

Environment Committee – 16 June 2016**Transcript of Item 10 – Environmental Challenges and Priorities for the New Mayoralty**

Leonie Cooper AM (Chair): Item 10 is environmental challenges and priorities for the new Mayoralty. Can I thank all of our guests for coming? A few people have said to me what a stellar group of guests we have this morning. We are hoping that you are going to be able to set out some pithy comments to begin with but do not feel constrained to try to put everything you want to say this morning into your initial remarks because you will have the opportunity to answer questions put by any of the Assembly Members to other people when they have made their remarks as well.

That said, we have an order of play this morning, if that is OK with everybody. We are going to start with asking Sean Beevers, Richard Howard and Denise [Beedell] to speak first with pithy comments to begin with. What we are looking for is inspiration for us as a Committee going forward because we are going to be the Committee now for the next four years. Also, if you were in a secret place with the Mayor and he said, "I know nothing about the environment and I really need your advice; what are the main challenges facing Londoners?" - I am not saying the Mayor is a blank sheet of paper, but if he said he was - what would be your top issues that you would want to see him address and how? It is the challenges and perhaps a little bit on the solutions. I am going to start with you, Sean, if I may.

Dr Sean Beevers (Senior Lecturer, King's College London): Thank you for inviting me. There is an immediate challenge for London, which has been widely publicised, which is nitrogen dioxide (NO₂) compliance with European Union (EU) limit values, and that is specifically associated with diesel vehicles. So, I suppose the challenge for London, and something that we have been looking at with Transport for London (TfL) and the Greater London Authority (GLA) is ways in which you can tackle diesel vehicles. We recently had a report which we published with Policy Exchange looking at various options that you could choose to resolve these problems. That, I suppose, first and foremost is an immediate challenge, both environmental and legal. We have also produced some health impact studies as well for the GLA associated with NO₂. There is plenty of information there and there is an obvious, I suppose, culprit, if you like.

The other one that, I guess, is more on the horizon is biomass burning. Now, we already know from measurements that biomass burning accounts for about one microgram of particle concentrations in the atmosphere and so it is quite a substantial part of the emissions from London, yet it has not been covered in any great detail. Basically this is people burning wood in their homes and particularly in open fires and in log burners that actually do not really comply with any particular standards. That is an important point; that it is often considered to be a source of environmentally friendly fuel in a way because wood fixes carbon and at the same time it releases carbon dioxide (CO₂) and so there is no problem, but there is an issue with biomass from that. In some of the forecasts that we have for 2030, that potentially becomes an increasing problem and so you should have a watching brief on that.

Particles are still probably the main source of health impacts of air pollution and so some of the issues associated with particles are not exhaust-related where most of the policies are associated with reducing exhaust emissions. There is quite a large component that is non-exhaust-related and it relates to tyre wear and brake wear. Now, the solutions there are really looking at the technologies for brakes and for tyres and so on but at the moment they are not legislated and they are not even tested so it is difficult to say where that

will go. We just assume that if there are more vehicles you get more of this stuff and so an obvious solution there would be to try to reduce the numbers of vehicles travelling.

The final point for air pollution is ozone. As we tackle nitrogen oxides (NO_x) and NO₂ in London, then ozone itself is likely to go up because of the atmospheric chemistry associated with NO₂ and ozone which are linked essentially. It is a bit of a list of woe in some respects but I suppose the solutions are, for biomass burning, keep a watching brief, try to implement proper standards for those types of log burners. There is a lot of work being done in Scandinavia and New Zealand to test the performance of these things in the real world and it would be worthwhile looking at those; diesel vehicles, obviously, and vehicles in general. Ozone is more difficult. It is probably beyond London itself and is more of a regional pollutant to tackle but just be aware that that potentially would be a problem in the future.

Leonie Cooper AM (Chair): Well, thank you. That is a very interesting beginning. I am sure the Committee will have plenty to ask all of our guests, but before we take any questions to you directly we are going to move on and hear also from Richard Howard, who is from the Policy Exchange. Richard, you have your two or three pithy minutes as well.

Richard Howard (Head of Environment and Energy, Policy Exchange): As Sean said, we have done a big piece of work together with King's [College London] specifically looking at the problem of air pollution in London. Just to add a bit of meat in terms of the significance of this problem, air pollution is identified as the most significant and pressing environmental concern amongst Londoners, that is clear from survey work done, the work done in the annual London survey and also work done by the *Evening Standard*; it is the most significant thing that people talk about and think about. It is also something that people think the Government needs to do more about to address.

In some of the work that we did we looked at the pollution maps that Sean [Beevers] produced of London and overlaid that with data of where schools are and we found that a quarter of schoolchildren in London attend schools where the NO₂ level is above the legal and healthy limit. That gives you a sense of the scale of the problem. That is 328,000 school children. It is also 3.8 million workers who are exposed to unhealthy and illegal levels of NO₂ whilst they are at work. This is a very significant problem. Sean's team has done work looking at the health impact which suggests that there are 9,400 deaths attributable to air pollution, that was the figure that related to 2010 and it has a significant impact on life expectancy and so this is a really significant problem; I cannot stress that enough.

In all the work we have done we produced two reports from the work that we did with King's [College London], which I am happy to send to you, which go through this in a lot of detail. We are very clear that this problem needs to be addressed and it needs action, not only by the Mayor of London but also at national level and also at European level. It is a combination of those three levels. You need to take action at all those three levels to have a big impact, and action does need to be taken.

The only note of caution I would make is there are better and worse ways to do this. There are ways to do it very intelligently, there are also measures that you can put in place that can either backfire or have the wrong effects, so you need to think very, very carefully about the policies you put in place. One particular thing to think about is to try to avoid penalising people who have gone out and bought vehicles in good faith because of Government incentives. One of the other narratives in our report is about how can you do this in a way that goes with the grain of the residents of London, the businesses of London and does not penalise those people. People have basically been incentivised to buy diesel vehicles for the last 15 or 20 years because of various Government incentives, including road tax, company car tax and capital allowances. What we cannot do or it

would be very difficult and not a great thing to do is to just simply walk away from those people and start imposing very significant taxes or restrictions on the use of those vehicles. We do need to think really, really carefully.

In my mind there needs to be a mix of carrot and stick approaches. For example, one of the policies which we have pushed quite hard is the idea of a diesel scrappage scheme and so that is more of a carrot to help people take polluting vehicles off the road. You could also think about incentives for retrofitting vehicles, particularly the diesel black cabs where there are alternative solutions which could be looked at. Basically, I want to stress to you that you need to take action on this but be careful about how you do it and try to work with the residents and businesses in London.

Leonie Cooper AM (Chair): If we now take Denise: if you would like to also make your initial contribution as well. Then when we get into the questions they will not just be to the three of you who have spoken but you will all be able to answer if you so wish.

Denise Beedell (Development Manager - Greater London, Federation of Small Businesses): The Federation of Small Businesses (FSB) represents around 7,000 small and micro businesses across greater London and around 200,000 across the UK. We were established over 40 years ago to help our members succeed in business and we are a non-profit making and non-party political organisation that is led by our members for our members. The FSB supports the principle of improving air quality and removing from the roads those vehicles that contribute disproportionately to air pollution. No responsible business organisation can condone the use of excessively polluting engines. However, we are concerned about the need to ensure that any improvements in air quality are not achieved at a disproportionately high cost to small business with damaging consequences for jobs, business viability and the economy as a whole.

A well-functioning road, Tube and rail network is critical not only for business success but also if well managed will ease pollution and improve the wider environment. Congestion in London not only adds to the poor air quality; it also damages the competitiveness of businesses operating across the capital. Our recent congestion charge survey showed that four out of ten businesses feel there should be lower charges for environmentally friendly vehicles; a carrot. However, a third, only a third, of firms feel that environmentally less friendly vehicles should be penalised, so they are less in favour of the stick.

Many small businesses rely on heavy goods vehicles (HGVs) to carry out their business activity, whether that is delivering their goods or receiving goods into their shops and businesses to then use, process or actually just simply sell. They do not have the resources available to upgrade vehicles as quickly as their larger counterparts. A new or newer vehicle has a disproportionately greater cost to their business compared to larger organisations and they need to be sure that the investment that they are actually making for their business works for many years ahead.

Changes to the rules on vehicle types allowed to operate in London must allow reasonable time for small and micro businesses to make these changes. It is concerning to see the language used in the impact assessment for the Ultra Low Emission Zone (ULEZ), for instance, namely that for small businesses, and I quote, "It may be more economical for them to exit the market". Small businesses have a huge amount to offer London. They are agile and create jobs faster and in larger numbers than any other kind of organisation across every sector. They are the very fabric of our communities providing social cohesion, supporting local economies and serving local markets. It is important for small businesses to know that their contribution to the London economy is valued just as much as the large well-known corporations.

We do not want to see tradesmen, construction business owners or market traders refusing to serve London, which is why policies aimed at improving air quality still need to recognise the difference between essential and non-essential journeys. Someone driving into central London because they choose not to use public transport is very different from the repair person, delivery courier or service engineer for whom the use of a vehicle is fundamental to their business. We want to see root-and-branch reform of current and future charging mechanisms so they can operate in a fair and balanced way that support air quality improvements without damaging London's competitiveness. It is imperative that a feasibility study should be undertaken urgently to assess whether a new and improved road charging system can be made more sophisticated and better reflect journey and emission patterns.

Leonie Cooper AM (Chair): Thank you very much. That is a very interesting spread that we have just heard between our first three initial speakers. I just want to pick up on a couple of the points that Denise started to refer to because obviously we have heard some initial comments from the Mayor concerning his proposals to extend the ULEZ in terms of its geographical spread to the North and South Circular, and also the concept of bringing its implementation forward, and also the concept of possibly charging cars that emit at higher levels, say, a 'T-Charge' or something similar. I just wondered if I could ask the three speakers but also anyone else what they think of what they have heard so far in terms of the Mayor's proposals. You are expressing some possible doubt there about the impact on business.

Denise Beedell (Development Manager - Greater London, FSB): I may state that we are not against this but it needs to be proportionate and it also needs to be clear what actually that toxicity charge is going to be. There is yet no definition for what is the most polluting vehicle.

Leonie Cooper AM (Chair): What would you mean by proportionate, then?

Denise Beedell (Development Manager - Greater London, FSB): It needs to make sure that where the larger firms that perhaps operate across the whole of the UK can often absorb those costs that are just special to London. A small business actually operating only in London does not have that method of dissipating those charges across their operations. Also they are assets, the actual vehicles that they have bought. They struggle then to sell them on because they cannot be used anywhere else other than their operations in London and so they then have to find a market outside London to sell them. Also the timing of bringing it in; currently vans, for the moment, there are not any actual Euro 6 vans available yet and the proposed bringing forward of the date - and this will come out in the consultation - is likely to only allow a few months for people to actually change their vehicles or suddenly face unexpected extra costs for doing their business in London.

We are already starting to see surcharges of deliveries into London for goods, like a £10 surcharge, on many delivery companies just to actually do that for London and, because many of our businesses are competing with businesses outside London, they cannot pass that charge on because it just makes them uncompetitive to someone that is perhaps based in Essex or Kent. It needs to be fair and what we are asking for is that it is balanced and clear so that small businesses can take those decisions and actually plan ahead accordingly.

Richard Howard (Head of Environment and Energy, Policy Exchange): Just looking down the list of measures that the stakeholder has mentioned already, there are some that we totally support like the idea of a diesel scrappage scheme, for example, the idea of working with national and European government to try to make progress at that level, the idea of retrofitting buses and buying cleaner buses; all of those are really good ideas and they are in our report and so I very much support those.

The policies that he has suggested around the ULEZ and Low Emission Zone (LEZ) I have some more issues with, and the T-Charge. If we think about the T-Charge first of all, it is not clear what is meant by that but if you wanted to apply that to all vehicles that have high levels of NOx pollution you would have to include all diesel cars up to and including Euro 5; because Euro 5 diesel cars are pretty awful in terms of their pollution, they are no better than Euro 1 diesel cars. You would have to include a huge number of vehicles and the idea of bringing that in in one year's time, the residents of London would find that pretty shocking as would probably the small businesses and large businesses.

This comes to the heart of my first point really, we need to take action on this but we need to do it, as has been said, in a proportionate way, in a fair way, and give people notice. That is one of the proposals. The proposal around extending the ULEZ to the North-South Circular was something that we thought about in our report. At the moment you have a proposed ULEZ for central London for 2020 and you already have a LEZ covering the whole of London which is already in place. It is enough to just use the two systems you have got rather than expanding the ULEZ. Those systems are understood, people understand the LEZ, they understand the Congestion Charge Zone and people are already well aware of the ULEZ proposal that is coming in. I would say it is probably enough to work with the grain of those, change the definition of those, for sure, so you could apply tighter standards for the LEZ and the ULEZ but I think it would be quite confusing to people to bring in a third zone covering the North-South Circular.

Samantha Heath (Chief Executive, London Sustainability Exchange): On this particular issue I would advise caution on a piecemeal approach. I am currently doing some work with the National Institute for Health and Care Excellence (NICE) on this and I will just say no more because it is obviously in panel at the moment so I cannot give any specific details. But there are some randomised control trials that are specifically looking at what is effective in battling pollution, and piecemeal approaches do not hit the spot. You put a lot of effort into it but you do not actually deliver. Just declaring where I have been; when we did the LEZ back in 2003, all the evidence there was you have got to treat London as a whole and not try to break it up because pollution does not know those boundaries. The evidence has been backed up by the work that I have been looking at with NICE with the randomised control trials that I am pretty doubtful that actually doing a ULEZ just for the centre of London would be as impactful as you want. Looking at the evidence base which is out there and I can send you the links to the randomised control trials and stuff that we are looking into at the moment.

The second thing that has not been in any particular announcement that the Mayor has made but I am really very cautious about: we have said that the public are really keen on having something done with pollution but that is not by accident. That has been a lot of work and people like Caroline [Russell AM] over there and Nicky [Gavron AM], who have done lots of work on this in the past, and I think that any Mayor and the Environment Committee reaching out and talking to communities and talking to people about this to bring them on board is absolutely cardinal. I would have to say that the role on behaviour, and I know that that is a dirty word currently with this Government, but there has been a great Behaviour Change Unit hosted by the Department for Environment, Food and Rural Affairs (Defra) and now they are known as the Nudge Unit, and there is some work that has been going on at TfL around behaviour but it is just squeaking along and does not really look at the very important things to actually reach out to Londoners and make a difference to bring them with us. That is something that any good Mayor and the Environment Committee could really look at.

Leonie Cooper AM (Chair): Just on trees, do you feel that looking at biodiversity makes a major contribution?

Samantha Heath (Chief Executive, London Sustainability Exchange): You need to look at the evidence before you go down that road. Trees are really great for reducing the heat island effect, biodiversity,

absolutely fantastic, wellbeing in London, all of those sorts of things. But the evidence that I have seen, it is unequivocal that it makes no difference at all. In fact, barriers are really a bit of a problem because what you could be doing is setting up vortice shedding, which means that the pollution is actually worse 600 metres away from the edge of your boundary. I would say when you are doing barriers of any description, including trees, be very cautious in what you are doing because you could be setting up some form of canyon effect which actually just holds the pollution in and even spreads it much further than you thought you had.

Caroline Russell AM (Deputy Chair): I want to pick up on several things that have been said. We have heard about avoiding penalising Londoners by going for a big project to try to tackle this diesel pollution. I hope we can avoid penalising Londoners by making sure that Londoners are able to breathe clean air.

On what Sean Beevers was saying about one of the things in your list, you had your list of woe and then in your solutions you talked about reducing the number of vehicles because in the end that is probably what is going to mean that we have less pollution in our air. I am just wondering whether anyone on the panel, and particularly Sean Beevers and also Samantha Heath, has any comments about ways to help Londoners to reduce the need to travel around the city by car in order to help bring down pollution.

Dr Sean Beevers (Senior Lecturer, King's College London): For me it seems to be that there ought to be put forward an image for London as being a forward thinking green city but often these debates revolve around what would happen next year and the year after. There are debates around penalising businesses and individuals and in our Policy Exchange report, as Richard has mentioned, we tried to avoid that as much as possible. There ought to be a vision that says, look, we have got a problem. Working around the edges of [the issue of air pollution] is not going to solve it, it is going to continue for a long time. You have to accept that if you do not do something reasonably ambitious you are going to have this problem for a long time. There ought to be more of a vision of - not so much whether you drive a Euro 6 or Euro 5 diesel car or vans or whatever - going into the 21st century and [accepting that] climate change is going to be an issue. We need to look at electric vehicles; we need to look at the whole change in the way we perceive areas and how we travel.

That is lacking at the moment we have just this debate about on the one hand we know we need to do something about it but we do not want to do something ambitious because there is a problem with businesses and people. There is an immediate problem but there is a long-term ambition for the whole of London which should be to move away from just using diesel vehicles and to move towards electric vehicles and to hybrid vehicles and so on.

Caroline Russell AM (Deputy Chair): Could I just come back because with the electric vehicles you still have the problem with the tyre and the brake wear, which you said --

Dr Sean Beevers (Senior Lecturer, King's College London): You do, yes.

Caroline Russell AM (Deputy Chair): -- so surely we should be looking for public transport alternatives and active travel walking and cycling.

Dr Sean Beevers (Senior Lecturer, King's College London): Yes. Actually some of the things that have been done in London like the Cycle Superhighways are a great idea and I am a cyclist so I am keen on that kind of thing. So, yes, active travel is really important and it should be encouraged. The message should get out that you might be exposed to air pollution while you are cycling, at least in the next few years, but if you are fit and healthy and actually cycle that should not be a problem for you. Air pollution affects those who are

basically ill, who have cardio problems, respiratory problems and so on. There is a whole education part of that issue; people should get out more and walk and cycle, and we should invest in the facilities for doing that as well.

Samantha Heath (Chief Executive, London Sustainability Exchange): In direct response to the point about engaging with people, absolutely, that is where I was coming from, but it is also freight decisions as well and logistic centres. The person I would guide you towards is Lucy Saunders [Public Health Specialist - Transport & Public Realm, GLA and TfL]. Her work about what a healthy fantastic high street is something that the Committee could have a good look at. Also, TfL's behaviour unit - and I do not think it is called a "behaviour unit" - but I could send you the contacts that I have been working with there, who I would really recommend; so it is about reaching out. Logistic centres are going to be crucial. You need to reduce lorries, taxis and HGVs as much as you do cars. It is not just about changing Londoners' behaviours; it is also about what we buy and when we buy it. That will have an impact on the economy. BOGOFs [buy one, get one free deals] and people not buying too much stuff at the supermarket checkout had an impact on the economy, it had an impact on retailers' bottom line and so too will this. It is a question and economic modelling is something that you need to pay attention to.

Denise Beedell (Development Manager - Greater London, FSB): I am just going to mention some of the work that is being done with the Low City Project because they are actually looking at the infrastructure that is there to help alternative fuel vehicles and recharging points for electric vehicles. Currently the freight industry has a very limited number of vehicles that the manufacturers actually make that they can use. I heard yesterday from a lady who delivers as a mobile farm shop and they are wanting to use electric vehicles but they cannot get ones that are big enough, as in capacity not weight. There are all sorts of practical reasons why diesels are still the preferred vehicle because they are often the only viable option. So the work of the Low City Project is something that the FSB does support and it is something I would recommend the Environment Committee get behind as well because it is really trying to find some very practical solutions to changing the sort of vehicles that keep London in business.

If we are going to be building the thousands of houses that we need, common sense tells you that you are going to need lorries bringing in the bricks and the pieces of wood and the cement and all the other things that go into the construction of a single house. The tension there is going to be, if you are trying to reduce the number of vehicles on the road and you want to build all these houses, just in that one sector alone there are going to be some missed targets.

Richard Howard (Head of Environment and Energy, Policy Exchange): I will try to be really quick. Walking and cycling is something we should definitely look at. The Cycle Superhighways have been helpful but there is actually not enough evidence about the impact of cycling in terms of improving air quality. We looked for it and we could not find much evidence so that is something think about, about really how much impact it has on improving air quality. It seems to be an unanswered question. Electric vehicles are a really important part of this. It is really important for London to create a competitive market for vehicle charging and also for electric vehicle rental. We seem to be moving towards a situation where we have a few large quite monopolistic, potentially, networks and I would say it is something that needs to be looked at about how London drives forward in terms of both electric vehicle charging but also car rental. There are strategies for both of those areas that already exist but you really need to look at that.

The points about freight are really important. In our report we talked about freight consolidation. There are some really good examples of freight consolidation centres that have been created in London. There are only two or three but they have had a massive impact in terms of reducing travel movements and so therefore

reducing NOx emissions and other emissions. The Mayor could do a lot more to push that, both freight consolidation but also re-timing, look at how you could do more freight deliveries in the night-time. At the moment that is actually banned, you cannot do freight at night in large parts of London and that is something that could be looked at as well.

Fiona Twycross AM: I was sitting here thinking about four years ago when I started as Assembly Member and we were told there were 4,000 premature deaths but it has gone up considerably in the meantime or the estimates have gone up considerably. I accept that the public are concerned about it but on some level it must still be or feel a little bit abstract to people or not part of an individual's community responsibility to take action. Samantha's point about bringing people on board and getting people feeling that it is part of their responsibility it is not just something abstract, must be absolutely key to changing behaviours.

I am quite interested in the charging aspect but what if putting in additional charges does not work? This is quite a provocative thing it is not something I am suggesting as a policy suggestion. When the levels of pollution get too high, at what point should a city look at introducing banning vehicles when emissions are particularly high or pollution is particularly high, which actually has been done, at least to a certain extent, in other European cities, when people go alternate days for different vehicles.

Dr Sean Beevers (Senior Lecturer, King's College London): When air pollution gets high it gets in the media and everyone takes an interest and not so many people, I guess, take an interest in just the general air pollution, the average air pollution, but the actual health effects are associated much more with the average air pollution. In a world of limited resources I would tend to focus your efforts at reducing air pollution generally rather than too much on individual days or whatever.

Samantha Heath (Chief Executive, London Sustainability Exchange): The evidence on alternate days is spurious that it makes an impact. You could do something as an emergency measure and that would grab the public's attention that is just an awareness campaign, as opposed to reducing pollution.

Shaun Bailey AM: Most of this conversation seems to be linked to pollution, car use, deliveries in London. For Members who represent all of London or live in outer London boroughs, the behaviour piece is important. The whole idea of car reduction does not work if you are outside London; the distances are far greater. Cycling where I live is ridiculous because I would have to cycle over 32 miles to get here and I probably would not survive; I would just get run over. My point is that some of this conversation needs to look at what would be impactful for people who live on the edge of London because what is very obvious to us who all live on the edge, we all work in the middle.

I am quite interested in the use of vehicles from a fleet point of view. It seems to me our public transport fleet would be the easiest to affect because we know what distance they drive in a day. Could they be powered by something other than electricity or diesel? Also, how do we affect the behaviour of people who actually need a car. If you live in the outer [London] boroughs, Havering, et cetera, you need a car to operate your family. What would we do about that?

Denise Beedell (Development Manager - Greater London, FSB): This is one of the areas where encouraging your local small business economy in the outer boroughs is vital because if people are employed in small businesses from the local area they are less likely to be travelling into London and it does offer a much more sustainable model for an awful lot of things. Smaller businesses tend to support local markets, money that is spent with a small business tends to stay in the area rather than go up to big global corporations. Certainly just on the travelling commute for the employees, if you are employing more people from your local

area, they are just not going to travel so far. That is one way but it does not answer some of your other questions.

Dr Sean Beevers (Senior Lecturer, King's College London): In relation to transport by public transport like bus, for instance, that is quite an important point. In our report we identified by 2025 that still the most polluted streets were associated with bus use and there were other polluted streets that were associated with a mixture of different vehicles. I know that TfL and the GLA have done work to reduce the emissions from buses but that is something that really should be focused on and continued because they all converge in the centre and they do contribute to the air pollution, and the air pollution is the worst in the centre. That is where the focus should be.

Your point about if you are in an outer London borough and you are travelling around by car I would say is less important from a compliance perspective simply because the problem in the future is very much focused between basically the North and South Circular. I would not be relaxed about it but slightly less focused on travelling in that area and more focused [on travelling] in the centre.

Richard Howard (Head of Environment and Energy, Policy Exchange): To respond to Shaun's [Bailey AM] question, it is really to amplify some of Sean Beevers' comments. If you are talking about trips around the outside of London within the suburbs, it is less of an issue from a compliance point of view. If you look at where the highest levels of NO₂ concentrations are it is in the centre of London and on the arterial roads into central London so it is a problem around people getting into and travelling within the centre of London. Yes, absolutely, you are not going to cycle that 32 miles into London, you are probably going to get on some form of public transport whether that is bus, tube or rail, and there are things being done to reduce the emissions associated with rail, for example moving from diesel to electric trains and that is quite important actually and something that is not discussed very much. With buses, there could be enormous improvements by moving - it does not necessarily need to be to electric or hydrogen buses - to the latest Euro VI hybrid buses. The evidence shows - it is your own evidence from TfL - that it would have a dramatic impact if you were to move the fleet from some of the older buses that exist simply to the latest Euro VI hybrid buses. Electric and hydrogen are interesting but Euro VI hybrid is enough for now.

Shaun Bailey AM: Is there a massive cost difference between a Euro VI bus and a hydrogen bus?

Richard Howard (Head of Environment and Energy, Policy Exchange): The hydrogen buses are very expensive. The procurement of buses at the moment is focusing primarily on the Euro VI hybrid anyway and so that is what you are already buying, it is just a case of how quickly can you turn over the fleet and move buses to that model. There is also an opportunity to retrofit some of the older buses and that needs to be looked at as well because that is potentially more cost effective. It is a combination of buying the best buses you can afford effectively and retrofitting some of the ones that you have.

Leonie Cooper AM (Chair): OK, I am going to, reluctantly, draw this to a close because we have some other areas that we want to focus on. So far we have pulled in quite a few of our guests and the majority of the Assembly Members as well into that discussion.

The next area that we are going to focus on is managing waste and developing a circular economy and I am going to ask Samantha to give us a provocative two or three minutes on what the challenges are and what might be some of the solutions.

Samantha Heath (Chief Executive, London Sustainability Exchange): I have assumed that you asked me to talk about this topic because of the work that we did for the London Infrastructure Board relating to the circular economy and we gave evidence to them. The London Sustainability Exchange engaged with quite a few Londoners to contribute to what the Infrastructure Board should do. A fruitful line of enquiry for the Environment Committee would be to talk to the Infrastructure Board and also to the London Enterprise Panel. Both of these, to put it very gently, could do a lot more in relation to supporting and developing a circular economy. The sort of things that this particular piece of work that we engaged with, there are a number, the Green Alliance did quite a lot of work and the Ellen MacArthur Foundation, we took evidence from them when we produced the report. The thrust of London Sustainability's work here has been talking about driving up the value of recyclers and making sure that we value what we put in the rubbish bin, and of course if we value something before we put it in the rubbish bin then it would not go in the rubbish bin.

I know this is something that the Environment Committee have looked at over many years and you have a big back catalogue. The first report that you published, because I led it, was called *Rewarding Recycling*, which looked at how you bring up the value of recyclers. The area where there is a risk is that waste has been considered a problem that can be civil-engineered away and local authorities do tend to [have that] view that because it is not something that people want to engage in and tends not to be something that people vote on unless it is piling up in the streets. Therefore, it is a very challenging area, but local authorities are not happy to give up or surrender their rubbish to anywhere else, which is a challenge to the green entrepreneur. An area where I would begin to look at change is not that local authorities do not have responsibility for waste but that they are prepared to give their aluminium or sell their aluminium on or allow entrepreneurs to sparkle in the area by collecting aluminium waste because the moment anything has value, of course, the local authority needs it to fund recycling.

The third sector has been at the forefront of innovation here and tends now still to remain in that area, but large waste companies that move in do not deaden innovation but certainly do not maintain that momentum. Innovate UK has done quite a lot of work on this and the [London] Enterprise Panel could look at an "Innovate London" to see where enterprise can come to look at how the green entrepreneur can be properly supported in London. All of the things that Denise [Beedell] had been talking about earlier about supporting entrepreneurs and enterprise is the same fertile ground that I would ask you to look at in this area.

The other thing - and Nicky [Gavron AM] would shoot me if I did not say this - is that burning rubbish or burying it reduces its value considerably. So long as you have an infrastructure that requires that, you are not going to solve the problem. That is some of the evidence and I will send you the link to this. It is on your own website, but some of you are new and you might not have seen that. We did in this table out the milestones in terms of where the London Plan needs to be and what the Infrastructure Plan needs to look at because it is, again, about decentralisation in the way that Denise was talking about and creating and fostering innovation locally.

Leonie Cooper AM (Chair): Thanks very much for that. In another blank-sheet-of-paper situation, which obviously we do not have - we have the existing burning, we have the existing incinerators and there is the potential for more incinerators - if you had a blank sheet of paper, what do you think would be the best way to collect waste in London to facilitate the development of the low-carbon economy or the circular economy?

Samantha Heath (Chief Executive, London Sustainability Exchange): Richard, you are going to kill me here. You know what I am going to say, don't you?

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): Yes, I do.

Samantha Heath (Chief Executive, London Sustainability Exchange): Yes, you are prepared for it?

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): I can kill you afterwards!

Samantha Heath (Chief Executive, London Sustainability Exchange): Good. So long as you are prepared.

The only things that should be collected are, potentially, nappies and cat litter. Everything else should have value and should be, therefore, sold on because everything else does have value. Aluminium has stonkingly high values. Paper can certainly be reprocessed. Therefore, it is a question of what you need to collect. That is my dream. The way in which we get to that is by fostering value.

However, the other thing that is a big problem – and this is where I was coming to – is that the value or the cost of waste collection is in how we pay our council tax, but there is no way that a local authority can subcontract that out to Thames Water to have a disposal in your sink to begin to take your load off for anaerobic digestion. That is a pipeline and may be not possible in the centre of London or in London, but it can be in other parts. Say in Reading, it could be possible. It is an innovation quite far away but is something that I question why we are still sending diesel lorries around to collect our potato peelings.

People in high-rises cannot compost. Rich or poor people in high-rises tend to recycle less. Therefore, it is what we do with high-rise, certainly where the London Plan looks at more high-rise development, and so another thing I would question with you is how you as an Environment Committee look at people in high-rise. The Waste and Resources Action Programme (WRAP) has done quite a lot of work in high-rise, but London really could be at the forefront of it and it is about how collection can happen. There are some things that need to be collected but not everything needs to be collected in the time-honoured fashion.

Nicky Gavron AM: Yes. We have noted on the Environment Committee that London's recycling levels are lagging behind the rest of the country and that we are lagging way behind any other major city. I went to the Zero Waste Conference in Copenhagen last December to hear that major cities all over the world now are going for way above 50% recycling rates – 60%, 70% and so on – and we are dropping. We have just dropped to 33% of our municipal waste. This is partly because we are upping the amount of incineration capacity. It has upped recently because the Belvedere Incinerator came on-stream and the previous Mayor gave permission for another incinerator. There is a very serious decision to be made about the Edmonton Incinerator, which has 500,000 tonnes of capacity. If you add all of that together, we are absolutely going to go on crowding out any possibility of getting recycling. We have to look at the London Plan. Currently, the Minor Alterations to the London Plan are pre-emptive of the Infrastructure Plan, in fact, in terms of incineration versus recycling and that has to be looked at in relation to the new London Plan coming forward.

What I want to ask you about particularly, Samantha and any other members who want to come in, is that the boroughs that do best on recycling rates are those that do not co-mingle. Co-mingling is something that has come in quite recently and obviously there must be some efficiencies around it or boroughs would not be bringing it in, but it means that instead of source-separating your cans, your plastic bottles and your glass, it is all crushed up with your nice tissue paper, newspaper and cardboard and so on. You get right from the beginning contaminated waste for recyclables and of course it feeds the incinerators because they get more residual waste out of it and more calorific value, more plastic, more paper, which these big, hungry incinerators need because they need to go at full pelt.

The answer seems to be around source-separated waste and I just want to ask your opinion on that. Obviously, it happens mainly in the boroughs like Bromley and so on, which are leafier, but there are examples of tall buildings in those boroughs and there are examples of flatted developments. I am just wondering how we can move ourselves away from co-mingling to source-separated waste.

Samantha Heath (Chief Executive, London Sustainability Exchange): I do not have any work that I have done on this from the London Sustainability Exchange. The answer to that is going back on what I said a minute ago, which sounds a little bit of a contradiction. It is that our entrepreneurs do want clean recyclate to be able to make use of it in terms of turning it into something else. I know from my work before I joined the London Sustainability Exchange that internal investment will happen on recycling and on remanufacturing of recyclates and the evidence that we took from the Infrastructure Board that internal investment will happen if they get clean recyclate, if they can do something really good with that when it comes and if they know they have a steady stream. This is where local authorities definitely have the upper hand. If they give clean, good recyclate to entrepreneurs to be able to do something good with it, then internal investment will happen. The rest of the stuff that I have done, my personal work, the Environment Committee already has access to.

Nicky Gavron AM: Before you answer, I just want to say. Do you think, if we had recycling consortia, if boroughs put their supply chains together and had floor and ceiling prices over a number of years, perhaps, for the supply chains, we would be able then to develop industries if not in London then close to London?

Samantha Heath (Chief Executive, London Sustainability Exchange): Absolutely, yes.

Nicky Gavron AM: That might be something for Denise, too.

Denise Beedell (Development Manager - Greater London, FSB): I am looking at it from the [perspective of] small business compliance with their waste management responsibilities because there are huge differences across London between different councils and the way that they treat waste from small businesses. Many of our members are quite cynical about the fact that when they see a huge difference between the borough on the other side of the street and the one that they operate in, they feel that they are being used as a cash cow, which is not an encouragement to do other than the bare minimum of compliance.

What we would like to see is more councils across London treating their microbusiness communities more like residential customers. They operate very good circular economy principles because anything you have brought into the business, like an envelope or a rubber band or whatever, it has cost you and so you are going to make sure you look after it. I have worked in small businesses where they recycle the envelopes for the memo envelopes and they make sure that there is a big box full of spare elastic bands that come from the post. It can be silly things like that. Small businesses also go and get their equipment from auctions, they have them repaired and they will go for retrofitting if it makes business sense. They do not just think, "I fancy a new office this year. I am going to rip it all out". That is something that is often done with big corporations because they have a new managing director in charge or something like that. Small businesses would be horrified to think that they would just rip stuff out because somebody new is at the helm. They look at the whole cost to the business and what the benefit to the business is and they will reuse and recycle where possible within their own businesses.

However, they do get very frustrated at the way that they are treated and charged for their business waste. The food industry is particularly hardest hit by that in some boroughs, but I do know that there are penalties from some local authorities for businesses being caught using municipal sites to get rid of their business waste.

If you are just trying to get rid of the bottles from the office party or the waste paper, you then have to take it home and, technically, you should have a waste licence to do that. Those are crazy policies for somebody trying to do the right thing and we need to perhaps have a look at that. It would be good if the Mayor could look into the way the small business waste management rules are applied.

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): We would love to have all of that green waste at the far end of the sewer system at our sewage works for co-digestion because we can generate renewable energy as we do with sewage. There are two problems. The first is that the sewage system is not designed to take macerated food waste and we could – and almost certainly would – get a lot more blockages to deal with. The other problem is in the home. Those macerators have small and inefficient pumps and they are using a lot of electricity to drive them. Also, more from our perspective, they need quite a bit of water to flush them through, particularly if they start to smell. We are worried that this is going to cause more energy use, more water use and potential blockages. However, if it can be made to work, the whole principle of co-digestion makes perfect sense. It is just the practicalities of joining it all up.

Leonie Cooper AM (Chair): My personal experience is that they seem to break down quite a lot as well and so I have discontinued my relationship with macerators, which might come as a shock to all of you.

Mark Jenkinson (City Director for London, Siemens): I know that I am not supposed to ask the questions, but are you saying that waste-to-energy is not part of our recycling figure? You mentioned Copenhagen: they have a very nice plant building in Copenhagen that is a waste-to-energy plant. It is creating public realm because it is going to be an exhibition centre and a ski slope and is also generating cheap energy for the local community. I just had the impression that you were saying that waste-to-energy plants are not part of the recycling figure.

Samantha Heath (Chief Executive, London Sustainability Exchange): They are not.

Nicky Gavron AM: I agree. If you are going to take the heat off your incinerator, then that is better than not taking the heat off. However, in fact, taking the heat off now does not meet the carbon intensity floor that the Committee on Climate Change has put in. That is one thing.

Secondly, those countries that have had district heating from incineration are now looking at moving away from waste being the source of fuel. They were here in this room. The last Mayor had a conference about waste and brought different cities in. Copenhagen were telling us that they are moving away from burning waste in incinerators because they want to boost their recycling targets and they do not think it is sufficient.

Shaun Bailey AM: I am glad somebody mentioned recycling when you live in a tower block. I lived in a particular borough and we were sent these ridiculous things that we could not keep in our tower block because they stank.

What I am interested in is the generation of waste. Can we help Londoners change their behaviour so that they do not generate so much waste? I am constantly amazed at the amount of packaging you get on tiny little things. I just feel like, if we had less to throw away, we would throw away less and that would reduce the size of the system straight away.

Samantha Heath (Chief Executive, London Sustainability Exchange): There has been a lot of work by WRAP. I recommend that the Committee looks at the WRAP work. It is to do with supermarkets. This is where London really can lead on this particular topic. The first one, of course, is what packaging can be used,

how it can be deployed and how it can be recycled. There was an issue, if I remember rightly – although, Shaun, it is not to do with the work from the London Sustainability Exchange but is to do with the work that I did before I joined – that, “We do not want to have damaged strawberries arriving in the home. Therefore, it has to be packaged properly so that you can get it”, but then what happens with the packaging is really very important. This is something that London can operate with WRAP very successfully and WRAP can operate not just nationally but internationally on this. It is really important that the issue you have addressed is dealt with, but this is where scale is crucial.

Shaun Bailey AM: Does it make a difference what a thing is wrapped in? It looks like an egg carton would be easier to get rid of than the plastic thing that they put the grapes in.

Samantha Heath (Chief Executive, London Sustainability Exchange): Yes. There is a lot of work that is being done on packaging that I recommend. Have a look at the work that the Committee has done in the past. There is some really good stuff on that.

Leonie Cooper AM (Chair): Thank you. I am going to move on again. The next section is going to be about carbon reduction, energy and the built environment. We are now going to hear some introductory and, again, pithy remarks from a new selection of guests. In this case, we are going to hear from Syed [Ahmed], Mark Jenkinson and then Michael Jacobs.

Syed Ahmed (Director, Energy for London): Thank you, Chair. This is a big area and I have concentrated on four particular issues that the Mayor could lead on in the context of his powers and what the priorities are in London.

First and foremost is energy efficiency of the built environment. This is a significant area in terms of energy and carbon emissions in London’s environment and there has been incredibly slow progress on energy efficiency in London for a number of years now.

Part of the reason for that is, especially in the domestic sector, the largest programme to help homes become more energy efficient was a Government programme with supplier obligations on the “big six” [UK’s six largest energy companies] effectively. It did not really serve London very well. In the last iteration we had of this programme, a number of organisations, including the previous Mayor of London (Boris Johnson MP), provided evidence to the Government to say, “Really, we need to do something different in London”, but unfortunately the Government did not take any specific measures. It is interesting that the former Energy Minister, now Chair of the London Sustainable Development Commission, said he does now understand the challenges in London and would probably want to have revisited that if he had his time again.

We will have a consultation on this new mechanism, the Energy Company Obligation (ECO), coming up in the next year or so and Londoners should again make quite strongly the point that there are real specific challenges with delivering energy efficiency at scale in London. That funding mechanism needs to address that.

One of the key things is that we have had some very significant programmes. About £20 million has been spent by London Government on energy efficiency programmes through the RE:NEW scheme and it has been through several phases. The first one or two phases of RE:NEW were very much looking at door-to-door area-based projects and looking at areas with low-income households and trying to convince people by going to talk to them about taking on more significant energy efficiency measures through insulation. Although lots and lots of homes were visited, it did not turn out that many homes then went on to undertake those

significant measures. We need to revisit our thinking about how we adopt area-based approaches and how we engage Londoners to make their homes more energy efficient.

More recently, the latest phase of the RE:NEW programme looked at registered social landlord housing providers and looked for large proportions of homes in London and what they could do to undertake significant energy efficiency action. Unfortunately, we have seen the Green Deal, the Government's main mechanism for energy efficiency, collapse completely in the last seven or eight months. We have also seen the main funding mechanism, the ECO, reduce its overall spending envelope by about a third. Most of the "big six" companies that have to fulfil these obligations have achieved their targets early.

There is a real vacuum there both in policy and in delivery in terms of making homes more energy efficient in London and there is no clear solution for that at the moment. The Mayor's manifesto talks about making homes more energy efficient. We need to redouble our efforts and look to see how we can create some innovative ways of delivering energy efficiency to Londoners.

Building on that just very quickly, there is a statutory requirement for landlords as of 2018 to ensure that their homes have an energy performance certificate with a rating of band E. An awful lot of the action undertaken by landlords was going to be linked into the Green Deal and so, if you are a landlord, you have to make the home more energy efficient for your tenant. How would you go about doing that? You could always look to the Green Deal to provide some funding. The Green Deal has collapsed now. What is going to happen to London's very significant rented sector in terms of making those homes more energy efficient for tenants? If you look at the swathe of homes in London and across the country, the rental sector provides the least energy efficient homes for residents and so we have a big challenge here in London about how we go about looking at that.

Linked into that, we have seen very little work from London government in terms of fuel poverty. About one-tenth or 300,000 homes in London are deemed to be fuel poor. There was a new fuel poverty strategy by the Government in March 2015 and we probably need to see the Mayor respond to this strategy and look to set out some kind of action plan for how we address fuel poverty.

A big issue is homes with children. The Children's Society undertook some research in 2015 and suggested that homes with children are disproportionately affected by fuel poverty. We have very little evidence, really, in London about the extent of that problem. My feeling from looking at various studies in the past is that there is a real problem here but it is not being well identified.

Thirdly is district heating and decentralised energy. There has been very significant work undertaken by London government and boroughs. In short, the Government is learning from what has been happening in London and there is now a £320 million pot to fund capital projects in the district heating sector, one of the few things that the Chancellor came through with in the Autumn Statement regarding green issues. London, on the basis of the schemes that have already been looked at in feasibility studies, could capture £100 million from that £320 million and that could in itself leverage in perhaps £600 million or £700 million more. There is a big quantum of money to be spent over the Mayor's period in district heating and London is in the lead in possibly accessing that money.

My last point is on community energy. The previous administration, Boris's [Johnson MP, former Mayor of London] administration, started up something called Low Carbon Zones. From what I understand, this was really successful in engaging communities in environmental programmes in their immediate area. Since then, we have seen a real growth and a real renaissance in community energy projects nationally. In London there

have been some real exemplar projects but not nearly to the extent that we have seen outside of London, but there are those exemplars that could be taken forward. The Mayor should really be looking to see how he can engage communities through community energy to build on projects and undertake wider environmental deals.

Mark Jenkinson (City Director for London, Siemens): I have five main points and I will try to also be provocative and inspiring.

As a first quick point, it just strikes me that this is a very broad topic and our view is that you need a champion within the Mayor's Office. If the Mayor were here, I would say you need to have a Deputy Mayor for the Environment and Energy, a champion who has these targets for CO₂ and air quality, and have someone pretty quickly given the issues we face. That is the first point.

Sam [Samantha Heath] referred to the Infrastructure Plan 2050 and that was a very good piece of work, which we were part of. Also, there is the London Energy Plan 2050 and it is very important that that, whatever you call it, moves on into the next phase. That is looking at the infrastructure needs from a green and air quality perspective and also what energy we need to power London for the next 35 years given the increase in population and the housing issues, we are really keen on that. It also looks at green infrastructure, which is very good thing. I was in Oslo last week. Cities around the world look at the Infrastructure Plan 2050 and think it is really good that a city like London has done something like that. I would encourage us to push that and certainly the things from the environment perspective.

The third point is that some of you are aware that we have a tool we developed called the City Performance Tool. When you have finished reading the other reports, we have a couple of reports we have done for Copenhagen. Frank Jensen, the Mayor of Copenhagen, approached us and said, "We have our carbon neutrality target by 2025. Do you think we will achieve it?" We were able to have a look and say, "What are you doing? Waste-to-energy, move to biomass", and also gave an indication of how they can get to their carbon neutrality target, which was referred to earlier. Part of it is the citizens themselves and about 10% is within their own jurisdiction and 10% is from the Government. You need somebody to engage with the Government and get it engaged and acting. The third one was the commercial sector. How do you get them brought into helping to deliver these targets?

We have done a piece of work already and so we have all the data now related to buildings, energy and transport now for London. We have done some initial tweaking and having a look at what the impacts are, which may be of interest. Just to give you an indication, what we can do is look at the impact of infrastructure on CO₂, PM10s (particulate matter less than 10 microns in diameter) and NOx. The best results are from residential home automation, double-glazing and wall insulation and so things like the old RE:FIT and RE:NEW programmes. Those are the three main savings relating to CO₂, PM10s and NOx. The savings on a cost basis would be more in the commercial area and looking at automating buildings. Again, it is a bit like the Copenhagen topic. How do you incentivise commercial building owners to invest and make their buildings more energy efficient?

We will talk about transport but we also noted that probably half of the issues not just on CO₂ but also NOx and PM10s also relate to buildings. Again, transport is very important. Also, we would add in shipping. We mentioned a lot about roads, but shipping also we need to consider, and certainly the built environment is key. We have some wonderful reports and we are very keen. We have all this data now on how we look at the scenarios and how we help to make the right decisions as well, as you mentioned earlier, and that we focus on the right things.

One of the things we looked at is in Munich and Vienna. If they introduced 20% of their cars as electric in Munich, the reduction in CO₂ would be 5%, whereas in Vienna it would be 9%. There would be less impact in Munich than in Vienna. We went through whether they drive further and whether they do more car-sharing in Munich than in Vienna. No, they do not. It is the energy mix. This goes back to the national thing. You can still see the combination of things and, again, it is a complex area about how doing all of these different things would have an impact.

The fourth thing is, hopefully, inspiring. You mentioned energy efficiency of buildings. The Crystal - I think some of you have been there already - is not just London's most energy efficient building but it is one of the world's most sustainable buildings. I would encourage you to come along to the Crystal. Some of you have been already. Also, it is in the Green Enterprise District - someone mentioned the Low Carbon Zones - and, again, we should use that example and spread that across other parts of London. That is one of the things we are trying to do in the Royal Docks with the various stakeholders. How can we make the Docks a smart area and also a low-carbon area?

The final point is a catch-all. I mentioned shipping. I also mentioned freight. We are doing a couple of trials with Volvo and Scania in Los Angeles, in Gothenburg and also on the east coast of Sweden where we are looking at electric highways, ie electrifying trucks. It is probably limited to certain parts of London where we can do this but, for example, Los Angeles has a port and all these trucks going past Los Angeles and polluting Los Angeles. What they are looking to do now is to electrify those trucks so reducing the PM10s. Clearly, PM2.5s (particulate matter less than 2.5 microns in diameter) is a different aspect, but certainly PM10s are reduced through this. An electric highway could be one thing that could be inspiring and innovative.

Leonie Cooper AM (Chair): Thank you, Mark. That was quite a contrasting contribution to Syed. Michael, a challenge there to add something else to what has already been said.

Michael Jacobs (Associate Director for Energy, Transport & Climate, Institute for Public Policy Research): I am currently with the Institute for Public Policy Research (IPPR) and the IPPR has produced some work on a variety of the issues that you are discussing today. In light of the contributions made by others, I thought I would concentrate on the overall picture of greenhouse gas and CO₂ emissions and try to place some of the individual policies, including some of the things that Mark [Jenkinson] has just said, within a wider context.

The previous Mayor adopted a target of a 60% reduction in CO₂ emissions in London by 2025, which was more ambitious than the UK nationwide carbon budget covering the same period. This Committee has been assiduous in trying to monitor what the Mayor has been doing. It produced a report in 2014 and an update last year, which showed, as indeed he had to admit, that he was off-track to meet those carbon reduction targets and so London is below the levels that the Mayor wanted London to be at. Of course, the impact of being below a target is cumulative so that you get further and further behind in terms of the total emissions.

The new Mayor has set a different kind of target in his manifesto, which is for London to be zero-carbon by 2050. This is a correct but brave target. It is correct because, since the Paris Agreement in December last year, the world has committed to having zero carbon or zero greenhouse gas emissions on a net basis and so that includes the potential for capture and storage, biologically or geologically, but we are now globally on a trajectory towards zero within the next 50 years, according to the Intergovernmental Panel on Climate Change, in order to hold global warming to two degrees or less. The commitment in Paris was to strive to hit only one-and-a-half degrees. Therefore, London, being a major global city, is right, in my view, to be seeking to be on that track, but it is a brave commitment because this is not going to be easy.

It is particularly not going to be easy because, even though I suspect the Mayor will not wish to revise the 60% by 2025 target, if you want to be on a trajectory beyond 2025 you need to do things now and up to 2025 in order to ensure that your emissions keep reducing and reducing on a very steep trajectory towards zero. It is, unfortunately, the case that – at least until there is a major shift in technologies – the easiest things get done first and so this gets harder.

This is a very important but big commitment that the Mayor has made. It will require changes in the way we use energy and produce energy and the way we drive and the nature of our buildings, which are much more dramatic than those we have currently in policy. This will require the electrification or the hydrogenisation, if you like, of vehicles on a mass scale, not on the tiny scale that we have now but on a mass scale, because in the end the transport emissions of greenhouse gases will start to become a larger and larger proportion of the total. It will require a shift in the way we produce heat. The vast majority of our emissions by category are in heat, about 50% altogether, and nearly all of our heat is currently through gas. That is not consistent with zero unless we do massive carbon capture and storage, which is not going to happen. This is critical and we need to start engaging seriously with the management of demand.

The good news is that the energy system is dramatically changing. Costs of renewable energy have fallen hugely, solar and wind in particular and other technologies. We now have new technologies coming into play like storage and demand response, a smart system that allows demand to respond much more flexibly, which are revolutionising the potential for emissions reduction.

The bad news is that the national Government has removed most of the climate policy that was incentivising this and we have had a bonfire of climate policies over the last year or so. This requires, in my view, the Mayor to take a different approach. The last one we can characterise as “hit and hope”. They were good policies with good spending but not enough and the outturn is that you miss your targets. We need a different system, the system that the Climate Change Act has for the country as a whole, which is of carbon budgets. We are really trying to map the scenarios of growth in London – London’s growth is a principal pressure on carbon emissions – and trying to match our policies and our spending in order to hold emissions to those limits.

Secondly, because of the financial situation with much fewer national incentives, the Mayor is going to need to use the balance sheets of the GLA and TfL to try to leverage the investment. Much of this, because the costs are coming down so far, is within the realm of profitability. This is not about imposing costs anymore; it is about investments, but they are investments that take a bit longer and require a cost of capital that is within reach. The GLA and TfL could potentially do that. Energy for Londoners, the new energy company that the Mayor has said he wishes to establish, could be a very helpful vehicle for doing this and for innovating in the way London generates energy, power and heat and uses it with demand management. TfL is the single largest energy user and so is a huge driver of potential change here. Energy for London is a very exciting potential development and I presume the Committee will want to look at it.

The last thing to say about this is that it is a huge economic opportunity. It is very easy to hear all of this environmental policy and concern and think that this is all about terrible costs that are going to be imposed on the economy in order to reach social and environmental objectives. Every time you impose a cost – and the costs are falling and falling – you are also creating a demand. You are creating a demand for a supplier. The reason we have Siemens here is Siemens is making a lot of money out of meeting environmental standards and outcomes. This is a huge growth area in the British economy as a whole. London has a strong low-carbon and green sector, which could be even stronger. Therefore, this is not an agenda about anxieties about pollution and health causing economic damage. In the end, this is about how you grow an economy. If you look around

the world's major cities, you will see New York, Paris, Los Angeles, Copenhagen and others looking at this as the vision for their economic and social development. The combination of the economic advantages, the greenhouse gas emissions reductions and the air pollution and wider environmental improvements that can be made through this agenda is really very exciting. This is an opportunity agenda and it is an economic opportunity agenda that I hope the new Mayor and the Committee scrutinising him will take.

Leonie Cooper AM (Chair): Thank you. They were three very contrasting contributions but very helpful for us to consider.

Coming back to a point that Denise [Beedell] made earlier when she was talking about the impact of building the very large number of new homes that it is widely acknowledged London needs, we have talked here about the possibilities but I will throw this out to the three of you who have just spoken and also to anyone else who wants to answer.

There is a bit of an interface between how the homes are constructed and then the nature of the homes that are constructed. How do you see that interface going in terms of carbon reduction and the overall built environment? You can go down different routes. Either you can come up with homes that will be a net contributor to further carbon both during their construction and also in use as well or you can go in a different direction.

Michael Jacobs (Associate Director for Energy, Transport & Climate, IPPR): I have two immediate points. The first one is that in a slightly surprising, incredibly welcome and little-noticed development just before the last Mayoral Election, the Mayor approved a new building regulation to effectively retain the zero-carbon homes standard for new buildings that the national Government had abandoned nationally. There was a long preparation period. The building industry did not like it at first, gradually became used to it and in the end was preparing to build zero-carbon homes. It has been abandoned nationally but retained in London from 1 October 2016. From 1 October all new homes will have to be zero-carbon. Part - 35% - of that reduction over previous building regulation Part L standards has to be done onsite and so it has to be actually within the home and the rest can be offset. At the moment there is a within-borough restriction.

This is excellent. It drives innovation and that is what it has been doing over the last ten years with the central Government since it was originally suggested and it will drive huge improvements in those new buildings. It will also create an offset fund, which is, in my view, going to be one of the most significant sources of funding for community energy, renewable energy and decentralised energy schemes. That is one good thing and we need to make sure that that happens and that those buildings are built to the highest possible standard, ideally much more than 35% onsite.

The second thing is on heat, which Syed [Ahmed] has mentioned. There is now very considerable interest in heat networks for new buildings, particularly for commercial developments where there are heat sources. It is much harder to do as retrofitting but there is so much new building that this creates a huge opportunity. There is now very considerable attention to this within the private sector and investors are interested in it. It looks like it can stack up financially. There is an obligation for all new development to investigate whether there can be a heat network and, with this new Government money that Syed referred to, there is a real opportunity there. Therefore, on the new build side, there is some real hope and opportunity. The retrofitting, as we know, is going to be harder.

Mark Jenkinson (City Director for London, Siemens): On the new build, I guess the issue is that it is cooling rather than heating. I mentioned London's Royal Docks. We have a number of developments going on

there. We have Silvertown Quays and ABP. We are looking at how we break the planning code because Silvertown Quays is being pushed to have two energy centres and ABP two energy centres. We have London City Airport with its backup generation. Rather than each doing its own isolated thing, how do we have this decentralised energy scheme? We can reduce the amount of energy, basically, that is not going to be used. How do you look beyond the borders of your developments? That is one thing that needs to be considered.

The other thing is on the retrofit side. We are involved - unfortunately, not making too much money on this one - in an EU funded project in Greenwich. It is the Sharing Cities project and we are looking to take additional heat from either Greenwich Power Station or maybe even the Thames and make a small heat network to provide heat for some of the council buildings or council homes around there. Again, how we do optimise the usage of the energy from the heat pump, how do we optimise the energy for homes and, also, how do we change behaviour? There is a big behaviour piece on how to get people to use that energy rather than to have the heating on and the windows open in the middle of winter.

Leonie Cooper AM (Chair): I feel that we are being enticed towards some site visits here by Mark, who was talking about Silvertown Docks and Greenwich and possibly even the Crystal, for anyone who has not visited.

Syed Ahmed (Director, Energy for London): I have three quick examples of where the Mayor can be creative using the London Plan. The London Plan is about new development and you, Chair, have asked about some of the existing buildings. One of the statistics we hear quite often is that 80% of the buildings that are here today will still be here in 2050 and so retrofitting London buildings for the future is, clearly, a huge challenge. However, I have three quick examples.

Across the way from here is PricewaterhouseCoopers' (PwC) headquarters at 7 More London. They built that brand new and, being PwC, they wanted to build it with the highest environmental credentials and the London Plan put an awful lot of emphasis on them to do so. They did that and it was the highest environmentally rated building in London at the time.

PwC has another office down on the Embankment, an old 1970s, fairly ugly tower block just down Villiers Street. They needed to refurbish that and their staff said, "Hold on. We want our building to be as good as the new building that you have built opposite City Hall". To cut a long story short, they did that. They used the learning that was required of them to learn through the London Plan to retrofit that old 1970s block and that building was rated more energy efficient and more environmentally friendly than the new building. Fostering this idea of policies through the London Plan for an awful lot of developers to ask what they can do to retrofit existing buildings is very powerful.

Secondly and just very quickly, one of the Mayor's decentralised energy programmes helped to support a combined heat and power (CHP) engine in the Royal Free Hospital up in Hampstead. The hospital wanted to make the CHP a bit larger because it would mean it is more cost-efficient for the hospital. Across the way, literally across the road, were some housing blocks - again to cut a long story short - they expanded the size of the CHP so that they could export heat to the blocks across the road. By doing that, again, they provided affordable low-carbon heat to the homes across the road, the CHP in the hospital provided more power, the running bills of the Royal Free Hospital went down and, overall, they saw more carbon savings. Again, that is another example of being creative and using Mayoral powers to look beyond the red line on planning.

Just quickly, the third one: Veolia built a brand new waste transfer site on Old Kent Road. When they were building that, they could not really do anything imaginative on the renewable energy component, which the London Plan asked them to do. They said that what they would do is to develop a heat network from an

existing site, which goes back to Nicky's point about incinerators. In Lewisham is the South East London Combined Heat and Power (SELCHP) site built in 1991. The one thing that it has not been is a CHP. It has never actually exported heat offsite. It just generated power by incinerating waste. However, again, using innovative planning discussions with Veolia, Veolia said, "We cannot do anything on this site on Old Kent Road, but what we do is we will finally put investment into the SELCHP site to take heat from there to [provide heat to] five tower blocks in Southwark about half a mile down the road".

That is just to say, in terms of retrofitting existing development, the London Plan, which is focused on new development, can be quite creative depending on what planning officers here, the energy team and the Mayor do.

Caroline Russell AM (Deputy Chair): Syed, you talked at the beginning about a vacuum in making homes more energy efficient and it was really inspiring to hear about that 1970s office building that could be brought up to current standards.

I am just wondering. Do you think that there is scope for the Mayor to have a retrofit - a London Green Deal, if you like - scheme that might help? Certainly, as a councillor in Islington, the low-hanging fruit has been done - the loft insulation, all the easy bits - and we have been left with the really difficult stuff and local authorities have no money to do it. I am just wondering. Can you see any mechanism by which the Mayor could help on this?

Nicky Gavron AM: Just one point on the London Plan. If there is a planning application for a major refurbishment, the London Plan will cover it because anything that needs a planning application the London Plan looks at. We have opportunities there, but of course that does not deal with the majority of retrofits.

The point I wanted to make - and we are talking about retrofitting existing buildings - was that I am very aware now of the research that has been done on new build and how much of it - 70% sometimes is stated - is leaky, is not thermally efficient and is producing CO₂. I just wondered whether amongst the ideas that come forward we might not be thinking - I just wonder what people think about this - about maybe the Mayor having some way of spot-checking buildings. Obviously, we cannot set up what the Greater London Council had, which was its own building regulations, but we could perhaps start checking on what is given permission in some way. It was just a thought because we are talking about existing buildings and at the same time we are constructing new buildings and they are not energy efficient.

Caroline Russell AM (Deputy Chair): In light of a zero-carbon-by-2050 target, is any aviation expansion doable?

Leonie Cooper AM (Chair): That is: can the Mayor do something around retrofit and a Green Deal, should the Mayor do spot-checks on buildings and how does aviation fit with targets?

Michael Jacobs (Associate Director for Energy, Transport & Climate, IPPR): On your first question about a replacement for the Green Deal, it is well within possibility. The core economics of the Green Deal were that you invested in energy efficiency and you paid for it through the savings in energy that are generated. That requires a financial relationship and it requires a relationship with the home and not the owner. The core of the Green Deal was correct; it was just set up in a crazy way, which gave us very high interest rates and made it not very sensible.

The great advantage of a public authority is the ability to use low interest rates to borrow and to take the risk over a wide asset base and so it seems to me that this is very plausible. What you are proposing, Energy for Londoners, could well be the vehicle to do that and so I very much hope that that will be one of the things that he looks at.

In terms of aviation, this is all about carbon budgets, which is why the UK adopted a carbon budgets approach in the Climate Change Act. Carbon budgets allow you to emit carbon in different parts of the economy according to which are the most cost-effective and efficient, as long as you stay within a total cap. If there are aviation emissions growing, it means that other emissions in other sectors have to fall faster than they would if they were not growing in aviation. At the point we get to zero, we are going to be everywhere; everywhere is going to be zero. However, *en route* to that, it is possible to grow aviation emissions if you accept – because you are in a carbon-budgeting system – that other emissions are going to have to be cut more drastically.

When the last Labour Government decided to approve Heathrow, at that point, which was 2009, it said that Heathrow would have to live within a carbon cap. It asked the Committee on Climate Change what that should be and whether it was feasible and it was to do with the efficiencies that could be generated in the aviation sector. The Committee on Climate Change said that, yes, it was possible to grow aviation with a new runway on Heathrow under a carbon cap, but it would have implications for the rest of the economy. However, because aviation emissions are expensive to cut, it is cheaper to do it in other sectors. It is difficult but it is cheaper.

That analysis needs to be revisited in the context of London airport capacity, but it is theoretically possible. It is more and more difficult as you get to zero, but it has implications for the rest of the economy.

Syed Ahmed (Director, Energy for London): Just to respond to Caroline's [Russell AM] and Nicky's [Gavron AM] comments, yes, the Green Deal did fail for the exact reasons that Michael [Jacobs] set out but, importantly, the Green Deal financing mechanism is still there. This is the ability for a homeowner to pay back via an electricity charge on their meter. However, ultimately, the big reason that the Green Deal failed is that the finance provided by the Government was just not suitable for most of the people who wanted to take out a loan, exactly the reason that Michael mentioned. There could be something that the Mayor could do in terms of the loan.

Also, Michael mentioned the carbon offset fund from new planning development. That is a quantum of money that will be coming now to local authorities. Islington has already had one in place since 2013 and is directing the money that has accrued from that carbon offset fund for retrofitting in fuel-poor homes of solid-wall insulation. There is a slug of money that will be coming through from new development and that could be used as a loan mechanism to help cover other pay-as-you-save deals for residents in that area.

Just on the issue of building regulations not actually doing what you would hope them to do, it has been ever thus, I am afraid. Even when we had terrible building regulations way back when, they were still not being met.

The key point you made was about trying to make sure that we get these buildings to operate as efficiently as possible, as was set out in the planning requirements. The Mayor could require post-occupancy valuation and could ask developers to provide reports back. That was previously done on biomass boilers. When somebody wanted to put a biomass boiler in, there were lots of caveats around that and then they would say, "You need to report on the emissions related to it". The Mayor can do something like that.

Samantha Heath (Chief Executive, London Sustainability Exchange): A very important study that the Environment Committee could conduct is about how we could do a Green Deal for London under Energy for London. [The London Borough of] Lewisham, which we have done some work with recently, has looked at this very thing and, taking advice from Syed on the financial instrument still being in place, you could ask its officers about what they are looking into at the moment. That is definitely to do with retrofit and is very important.

The other thing that has fallen by the wayside over the last few years is about the relationship with businesses. For big businesses, it is in their interests to do – and they already do – a lot of energy-saving work, but this work that we did with the Federation of Small Businesses years ago on how small businesses can engage with this agenda really has been underplayed. A study on how small businesses have been engaged and how the programmes have dwindled on the vine recently is something that I really recommend you look at.

On Nicky's [Gavron AM] point about in-use studies, I absolutely agree with you that how buildings are lived in is a crucial area that you could look at. You could not go too far, but the Olympic Park and all the buildings around it, now that they are built -- the study, just to refresh your memory, was on all the reflections on the Olympics and how hard it was. If you remember, right in the early days, it was a challenge beyond anything to get the targets that we put in place delivered on in the [Olympic] Park. You might even want to look at the personal ambitions and just how that was really fantastic.

An area that we have not talked about today is Smart Energy GB and the smart [meter] rollout in London. The Environment Committee really needs to look at how that is being rolled out because I believe that it is going to underplay its hand unless the Mayor and you take a stand and look at how it is rolling out. The supplier-led engagement has not particularly worked effectively, but I am sure that Smart Energy GB will come to talk to you. UK Power Networks as well would want to come to talk to you about electric vehicles and how they are going to deploy those given the capacity in London because that is a real problem.

Just going on to Syed, the behaviour change element and how you engage with London has been underplayed over the last eight years and needs to be ratcheted up if you are going to be at all successful.

Richard Howard (Head of Environment and Energy, Policy Exchange): We talked a lot about heat networks. Heat networks are lower carbon; they are not zero carbon until you attach very low-carbon sources of heat. If heat networks are simply burning gas to make heat in a gas CHP, they are not low carbon. You really need to think about how to make heat networks low carbon.

As a second point, linked to the first one, there is a tension between some of the climate change and CO₂ reduction narratives here and some of the air quality narratives. In the report we did, we highlighted the fact that decentralised energy – in particular, CHP and biomass – are supposed to be great in terms of CO₂ but are actually awful in terms of air quality. Those things are really not joined up in terms of GLA policy at the moment and you need to really look at that.

Leonie Cooper AM (Chair): I am going to move on to the last section, which we have entitled “Green and blue London: the natural environment and water management”, and I am going to move immediately to ask Richard to make his pithy contribution and then we will take Simon [Moody].

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): Thank you, Chair. Thames Water supplies 85% of Londoners with their water and it deals with 100% of their waste water

and so we are particularly keen that the Mayor and this Committee should keep the resilience of the water and wastewater infrastructure against extreme weather under really careful review.

I am going to concentrate on drought because, with drought, both the likelihood and the consequence have been underestimated, particularly compared to flooding. Also, I suspect Simon [Moody] will concentrate more on flooding. Drought is not a problem in normal years but London has a large and fast-growing population and they are all dependent on something that falls from the sky in relatively random amounts. It is very easy to underestimate the risk of something that has not happened in living memory, but London could run out of water.

We rely very heavily on winter rainfall to top up the underground sources and to top up our reservoirs. The rain we have had this week will have mostly evaporated or been picked up by plants. It is not much good to us. One dry winter: no problem. Two dry winters: we are getting into problems and we are going to have to start taking drought measures, as we have and that is the worst we have had in the last 90 years. Three dry winters or four dry winters: we are in serious, serious trouble. We had a near-miss in 2012 and we were saved by unprecedented amounts of spring rainfall in Olympic year, but the forecasts then were looking bad. If we had had a very dry summer, London would have been close to running out of water by September or October. We need to keep reminding ourselves of that, even when it is raining.

People tend to think about drought and they think about hosepipe bans. The *Daily Mail* gets very cross and it is seen as an inconvenience. Of course it is, but most people in London do not have hosepipes, as we know, and it is mainly, from our point of view, particularly in the capital, a way of raising awareness of the problem.

In practice, we have moved pretty quickly from a hosepipe ban to the next stage, which is a drought order. The things we are allowed to restrict under a drought order impact disproportionately on small businesses like landscape gardening, car washing, window cleaning, street cleaning and things like that start to get hit.

From there, we move pretty quickly on to emergency measures and that is when it gets really difficult. If anybody thinks that we are going to have standpipes in London, just look out of the window. It is not going to happen. It is not practical. What we would have to do is to lower the pressure very dramatically so that people could get just enough water to keep themselves and their families hygienic, cook, wash and so on. What would suffer would be businesses. It would be very difficult to keep the fire main pressure up in the [London] Underground. Would we keep the Underground going? Water for computer room cooling, water for hotel laundries and water for Ascot, Henley, the Hampton Court Flower Show, Wimbledon and Lords are the kinds of things that are going to start getting hit. When we did some independent economic research, it showed that the impact for London of running out of water would be £330 million a day. If we reached emergency measures, they would not be on for a week or two; we would be looking at four to six weeks at a minimum until the situation was stabilised. Quite quickly, we would be into very serious economic impacts.

The other problem in a drought is the sheer uncertainty. We just do not know when it is going to rain again. This sounds blindingly obvious but, believe me, I have seen Ministers go very white when they suddenly realise that nobody can tell them when it is going to rain. That is a big problem for us as well.

What are we doing about it? We have a five-year statutory Water Resources Management Plan. The next one is due in 2019 and we are working it up now. Of course, it starts with managing demand. We have hit our leakage targets for ten years running. We are fitting smart meters progressively across London and we are stepping up our efforts to encourage water efficiency.

However, as the previous Committee concluded, that is not going to be enough to cope with the combined impacts of London's population growth and climate change. We are going to need at least one big new water resource. Part of our work at the moment is working out the best water resource for us to develop. As well as the Water Resources Management Plan, we have had a lot of support from the Mayor's Infrastructure Delivery Board and the National Infrastructure Commission is looking at this. It is going to be a very live subject.

I would encourage the Committee to, please, stay involved. You have given us lots of help in the past. You have helped us to change the guidelines so that it is no longer a 25-year plan. It is a minimum of 25 years and we can look further ahead. You have helped us to persuade the people who write the guidelines that we can look at a wider range of credible droughts, not just what has happened in the last 90 years. It looks as though, with your help, we have persuaded the Government to have a National Policy Statement for water, which is really helpful, and your support for the need for a big new resource has been critical as well. Those debates are going to be going on over the next two or three years. I am not being alarmist, but these are things that we really need to keep looking at.

Very briefly on flooding, London has a combined sewer system. It takes both water that comes off roofs and roads and what comes out of our sinks, toilets and bathrooms. Our job is to try to keep as much of that rainwater out of the sewer system as possible. It is possible to do something about retrofit but it is difficult. It is the new developments that we have to really concentrate on.

Again, we have had support from the Mayor and this Committee in getting integrated water management strategies drawn up in places like Old Oak [and Park Royal], Vauxhall, Nine Elms and Battersea (VNEB) [Opportunity Area] and Charlton Riverside [Opportunity Area]. We are looking at what we can sensibly do with capturing the rainwater, keeping it out of the sewers and, where possible, then using it for things like watering open spaces, toilet flushing and so on. That has to be planned from the beginning. It is like transport infrastructure; it cannot be an afterthought. This is a really good step forward with these integrated water management strategies but we need more of them and, again, I would encourage you to keep asking the questions about that. Once things are built, it is much more difficult to sort out the problems.

Simon Moody (London Area Manager, Environment Agency): Richard [Aylard] has touched there on some of the challenges at one end, primarily, of the water cycle with a rising population and changing climate. I will look very briefly at the other end to allow some time for discussion still.

On managing flood risk in London, the Thames Barrier just up the river there protects 344,000 households in London and it protects £150 billion-odd worth of commercial property and business, but it is not the panacea of flood risk in London. Richard has talked about the risks of other sources of flooding and, actually, there are four times as many households at risk of surface water flooding in London as there are households at risk of tidal flooding or flooding of the rivers. How we manage that and predict that is a far more challenging place to be. It is less predictable and it is more difficult to mitigate.

The sorts of work that Richard has referred to I would support. Integrated water management has started to show what we can do with new development and it is transferable and scalable and so we should be making that the default for how we think about integrated water in new development. We should not go back to disaggregating that and the risks that that brings.

Green infrastructure plays a part in that. I have come to this Committee before and talked about sustainable drainage systems (SUDS) and the role they have in surface water management. We talked about green

infrastructure earlier and it has benefits around heat island, biodiversity, wellbeing, water quality and flood risk. It is questionable around air quality. We need to plan for that.

The challenges around that are longevity and the scale and the horizon in people's thinking. We are currently managing the tidal risk on the Thames until the end of the century as part of the Thames Estuary 2100 plan. That is an adaptive strategy that brings forward different interventions and investment depending on what the changing environment is doing. There is scope to look at other long-term problems that way. The more we segregate and thinks in chunks of time, the more risk we fail to mitigate. Longevity is one.

Scale is another. Strategic-level SUDS provide some of the answer to surface water flooding in London, but that can be challenging when the beneficiaries are separated from the work that they are going to do. They are in different boroughs, potentially, from where that works. Some leadership around that is the key to allowing us to look at that at a larger scale. As we do more upstream thinking about flood risk and about managing water flows through catchments, that join-up is the key.

On that same issue, there is integration of thinking. We talked about integrated water management strategies. We talked earlier about energy and thinking about that in a segregated way and the challenges and the inefficiencies that that brings. There is a leadership role for the Mayor continuing what we have seen with the Green Infrastructure Task Force and the London Sustainable Drainage Action Plan from the previous administration. The need for that leadership remains.

I suppose just a word of caution around that is about the delivery of those plans so that they do not just remain shiny bits of thinking on the shelf but that we mind the gap through to delivery and that that leadership does not just go through the thinking and planning phase but extends to getting these built and becoming part of the environment of London in the years ahead.

Leonie Cooper AM (Chair): Thank you very much for that final contribution from one of our speakers. You were very much last but definitely not least.

David Kurten AM: Thank you all for your contributions. Obviously, London's population is increasing all the time and so there are more people and more businesses. We have talked a lot about the blue side of London, but Simon [Moody] mentioned the green side as well. How can we protect and enhance our green spaces in London and the green infrastructure that we have in London?

Richard Howard (Head of Environment and Energy, Policy Exchange): Yes. We have done some work at Policy Exchange on green infrastructure. It was mainly done by my predecessor and so it is not my expert area, but I will try to cover it as best I can.

We did look at this in the context of London and one of the things we found was that there are lots of interesting initiatives going on, things like the All London Green Grid. That is a planning approach to this. London has lots of green infrastructure. If you think about the number of parks we have, it actually is very green for a city of its size compared to other global cities.

However, it is not thought about in a particularly strategic way. We do not think about the benefits that this green infrastructure provides in a strategic way. Part of the reason for that is, although one of the other contributors highlighted some of the benefits of green infrastructure, we do not actually push that into our policy thinking. There is this notion that Defra is talking about now of "natural capital", which is about the monetary value that you can place on environmental assets. However, it is still quite conceptual thinking.

Thinking about the benefits that parks and so on provide in terms of flood risk management and so on, we could actually monetise that and think about that in the way that we think about policy. I guess what I am saying is that there is a need for more leadership on this issue and there is a need for a more coherent strategy about green infrastructure.

There is also a need to engage with people more on it. There is this idea of London as a National Park City, which is a really interesting idea but seems to be more of a brand at the moment and there is not much policy substance to it. However, that is potentially something that the Mayor could grab hold of and start to badge London and think of London as a National Park City. It is a really interesting concept. We do need to think far more strategically about this than we have been in the past.

Samantha Heath (Chief Executive, London Sustainability Exchange): There was a GLA Economics report talking about “valuing greenness”. It is now ten years old but some of it is really very important because it is about how we add value and how we fund our open spaces. Of course, the Assembly’s Environment Committee did a wonderful thing on open spaces, again, about ten years ago. That was really very useful.

You have a great asset in-house, which is the London Climate Change Partnership. I know that they could not come today, but I am absolutely sure that their work with Business Improvement Districts on green spaces and open spaces in order to mop up flood risk is really important. David [Kurten AM], you will find that quite interesting because it is about how our green spaces can significantly work for us.

Other regions do have something called “nature partnerships”, which were set up a good five years ago. I know because the London Sustainability Exchange did some work with your environmental officers on what a London nature partnership would look like and it was taking the All London Green Grid and looking at where it would work. That was looking at those who do not actually have a vested interest in an open space like universities and schools, as well as the likes of the City of London – lots of our open spaces are not in public ownership but in private ownership – and how all of those organisations can work significantly together. Across the rest of the country, these work hand-in-glove with the enterprise partnerships or the enterprise panels and that has not actually happened in London. As an Environment Committee, you could begin to look at how that would happen, as well as looking at the various open spaces and street trees that have been happening and at how Grow London, which has been significantly valuable, really has impacted on people’s desire to grow guerrilla gardening and the like. A London nature partnership being revisited would be an exciting place for you to go.

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): Even conventional infrastructure can have real biodiversity and recreational value. We have a complex of operational reservoirs in Walthamstow in North London, which is supplying Londoners with water every day. Working with the London Borough of Waltham Forest and the London Wildlife Trust, we are opening those up and it is going to become the largest urban wetland in Europe so that local people can walk around, birdwatch, fish and cycle right next to these conventional reservoirs. There is lots more that can be done like that. We have to do use things for more than one purpose in a city as crowded as London, in my view.

Shaun Bailey AM: That almost covers my question because I was trying to understand whether we need to re-examine the concept of the Green Belt. As a Londoner, the Green Belt to me means a park and I had no idea that it can help with flooding risk and we could do other things with it. If we could re-examine that concept, I believe that Londoners would be more amenable to using it in different ways, but what does that redesign mean? Currently, the Green Belt means houses or not. If you live in the outer ring, we are beginning

to get worried about turning over all of our Green Belt to new housing, but if we thought we were turning it over for other functions for London, I am sure there would be more support for it.

Michael Jacobs (Associate Director for Energy, Transport & Climate, IPPR): Just very quickly in response to your question and in response to the comments about valuing nature better, the National Trust is doing some very interesting work around this on valuation and also how to get new investment into green spaces and parks because of the valuation. It may be useful for you to talk to them.

Syed Ahmed (Director, Energy for London): Very quickly, one thing that has been raised is that there was something called the London Green Infrastructure Task Force, which the Mayor brought together at the tail end of 2015. Their report, which I cannot remember the recommendations from, was very good.

Secondly, I have just been reminded that in one of the Opportunity Area Planning Framework (OAPF) areas down in VNEB, a park was required as part of the development. We have a number of these OAPFs, about 30, around London and so there is a way, as we build new communities, to make sure that we incorporate these green spaces into them as well.

Simon Moody (London Area Manager, Environment Agency): The future is about understanding the multiple benefits because we cannot do that isolation – it is that integration point – and an increasing maturity around how we value that economically. We know it works. I talked to a hospital that turned its wards around to face green space and put its rehabilitation wards facing green space, which was a flood storage area. They believe that they have had demonstrable improvements in the time people are taking to recover as a result of their view from the hospital. As we understand that more, we need to value that within the planning system, but not forgetting that it is not all about new, not forgetting what we already have and not losing that within a city growing at the unprecedented levels that London is.

Michael Jacobs (Associate Director for Energy, Transport & Climate, IPPR): That will require a lot of co-ordination between London as a whole and the boroughs. It is critical on the planning side.

Samantha Heath (Chief Executive, London Sustainability Exchange): Just a quick issue, going back on that, Shaun [Bailey AM], definitely “strategically” is the answer that I would give. Whatever you do, you cannot just pick. You can do it case-by-case but that would not really be very helpful, which is why I went back to the nature partnerships.

The one thing that we have not talked about as much as we could do is overheating and that is one area where deaths definitely will occur if we do not take action. Our parks and open spaces really do provide valuable places where we can cool off in the summer, when [the weather] is not like this, obviously. Again, I would just go back to the London Climate Change Partnership and the work that it has done on overheating. You have a real in-house ally there and I am sure that you can get some joint evidence-based pieces of work up and running.

David Kurten AM: Richard, I was going to ask about extreme weather conditions and you answered a lot of that in your talk, particularly about drought and flooding, which I suppose are the two main things concerning water.

However, one thing did interest me that you said. You think that London needs an extra water source. Could you elaborate on that? Where is it going to get more water from if we have three or four years of drought?

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): There are three main options that we are looking at. One is to build a big new reservoir in Oxfordshire. We would take water out of the River Thames in the winter when it is just flowing away to the sea and we would store it. When we need it, we would put it back in the river in Oxfordshire and it would flow all the way down to London under gravity. We would be using the Thames as a gravity-powered conveyor to bring water that falls on the Cotswolds into London. London currently has about 110 days' storage of water. That will give us an extra 80 and so that would be a pretty big boost.

Another option would be to bring water in from the River Severn and bring it across the country, possibly using the canal network. That would mean quite a lot of pumping and quite a lot of extra pipelines and we would need to be sure that there was enough water at the other end of the pipe when we needed it.

The third option is to recycle treated sewage effluent that is going back into the river. Potentially, that can be treated to a higher standard and put back into the supply.

Which of those three or which combination of those is best in terms of cost and environmental benefits is being looked at by us and there will be a formal consultation in 2017. That work is ongoing.

Shaun Bailey AM: I liked one and two; number three did not sound so good!

Leonie Cooper AM (Chair): I suppose it does depend where exactly a large reservoir might be situated in Oxfordshire and how much we might like it.

David Kurten AM: Just to come back on that, great, but I have never heard of the idea of a reservoir in Oxfordshire.

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): I am sorry. That was a very quick overview and I am more than happy to talk to you outside the meeting or to send you more information if you would like it, David.

David Kurten AM: Just off the top of my head, if there were a drought in London, there might also be a drought in Oxfordshire and at the Severn as well.

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): The point of it is that it would be a very large reservoir and would hold enough water to deal with the local area and would have a very significant surplus not just for our customers in London but potentially for other water companies. This would not necessarily be a Thames Water resource. It could be a southeast water industry resource. We do not mind who owns it and builds it; we just need the water.

David Kurten AM: We do have a desalination plant --

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): We do and that is a drought option that gives us an extra 7% of London when we need it, but that water is more than ten times as expensive as the rest of the water we supply and it is very energy-intensive. It is not something that we would use unless we absolutely had to. We used it in 2012 and it kept the reservoir levels topped up and that was really good, but it is a bit like an emergency generator. It is not something that you want running all the time.

Fiona Twycross AM: Yes, just very quickly, surely there are environmental issues with building a new reservoir in itself. It seems like there must be environmental considerations in terms of building a new reservoir.

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): Absolutely, there are environmental pluses and minuses with all three options. I am sorry that I have skimmed across them and perhaps did not give Shaun [Bailey AM] the most balanced view of the three options but --

Fiona Twycross AM: What I am trying to ask is whether there is more we can do in terms of cutting the amount of water people use and things like that before we go to --

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): Absolutely, yes, we are doing that and that is what is going to get us through until 2020. Beyond that, if London's population keeps growing at the rate it is, it is not going to be enough. Our 2014 plan had headroom built into it. It is 2016 and two-thirds of that headroom has gone just because the population is growing faster than anybody thought it would. That is the worry.

David Kurten AM: I know you said that the desalination plant - to come back to that - is for emergencies and of course it is, but with the population growing you said that it could supply only about 7% of the water. In an extreme case of drought, do you think we need some more desalination plants?

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): We would like to find ways that we could supply the water without having to use really high-energy solutions.

David Kurten AM: Of course, yes.

Richard Aylard CVO (Director of External Affairs and Sustainability, Thames Water): In an emergency, there are all sorts of things that we would consider doing, including bringing water in by tanker from Scotland. If the chips were down, we would do everything we possibly could to keep London going. My point is that, by then, the economy would have taken a big hit and it is our job to make sure that that does not happen.

Leonie Cooper AM (Chair): I believe someone once talked - perhaps the previous Mayor - about having a large pipe to pipe water down from Northumbrian reservoirs, but I am not going to investigate that any further because it probably goes into the box as incredibly energy-intensive and I am sure that that is not going to happen.

I do not like to call this to a close but I have to because we have very slightly overrun. Can I thank all of our guests for their comments this morning? Some of you have pointed us to previous reports that have already been considered and indeed produced by this Committee, but you have also pointed us to a number of external organisations that have commissioned or created valuable inputs in the areas we have dealt with. I am sure that as we move forward in terms of developing our work programme over definitely the next two years and probably the next four years, we will be taking on board the comments that you have made and also the references, the documents and the organisations that you have been referencing.