standards they can send them to Yorkshire or whatever they do normally. Pretty quietly you said “Indeed”, so you are agreeing that is the basic model they work on.

**Mike Weston (Director of Buses, Transport for London):** Selling buses elsewhere in the country.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** That is what typically happens.

**Mayor John Biggs AM (Chairman):** Yes, OK.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Secondly, in the contractual regime the contracts are for five to seven years. It is entirely possible that somebody could win a contract for a new Routemaster for five years, maybe extend it to seven, and lose that contract at the end in which case new Routemasters would be surplus, aged seven years. Since they would be the property of the operating company there would be no obvious direct route back into London unless they happen to be successful in another contract.

By us owning the vehicles that allows us to make sure that they run their entire life inside London. We will move them between operators as is necessary. That means the cost will be lower. It also means that, in production terms, we were able to get the lowest possible unit cost for ordering the largest number of buses whereas, of course, the operators would have been ordering them in the 30s and 40s and 50s and we ordered 600.

**Mayor John Biggs AM (Chairman):** That is what I call making a silk purse out of a sow’s ear.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I am obliged.

**Mayor John Biggs AM (Chairman):** Mainly you had no choice.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It was the right thing to do.

**Mayor John Biggs AM (Chairman):** Basically you had no choice, did you?

**Mike Weston (Director of Buses, Transport for London):** We had a choice.

**Mayor John Biggs AM (Chairman):** You could have had a choice not to build the Routemaster in the first place, given there was not any appetite for the standard model. In the same way as we exported our heavy industry to China and thereby achieved massive emission reductions in the UK, we will export our buses to Yorkshire or whatever and achieve better air quality in London. That does not apply in the case of the new Routemaster because Yorkshire does not want them. Essentially that is the case.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** That is an interesting story about Yorkshire which includes some of the facts that I mentioned a few minutes ago.

**Mayor John Biggs AM (Chairman):** That is a very good answer. On average, how many years are buses used on busy central London routes before being exported elsewhere? We are testing this model more methodically.

**Mike Weston (Director of Buses, Transport for London):** For standard buses operators can win a contract initially for five years. They can then get a two-year extension if they meet certain performance criteria. Then, when the route is retendered, we will - subject to value for money and operators offering a discount and achieving what environmental targets we have at the time - allow an operator to rebid with seven-year-old vehicles so it could do another five years plus. The maximum age of a vehicle in London, when it left the fleet, would be 14. In practice it is probably nearer to 12 because not every contract gets a two-year extension.

**Mayor John Biggs AM (Chairman):** The life of a bus is 20 - 30 years?

**Mike Weston (Director of Buses, Transport for London):** No, by 20 years a bus is getting pretty old.

**Mayor John Biggs AM (Chairman):** This is the model the bus companies work on; to get them new in London and then ship them somewhere else and they cannot do that with these?

**Mike Weston (Director of Buses, Transport for London):** No, the business model most bus operators work on in London is having at least that option of moving them somewhere else if they lose a contract. They will endeavour to try to leave it in London because obviously they can be more competitive with a mid-life vehicle, but at least they have got the option of moving it somewhere else.

**Mayor John Biggs AM (Chairman):** Did you go to any of the bus companies and say, "Will you lease these?"?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No. We took a business decision that said we will own these vehicles. That means we will ensure that the entire fleet stays in London for their useful economic life and we will avoid the risk element that the private sector would not unreasonably put on an untried, untested, and unlikely to be deployed elsewhere product. That risk premium, in our calculation, would have been material. That would have been a cost to the network that we could avoid, and we did.

**Mayor John Biggs AM (Chairman):** If we were in an episode of *Yes Minister* I would be saying, "That is very brave, Minister".

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Thank you.

**Mayor John Biggs AM (Chairman):** Indeed.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I hope that is helpful.

**Mayor John Biggs AM (Chairman):** It certainly is an answer that will be sent off for semantic analysis, as all your answers are.

**Mike Weston (Director of Buses, Transport for London):** Can we just clarify the first point about bus operators for the rest of the bus fleet because you were interested. They do not necessarily lease vehicles. There is a mix of lease and buying. About half of the bus fleet is leased, half via banks or whatever, and half is bought.

**Mayor John Biggs AM (Chairman):** Obviously one of the reasons why you might expect a bus company to trade up its buses is because they are failing to meet the emission and other standards that you expect of them. Yet with these buses, unless you write them off and scrap them, you are stuck with them until 2026.

**Mike Weston (Director of Buses, Transport for London):** No. At the moment if an operator is bidding with Euro III vehicles they have to have upgraded them with the extra exhaust treatment, for example. You would look during the life of any vehicle to see whether there are any upgrades you can do to make them more environmentally friendly.

**Mayor John Biggs AM (Chairman):** It is a rather messy market. You can see there is a purity in the market where you say, "I want you to tender for this route and I want your buses to emit X grams of whatever it is and Y grams of whatever else it is as part of the standard". Then you say, "By the way if it is on this route it is going to be a Routemaster and so those conditions do not apply". It does seem rather an artificial bending of the market.

**Mike Weston (Director of Buses, Transport for London):** They know at the point at which they bid what they are bidding against.

**Mayor John Biggs AM (Chairman):** If we are good capitalists - as we all are in London, of course, with a few exceptions - and we want the market to help improve the environment - which it might be able to do in a number of ways - then we do that by setting standards. We are saying those standards do not really apply on these particular routes. Just agree with me and we will move on.

**Mike Weston (Director of Buses, Transport for London):** At the moment the diesel standard is Euro VI and they do.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No, we are not agreeing with that.

**Mayor John Biggs AM (Chairman):** OK. I concede to you that they manage Euro V and a half, not Euro VI.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** What we have presided over is the fastest practical increase in low-emission vehicles that is commensurate with the amount of money we have to spend, the tendering programme, the availability of products on the market. The result of which may "look messy" - to use your words, John - but it has been how we got as many vehicles with the lowest possible emissions into the fleet as fast as we can.

**Mayor John Biggs AM (Chairman):** I appreciate that. You are putting a price on emissions then, effectively?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** If your next question is what is that price then I am not sure how I am going to answer it. There is a value, for sure.

**Mayor John Biggs AM (Chairman):** What is the price?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Let us stick to that.

**Mayor John Biggs AM (Chairman):** OK. Can you write to us and tell us - having reflected on it perhaps by sitting on a bus - what the price is?

**Mike Weston (Director of Buses, Transport for London):** There are standard government values for reducing NO<sub>x</sub> and PM emissions.

**Mayor John Biggs AM (Chairman):** We have spent a lot of time on this. Gareth has to leave in seven minutes and we are now to his question.

**Gareth Bacon AM:** I will be fairly speedy. Thank you, Chairman.

**Mayor John Biggs AM (Chairman):** Miss a couple of stops if you like!

**Gareth Bacon AM:** It is about the cost of bus conductors. In advance of this meeting our committee officers had a huge amount of information from you for which, of course, we are grateful. They had an awful lot of heavy lifting to prepare our brief. They managed to pull out a table which is showing the cost comparison of purchasing the 600 new Routemasters instead of standard hybrid buses. The table itself seems to suggest that the only way that the 600 new Routemasters are cheaper than standard hybrid buses is if you discount or leave out additional crew members. Is that something you recognise?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** It would be fair to say that if you were not paying for an extra body the cost is considerably cheaper, without a doubt.

**Gareth Bacon AM:** The table shows what I think is an 18-year period from 2012/13 to 2029/30. It suggests that if the additional crew members are not included they will be £32 million cheaper over that 18-year period. Thirty-two million pounds sounds like a lot of money but over 18 years, in comparison with your budget, is not a lot less than a rounding error I would say. You agree they would be more expensive if you included the cost of the additional crew member?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Yes.

**Gareth Bacon AM:** OK. Obviously in the old Routemasters the purpose of a bus conductor was to collect fares. Arguably you could be monitoring people getting on and off safely from the rear platform. On the new Routemaster we have the full rollout of Oyster. What is the job description of a second crew member?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The safety and security of the passengers is his principal job. He is also involved in helping, for example, people in wheelchairs on and off; answering travel enquiries; taking photographs for tourists and --

**Mayor John Biggs AM (Chairman):** Get them to sell ice creams as well.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Indeed, we can do so. Obviously in the days of Routemasters with conductors they were involved in collecting the fares. They left the platform and were taking cash and checking passes.

**Mike Weston (Director of Buses, Transport for London):** Their principal role was still the safe operation of the platform and the vehicle moving away from stops. Even in the old Routemaster that was still one of their principal roles. It was just harder to do because they had to make sure the platform was clear before they rang the vehicle off.

**Gareth Bacon AM:** Has any strategy been formed about whether the conductors on the Routemasters provide value for money?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Maybe a good way to answer it is to say that --

**Gareth Bacon AM:** Sorry, I am slightly distracted by the noise here.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The Mayor envisaged a bus that could be operated with a crew of two, with an open platform and people being able to hop on and off as we have described. To the great credit of my team and my predecessor, what we designed was a bus that could be used with a crew of two or one which allows us huge amounts of flexibility.

It would be fair to say - especially before this Committee - that the financial situation in the country and therefore the availability of taxpayers' money through the Department for Transport to TfL over the period 2007/08 to now has dramatically worsened. Whilst it would have been beautiful to have had a fleet of several hundred crew operated new Routemasters with conductors carrying out the duties that we described - which are well loved by passengers - the economic realities of 2015 are that with the limited amount of taxpayers' money that is available to us the second person on the bus does not represent good value compared with other calls on TfL's funding. We have been able to move - with no design change to the bus whatsoever - from crew operation on some busy routes to single person operation at certain times of the day or all day on other routes on the same vehicle. Our judgement is that the money that the conductors would have cost on those routes is better spent elsewhere.

**Gareth Bacon AM:** Is it the long-term plan then to remove fully the second crew member on the 240 ones that have them?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No, there is no long-term plan to remove the conductors from the routes that currently have them. Equally there are no plans to introduce any more conductors on any of the routes that are listed for conversion in the future.

**Gareth Bacon AM:** Is it fair to say then you are reserving your right to approach the problem flexibly depending on demand and economic circumstances?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Yes and, frankly, the outcome of the spending review later this year.

**Mayor John Biggs AM (Chairman):** You could foresee effectively never operating the third door while the bus is moving, never having it open?

**Mike Weston (Director of Buses, Transport for London):** You would still have it open at the stops.

**Mayor John Biggs AM (Chairman):** Yes, obviously. It would be quite difficult to get on and off. They could climb through a window except the windows do not open.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** As I say, the great thing about the bus is it is capable of being operated with a crew of one or two at any time of the day or night in any place in the city, as financial and other circumstances change.

**Mayor John Biggs AM (Chairman):** Under this Government we will be heading towards zero operation.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** There may well be a Mayoral candidate whose manifesto promises to run all of these buses in crew operation. In which case there is a price which we can give for whatever cost. There may well be a manifesto commitment from Mayoral candidates to do something different.

**Jenny Jones AM:** Hopefully if you get a Mayoral candidate who is not economically illiterate they will not ask you to do something so impractical.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I will be using my vote wisely, Jenny.

**Jenny Jones AM:** Vote Green in 2016. You are answering these questions extremely well, but quite honestly I have huge doubts about the whole business case for this bus plus I loathe it as something to travel on.

The original business had a BCR. Then you did further work to improve that. How did you justify it? What further work did you do to improve it?

**Mike Weston (Director of Buses, Transport for London):** The next order?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Are you talking about the original order for 600?

**Jenny Jones AM:** I am talking about when you first looked at this bus the original BCR was negative. Presumably at that point you could have said, "We are scrapping this idea. We are not going forward with it." Then you did further work to justify going forward with it.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The business case is wider than the BCR. We were attempting to deliver a manifesto promise as I described earlier.

**Mike Weston (Director of Buses, Transport for London):** The BCR can only take into account the things that you can put a financial value on, either because it is money that you are getting; or it is costs you are not incurring, for example the safety to costs. The BCR is one element of the business case. The rest of the business case articulates the other reasons why you want to deliver a project.

**Jenny Jones AM:** Let us go to your business case then. The 2013 business has got a £6 million fuel efficiency saving by 2030 which, of course, vanished when the ULEZ was announced. Those are dodgy figures now. There is £4.6 million a year for emissions reduction. We have just heard there are more emissions and we do not really know if that is OK anymore. There is £2.6 million per year saving on dwell time. That is not so because the bus timetables have not changed and there is no data. So dodgy figures. There is £4.9 million per annum on ambience, partly because they are less noisy. This is my briefing, you can have it afterwards. Also because of the modern cooling system which, of course, is absolute rubbish. It is not only the upper decks that get hot, it is the lower deck as well. Do not tell me any different. You have got a total there of £18 million in this business case which I think has really dodgy figures; really, really dodgy. Does this explain why you have not published a revised business case?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We would have to say that all the figures contained in this 2013 document were the best assessments and assumptions available at the time. If we were to write it today the numbers would clearly be different.

**Jenny Jones AM:** Are you going to publish a revised business case?

**Mike Weston (Director of Buses, Transport for London):** The business case is done --

**Jenny Jones AM:** You should really, should you not?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No, because the business case is done at a point in time to justify a project. The project is almost delivered. We have said that we will be doing a deep dive to review the performance of the project at some point in the future --

**Tom Copley AM:** You do not know when?

**Valerie Shawcross CBE AM:** We have until the next election.

**Tom Copley AM:** Yes.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We do a business case as part of justifying a project and that is in the past.

**Jenny Jones AM:** When you ordered those 200 extra buses, you must have revised the business case because it still was not looking very good, was it? You must have gone to the TfL Board.

**Mike Weston (Director of Buses, Transport for London):** There was a revision in 2013.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The Mayor has said on record that he would like 2,000 vehicles like these by 2020.

**Jenny Jones AM:** You are reining him in?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We secured another 200 vehicles at a lower unit price than the average price for the 2014 - 2016 batch, as a result of which we are making progress towards his desire for 2,000 vehicles like this by 2020.

**Mayor John Biggs AM (Chairman):** You just keep your fingers crossed that he will forget about it until he is gone. Is that right?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** He will have 800 by the time he is gone.

**Jenny Jones AM:** Forgive me. When was the decision taken by the TfL board to buy the extra 200 buses?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Stand by for one second. November 2014.

**Jenny Jones AM:** November 2014? You must have known that your business case from 2013 was already out of date.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Yes.

**Jenny Jones AM:** Yes? Thank you very much. OK. Have we had those revised figures? We have had them, have we, in the briefing? No, we have not had them. What I am trying to get at is that you are making decisions about buying more, you are making decisions about reducing the number of passengers that these buses can use and so on and the figures all feel very dodgy. I am hoping our report will reflect that, Chairman.

**Mike Weston (Director of Buses, Transport for London):** What we must remember is that the 200 extra buses we – and all the operators – would have financed in some way by 200 other new buses because these 800 are not extra new buses into the London bus network. They are instead of other new buses. We are replacing the fleet. The fleet is 9,000 vehicles. As we said earlier, the average age is probably 12 years when they leave the fleet. You are renewing about 600 or 700 vehicles a year and this is part of that replacement. Therefore, the bulk of the money we would have been spending on other hybrids instead.

**Jenny Jones AM:** You could have bought other, lighter hybrids.

**Valerie Shawcross CBE AM:** And more of them.

**Jenny Jones AM:** Actually, other hybrids now are much lighter than these cumbersome old buses.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We are dealing with the Mayor's desire to have 2,000 vehicles by 2020.

**Jenny Jones AM:** OK. You could have bought better buses but you ordered these instead; better, lighter buses?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No, I do not accept 'better'.

**Jenny Jones AM:** Cleaner; lighter.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No, I do not accept any of the adjectives.

**Mike Weston (Director of Buses, Transport for London):** The only hybrids we could currently buy are Euro VI hybrids. They all have Euro VI engines --

**Jenny Jones AM:** Yes, which can operate in central London with the --

**Mike Weston (Director of Buses, Transport for London):** -- which is what we are buying.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** That is what we are buying.

**Mayor John Biggs AM (Chairman):** If we return to my very first question - and I know this strays into Richard's [Tracey AM] last question or the question he is about to ask - if the Mayor tomorrow said, "Let us buy 100 buses", would you seek a Direction from him, given that it clearly does not make business sense to go ahead?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I do not think I accept the premise that it does not make business sense because we do not know what the deal for 100 more buses might be. I cannot tell whether it would make business sense. There would be a number of things in play: firstly, whether TfL had the funds to do so, what the unit price would be, what the specifications for the next --

**Mayor John Biggs AM (Chairman):** We can rephrase the question. Perhaps Richard will rephrase it a bit more subtly. Clearly, if we said, "What is the business case for buying every Londoner a Jaguar", then obviously it would be prohibitively more expensive than buying everyone a bicycle. On this one it may be a bit more balanced, but indications suggest that it is heading in one particular direction.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** So ... what was the revised question?

**Mayor John Biggs AM (Chairman):** The revised question is, yes, Richard's, is it not? Go back to Jenny and then to Richard.

**Jenny Jones AM:** The Independent Investment Programme Advisory Group (IIPAG) asked you to put forward a revised business case, did it not? You did not do that.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No.

**Jenny Jones AM:** Why not? Do you not think that, in view of all the changes that have happened, it would have been a sensible thing to do?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** The business case was produced at the beginning of this project. The project is in the process of being delivered. It is consistent with mayoral ambitions. It is on target, is on cost and is delivering many of the benefits that we hoped for, especially in the area of passenger acceptance and popularity. I do not see any reason to produce a new business case for this.

**Jenny Jones AM:** Even though all your figures are looking dodgy?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I do not accept 'dodgy'. I accept that, with the passage of time, those numbers are different. As I have said already, we are more than prepared to look into the project and see what has been achieved as part of the project.

**Mayor John Biggs AM (Chairman):** We are investing in happiness?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I am pleased to hear that.

**Mayor John Biggs AM (Chairman):** No, you are.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** I am sorry. Was that a question?

**Mayor John Biggs AM (Chairman):** It was a question. TfL is investing in happiness?

**Mike Weston (Director of Buses, Transport for London):** Passenger ambience, yes; the environmental benefit.

**Tom Copley AM:** This is the thing because we have seen the various different BCRs throughout the process. It was negative and then it was 0.7:1 and then it was 0.2:1. At no point did it reach the level I believe TfL usually expects before you embark on a project, which is 2:1.

Is the answer to this going to be 'iconic status' and 'ambience' again? Why did you go ahead with a project which had such a low benefit-cost ratio that you would not normally accept for any other project?

**Mike Weston (Director of Buses, Transport for London):** As we said earlier, a project or an initiative does not have to have a positive BCR. It has to have a positive business case. The business case overall was deemed to be worthwhile because of all of the other things that were in the business case itself.

**Tom Copley AM:** How do you usually weigh the BCR against other aspects of the business case?

**Mike Weston (Director of Buses, Transport for London):** One example in my direct area is - and I signed one off yesterday, a very small one - school bus routes. It was at capacity, we needed to provide an extra bus and it did not have a positive BCR. It did not pass the benefit-cost pass-rate because we will not generate enough extra revenue, but the business case is because we are leaving schoolchildren behind. We are doing it because we are resolving a capacity issue despite there not being a BCR --

**Tom Copley AM:** In this case, you could have put a different bus design and had a much better BCR and you would have --

**Jenny Jones AM:** A lighter bus.

**Tom Copley AM:** -- a lighter bus.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Except, of course, we have a brilliant bus design, which is widely loved by millions of people internationally and is acclaimed and is on postcards.

**Tom Copley AM:** It is loved by people internationally? This is a tourist attraction? Should London & Partners be funding this bus?

**Jenny Jones AM:** Good point; or Boris out of his own pocket.

**Mayor John Biggs AM (Chairman):** They love it so much that they cannot quite bring themselves to buy it. That is interesting.

**Mayor John Biggs AM (Chairman):** Have you finished, Jenny?

**Jenny Jones AM:** I have. Thank you very much.

**Mayor John Biggs AM (Chairman):** Did you ask the IIPAG [Independent Investment Programme Advisory Group] question?

**Jenny Jones AM:** I did not ask it in that way, but Tom has, about the iconic requirement superseding the commercial.

**Mayor John Biggs AM (Chairman):** Yes. Your own internal scrutineer said that iconism has superseded BCR and you stuck your hand up to that?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** There was an IIPAG recommendation and we did not agree.

**Mayor John Biggs AM (Chairman):** That is a 'yes' in a sort of friendly way.

**Richard Tracey AM:** Just some final questions. Some of this you have really almost answered. You have 800 or you will by May 2016 --

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** To take a date at random, by May 2016.

**Richard Tracey AM:** When the Mayor leaves office, you will have 800 of these buses?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** Yes.

**Richard Tracey AM:** Apart from his desire for 2,000, there is some significance about 1,000. Wrightbus has the rights up to 1,000. Is there any likelihood at all that you will seek to buy any more, not necessarily by May 2016 but in the future planning of TfL?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** We could order another 200 New Routemasters inside the current deal that we have with Wrightbus. We do not have any plans to do so at present. To enlarge on that, that is partially because the opportunity for high-capacity, long, three-door double-deckers has its limitations. There is not an infinite supply of routes that these particular types of vehicles could go onto.

**Richard Tracey AM:** Yes. Presumably, either Wrightbus is currently working on new designs or variations of this bus or else you have ideas.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No. In fact, what is happening – and one of the benefits of this particular project – is that it has sparked several manufacturers, including Wrightbus itself but also Alexander Dennis and others, to produce an iconic-looking, futuristic, double-decker bus design that has many of the features or ideas that live inside the New Routemaster, which they hope to sell to commercial operators nationally and internationally, which they hope will find favour with contractors of ours who win contracts for new double-decker buses and which they will be able to have inside the new tendering regime. It is likely that the design influence of the New Routemaster will find its way into the commercial products that the operators will themselves buy as part of contract awards from us.

**Richard Tracey AM:** Yes. You have really answered the question about an updated business case because you do not have any intention of producing an updated business case, do you?

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** No.

**Richard Tracey AM:** Yes, I thought I had heard you correctly. The last question I had for you is: what advice would you in TfL to be giving to the next Mayor about this bus and its future.

**Mayor John Biggs AM (Chairman):** Do not buy it.

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** About this bus and its future, I will be advising him that he is very lucky to have a wonderful fleet of 800 iconic, low-emission, fuel-efficient, etc, vehicles. As for the future, we would be advising the Mayor of the big technical developments in respect of electric vehicles and of the other vehicles that allow us to run on a zero-emission basis in parts of London. That is induction charging and so on. Therefore, the advice to the Mayor would be about what technologies are available and what technologies are emerging and where he might like us to take the requirements so that the manufacturers produce vehicles of that sort that the operator could use and we could specify.

**Richard Tracey AM:** Thank you. That completes the questioning.

**Jenny Jones AM:** There have been some brilliant tweets on this from people who are really well informed about it all. There is a brilliant one from the Deputy Political Editor of the *Metro*, which says:

*“It’s not even particularly warm today but this Boris Bus is ridiculously hot. New Bus for London is really hopeless.”*

**Leon Daniels (Managing Director, Surface Transport, Transport for London):** That is a nice balanced comment from the media.

**Jenny Jones AM:** He is on it now. He does not know we are talking about it. He is on the bus.

**Richard Tracey AM:** He may be watching the webcast on the bus.

**Mayor John Biggs AM (Chairman):** They have a relationship with TfL at *Metro*, do they not? Can we thank you very much for your answers and for giving us so much of your time, some of which was illuminating? It was a totally illuminating body of evidence. Thank you very much and have a safe journey but avoid Routemasters.

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