Appendix 1

Environment Committee

19 May 2011

Transcript of Item 8: London's Energy Gap

Murad Qureshi (Chair): Can I welcome our expert Panel; Richard Rigg from London Array and Alastair Tolley from the Association of Electricity Producers. We have also got Peter Daw, with whom you may be familiar. He is on the Climate Change Mitigation team at the GLA. We have got Wayne [Hubbard] from the GLA as Head of Business Development at the London Waste and Recycling Board and we also have Ross Hudson, Environment Programme Officer, from the Low Carbon Zone programme at the GLA. Thank you very much for coming along this morning.

I am going to kick off with a few questions and then we will go into a presentation from London Array from Richard which will begin the discussion on whether renewables can plug the gap. Let's firstly establish that there is a gap in the first place. The first time I came across that was when reading the Mayor's Climate Change and Energy Strategy over Christmas in a very bleak winter. Can I ask the GLA officers to set out for us your understanding of the size of the UK's energy gap now and the projection out to 2020? Let's start on that before we come to the London context please.

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): Thanks, Chair. It sounds like your Christmas was almost as exciting as mine then if you were heavily involved in that. I will just set out what we did in the Energy Strategy, the reason we did it and what we were trying to achieve.

The first important point to make is the illustration we use in the Energy Strategy. When we were talking about the energy gap it was based on electricity only so the illustration we used was electricity rather than energy as a whole. What we were really trying to do was to emphasise the risks of an electricity gap emerging in the future. That was the purpose of what we were trying to do within the Strategy.

Now why were we trying to establish that? Firstly, it was to emphasise to Government the importance of delivering the infrastructure that the country needs to continue to generate the electricity to meet demand going forward. It was, secondly, to illustrate the importance of our own programmes which are all demand side related, so the importance of reducing our need to use the National Grid and electricity from the National Grid. That is really the context for the work we undertook.

Now how did we go about this? We asked GLA Economics, in the first place, to look at the Department of Energy and Climate Change (DECC) peak demand forecasts going forward for electricity and also look at the National Grid seven year plan statement which sets out infrastructure coming on line.

The starting point is using DECC peak demand and taking into account infrastructure that is due to go off line over that period, a gap begins to emerge of 43 terawatt hours by 2015/16. That is largely due to the closure and decommissioning of nuclear plant and, also, the implementation of the new large combustion plant directive in that period of time.

The picture is slightly more complicated than that so we then took account of plant that had planning permission or was being constructed over that period of time. When you factor that into the equation that gap reduces from 43 terawatt hours to 30 terawatt hours by 2015.

Over and above that, National Grid estimates include a further 31 gigawatts of electricity capacity planned over that same period but with no planning consent, so projects in the early development stage.

Taking all that into account in fact there is a very slight surplus in terms of electricity demand United Kingdom (UK) wide. We thought it was quite reasonable to assume some delay in some of the build out of some of that kit and also a drop out of some of the plans which were yet to receive planning application or were still in development. We applied a 10% delay factor in projects which were in the pipeline and had received planning permission and a 25% drop out rate for projects which were pre-planning.

With that in mind we then extrapolated the position forward to 2020 on the build out rates which we had in the seven year plan and that gives a gap of 7.5 gigawatt hours nationally by 2020. We are really trying to capture the importance of infrastructure in the system or in the early stages of development being delivered. Also the importance, from our perspective, of the programmes that were operating in reducing demand to alleviate that problem.

Murad Qureshi (Chair): OK, Peter. Thanks for giving us some idea of the methodology you adopted to get to the national figures. How did you apportion the energy gap for London? I saw a figure of 500,000 megawatts per hour by 2020. That is probably the second stage of your analysis.

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): That is right. 576,000 megawatt hours by 2020. That was based on the electricity share London has nationally. We just apportioned a London share of that national figure.

Murad Qureshi (Chair): OK. Does the Association of Energy Producers agree with that analysis?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): Let me explain. For us, the issue of an energy gap has been around for a while. Clearly we do not have one at the moment - the lights are still on - but it is a national issue. We have got this integrated transmission system so generation anywhere in the country can serve demand anywhere in the country. London is a good example of somewhere relying on generation elsewhere. Its local generation capacity is a lot less than its demand.

We have got a number of issues/challenges for us in the industry. First of all we have got a lot of plant closing. As we heard we have got coal plant closing in the next couple of years because of environmental legislation. Nuclear plant that is going to close as it gets old - and by 2025 all but one of our nuclear plants will have closed. Then we have got probably more coal and gas plant closing by the early 2020s because of new environmental legislation that is going to kick in from Europe. That is the first problem; we have got to replace that to keep the lights on.

The second problem is that we have got to decarbonise our electricity industry. There are some very ambitious targets to cut carbon dioxide (CO_2) emissions but also to increase renewable electricity generation to 15% of energy by 2020, which is about 30% of electricity compared to about 7% today. We have got to go even further in the decade after that because the Committee on Climate Change - the Government's advisory body on climate change - wants us to decarbonise the industry by 2030.

On top of that we have got probably increasing demand for electricity because electricity is going to be used more and more to help decarbonise other energy sectors like transport and heat through heat pumps and electric heating and electric vehicles. All this adds up to a lot of investment in new types of the plant, so renewables, new nuclear, carbon capture and storage - a new technology to get rid of the carbon emissions from fossil fuel generation - and gas-fired plant which will be necessary to cover the times when the wind is not blowing. It is a lot of investment. Nationally you are looking at £200 billion in the next decade in our energy sector - about £120 billion of that in generation. Then you have got even more in the decade beyond that. We have got this really significant challenge.

Companies do want to invest and, as we have heard, there is already plant under construction. There is quite a substantial pipeline of projects that have either got planning consent, in planning or have been

proposed, but to unlock that investment what companies need is certainty, long term certainty, and stability in the energy policy and in the energy market. At the moment we do not really have that because, in order to try to facilitate the sorts of investments that we are doing, the Government has decided to review the electricity market with the aim of reforming it. While that is welcome, while we wait for the outcome of that and the certainty that will provide - which should, hopefully, come with a White Paper this summer - a lot of investment decisions are on hold.

The other thing we need to unlock investment is money, quite simply. You cannot rely on a very small handful of companies to make that size of investment. We have got to attract new sources of finance. Part of the point of these reforms is to make the UK more attractive to global finance, but that has yet to be seen I think.

As an industry we are very conscious of this risk. We are planning to avoid it by investing in new plant. What we do is make and sell electricity but what it requires is for the Government to give us the certainty and stability we need to invest.

Murad Qureshi (Chair): To respond to that, it is interesting this week we have had the coalition Government come up with the fourth carbon budget. It is broadly consistent with the previous Government. It has not said how it is going to implement it; it has just set the targets and we will hear that later on in the year. Does that not give you sufficient security in terms of where the national picture is going and how it affects --

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): We know in terms of decarbonisation where the national picture is going but we do not have any, at the moment, certainty in the long term about carbon prices which will underpin investment. We do not really know what is going to happen to electricity prices because we are creating a very different sort of market in which you will have very spiky and 'troughy' prices because there will be times when the wind is blowing and times when the wind is not blowing. If, for example, you wanted to invest in a gas fired plant - which is traditionally the cheapest and quickest thing to build - you are going to put a lot of money into that and it is going to be around for several decades, you want to know now that you are going to get your money back. If you cannot know how that plant is going to operate beyond 2020 because you do not know what the picture is in terms of the market, then you are not going to make that investment.

Murad Qureshi (Chair): Could you also give us some indication of the £200 billion investment that the industry thinks is required to keep up with the demand levels and what effect that is likely to have on energy prices? The bottom line is Londoners have been hit by one price hike already at the beginning of the year and there is going to be a second one later on in the year which is already being absorbed within inflation figures at the Bank of England. Most of it is going to be raised on energy prices which people are going to pay to get the investment done. You are not going to get public subsidies are you?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): Yes, the subsidy will have to be recovered from somewhere. I think, in its recent report on renewables, the Committee on Climate Change said that to support renewables to 2020 would add two pence a kilowatt hour to the price of electricity which translates to about £50 to £60 on a household bill. It also said that that could be offset by domestic energy efficiency measures. We are very conscious of the cost to consumers and cost effectiveness and keeping the cost down has got to be key to all this, but there will have to be some way of delivering this investment and someone has got to pay for it.

Murad Qureshi (Chair): Alastair, just so you are aware, we have already looked at the demand side through the Mayor's Office, so we are not going to be concentrating on that today. It is just the supply side this morning.

Finally I will ask the industry if the figure for London is one that you broadly agree with and does London have any particular problems? You said we do not export energy; we import it. Apart from that, are there any other considerations we should take on board?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): I have not done my own calculations on the figure but based on a share of national demand then I am sure that is reasonable. I suppose what is important for London is to make sure that it is playing its role in making the UK an attractive place to invest in energy. There are lots of opportunities for London in terms of jobs, skills and the finance community here and making use of the opportunities that exist for local generation which will mainly fall, I imagine, on the heat side because this renewables target is not just an electricity one; it is an energy one. That is going to require decarbonisation and renewables in the heat sector and also the transport sector.

Mike Tuffrey (AM): Some factual questions. Peter, in terms of the projections, what did you assume in terms of growth of demand in coming up with this gap?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): The growth was based on UK projections. I do not have them to hand. It is the DECC projections going forward of an electricity peak.

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): The Office of the Gas and Electricity Market (Ofgem) puts forward - I forget the paper - a fairly steady and low increase over that period on current peak electricity demand.

Mike Tuffrey (AM): It is a national figure?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): It is a national figure.

Mike Tuffrey (AM): If London was growing faster than the rest of the country that just gets averaged out? OK. My second question was this gap of 576,000 megawatt hours. What is that in terms of a typical - not that there is a typical - power station?

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): Alistair might correct me but it is not a huge gap. The important thing to note is that this is an illustration. All we are really trying to demonstrate is that this risk exists. Kingsnorth, for example, is many times bigger than --

Mike Tuffrey (AM): Kingsnorth. That is the big coal one.

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): Yes. That would be six or seven terawatt hours it can generate a year. Something like that.

Mike Tuffrey (AM): Then a question for Alistair: in terms of the size of that gap, if that is not even one power station, should we be alarmed at that gap? What does that gap say to you as an electricity producer? That calculated gap. That notional gap.

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): We can run these figures a number of ways. It is entirely dependent on what assumptions you make about what is going to come on and what type of electricity generation you are going to get. From a national perspective it is right to be cautious and right to be concerned.

If the point were just keeping the lights on, if it were, "We've got to invest to replace the plant that is closing" that is not so demanding financially and the industry can probably deliver that. When you add on the other things, the decarbonisation, it becomes more of a challenge. That is the point.

Mike Tuffrey (AM): The real London gap is the gap between what we generate in London - which is diddly squat because it is a city and not a place where you build a power station, although we used to have power stations along the Thames - and what we need. That is the big gap so this notional gap is

our share of a national gap. Nonetheless, it is helpful for folks in the debate. I wanted to get some sense of how big a risk London is at if Government does not sort this out.

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): The important point there is that gap we have illustrated is an assessment of a number of things which are yet to be funded anyway, so we are saying that is a portion of the number of things that are yet to be funded. You could argue that in fact the gap is all of that because none of that is, as yet, funded.

Mike Tuffrey (AM): London's share of the national gap is bigger. Yes, absolutely. That is helpful. Thank you, Chair.

Murad Qureshi (Chair): Are there any more questions on the size and the nature of the energy gap in London? No? OK. Can we move on to plugging the gap and whether renewables can do that? We are going to start this section of the discussion with a presentation from Richard [Rigg] about the London Array scheme - the wind farm in the Thames Estuary. I just hope you are plugged up as well and that your presentation will go live!

Richard Rigg (Project Director, London Array): Chair, I hope so! Let's see how it goes across. The very first slide I am afraid has a couple of glitches and I think it is to do with City Hall electronics, rather than the presentation. We are missing the DONG and Masdar's logos.

London Array is a consortium of these three companies; DONG Energy, with 50%, a Danish company and E.ON, 30%. -the link there to the UK is that they bought Powergen and Powergen was one of the original members of this project. The Masdar initiative from Abu Dhabi with 20%. My role in this, as Project Director I do not work for any of those companies; I am an independent. Of course that means my focus is on this project and I am not involved in the politics of the various companies etc.

I thought it would be useful, bearing in mind the topic today, to have a quick look at the Crown Estate's involvement in offshore wind and the various rounds of offshore wind so far and in the future. Round 1 was really the trial round. Small wind farms, generally ten square kilometres, 30 turbines, though some of them were combined to make rather larger wind farms. All of them are very close to shore.

Round 2 - and London Array is a Round 2 project - introduced much larger wind farms. London Array will be 1,000 megawatts when fully complete and, even now, would be the largest offshore wind farm in the world when it is complete. You can see London Array is the middle one in the Thames Estuary there.

The right hand slide shows the various Round 3 areas, the zones, that are now being developed by various consortia. You will see that it is an enormous area of seabed that is being developed. That is really where the future possibility of meeting any energy gap from a renewable point of view is based. As I go further through this you will see that the challenges are absolutely enormous for that and the timetables may be longer than people hope.

London Array, the location in the middle of the Thames Estuary, was effectively chosen for us by the shipping. What you see on this slide are radar shipping tracks. This was part of the environmental statement. The bit in the middle there is the site of London Array, between the main shipping lanes into London and across to the continent. Interestingly, one of the problems we have had is with the red throated diver, a bird that winters in the Thames Estuary, and its favourite spot to winter - you can imagine when you look at that - is exactly the same place that we want to put our turbines. That is why we have a two phased project. The first phase has been given the go ahead. The second phase depends upon the satisfaction of various studies that we are not going to cause adverse effect to the population of red throated divers going forward.

In this project overview just a quick summary of the project itself and a little look in the inserted map of Round 2.5. I have mentioned Rounds 1 and 2 and I also mentioned that Round 3 offshore has got quite a long gestation period purely because of the size and the difficulty of those projects and the distance

offshore. The Crown Estate has tried to bridge the gap. When you have built up an industry for Rounds 1 and 2 you do not want the industry to fade away before you start doing Round 3. It wanted to keep the supply chain operating and built up so that when Round 3 came though the UK could perhaps do a lot more itself on Round 3. What you see there, in that top little map, are the green bits are the extensions of the Round 2 and 1 projects that are proposed. Thanet 2 has been dropped but the Galloper wind farm will be as big as London Array when it has been extended by this bit. Thetimescales - probably 2015, 2016, 2017 as the dates for those extensions to come on line.

Looking at the project itself, you will see that we have a 50 year lease from the Crown Estate. We have a lot of real estate which we can use. We will not be using all of that. The bottom left hand corner of the London Array bit of the map you can see has been left clear and that is so that we do not cause problems for navigation radar. We cannot use that area; we have had to back the turbines off. There is a junction there between two main shipping routes so we have to move the turbines back from that point.

We had the investment decision for the first phase - 175, 3.6 megawatt turbines, so 630 megawatts - taken in May 2009. Since then we have set up our construction and operations and maintenance headquarters in Ramsgate. We have an onshore sub station just outside Faversham - Cleve Hill. Offshore construction vessels are largely operating from Harwich, apart from the cable contractor who is working from Sheerness. As I mentioned, Phase 2, is subject to a go ahead - and we are reasonably confident we will get the extra 370 megawatts.

This slide should give you a feel of the elapsed time for the project. London Array has had one or two hiccups. Its first hiccup was when the local authority rejected the application for the sub station onshore. That added a year to the project's timescale because we went through a public inquiry. Then, as you might remember, Shell very publicly sold up its share in London Array and, as a result of that, we missed our grid connection date. Some of the stuff we had to do to qualify for a grid connection, we missed that so that pushed it back by another year. What was expected to be completed in 2010 is now expected to be completed in 2012.

There is a little comment in there about budget assistance for Round 2 projects. That is really quite important. At the time we were coming up to make the financial investment decision there was a move from one Renewables Obligation Certificate (ROC) to one and a half ROCs for offshore wind as an increase in support but, for certain projects in Round 2, including London Array Phase 1, that was upped to two ROCs. They were at a certain stage. There was a major shift in exchange rate between the pound and the euro and the bulk of the cost was in euro. I think it was a 40% move at that particular point. The decision was to give those specific projects two ROCs per megawatt hour. Without that extra half ROC London Array would not have gone ahead. It was that close. The final two points to mention there. We started onshore in July 2009 and we started offshore this March.

This gives you the overall schedule. We are now in quarter two of 2011, so the onshore sub station and foundation installation is underway at the moment. During the course of the summer we will put in the offshore sub stations and the first two export cables. The little triangle, three down, is the critical thing. That is our grid connection date. After that we can start installing turbines and powering them up. Purely by coincidence, there will be something like 100 turbines operating at the time of the Olympics.

This is an artist's impression of the onshore sub station and the cause of the public inquiry. It is probably unique in the sense that it went through a design competition and this is the result of the design competition. One of the thoughts was that we should try to replicate the beach huts. This is only 700 yards from Seasalter Beach. I am not sure that they have managed to do that but certainly it is a very imposing sub station and a very orderly one. It was on the basis of this design that we got our go ahead. It is a full size new sub station with a National Grid element to the top of the picture there - the buildings up there - connecting into the 400,000 volt overhead line. Going back to the earlier part of the conversation, this would be coming into London. Power from here could be coming into London via the National Grid.

Now a quick rundown through what is happening at the moment. What you have here are monopiles and the transition pieces that sit on top and the turbines go on topof that. These are manufactured in Germany and Denmark and this, actually, is the first large load of these being towed across from Aalborg in Denmark about a month or so ago. Two months ago now. That white blob on the top of one of them is the radar that we have to install to keep an eye up and down Black Deep and Fisherman's Gat for navigation radar purposes.

The picture on the right is one of those monopiles in what is called the gripper on the installation vessel and just down in the right hand corner you can see the top of the hammer itself which goes on to the top of the monopile to drive it into the seabed. The monopiles can be anything between 35 metres and 70 metres long and weigh anything up to 500 tonnes or so. There is a finished article on the left hand side and that was our first foundation installed on 8 March 2011.

The main installation vessels that we are using; the Sea Worker, the one at the bottom, was at the time of doing that first monopile at night. That is a jack up vessel which has to be towed into position and then jacks itself up. The more important one is the one on the right and that is the Adventure. She is seen there in Grand Harbour, Valetta, having just managed safely to come past Somalia from China where she had been constructed. She arrived in Harwich on 9 May 2011. She is now in Teesside mobilising and the first foundations that she will put in will be in June 2011. Then the two ships will work together to install foundations.

These amazing things are the transition pieces for the two offshore sub stations. All those tubes are J-Tubes up which the cables go, the Array cables and the export cables. You can see the size of them by the size of the individuals at the bottom there. That was them being loaded out in Belgium to come across. That is the first one actually being installed last Friday. If the weather stays like this - and I really hope it does - then the second one should be going in, the monopile first and then the transition piece, over the next two days.

This picture is not very clear I am afraid. The scaffolding is being removed but you have the two offshore sub stations - the top sides - there. They weigh about 1,500 tonnes each. Again, you can get a feel of the scale - there is a man down in the bottom of the picture in a yellow jacket. Those are plonked on top of those large structures you have just seen.

We must not forget cables. They are absolutely the lifeblood. They are also, usually, the biggest problem. They are the most easy things to damage in the course of construction or to put an anchor through or something like that. Certainly insurers see cable installation as the area where they get most claims during a construction project for offshore wind.

What you have there are the three main vessels that we will be using. The Stemat Spirit at the top there carries 54 kilometres of cable, and no joints, from the wind farm right up to that sub station. That is by far the heaviest item for the wind farm at 4,600 tonnes. Just one continuous cable. In total there will be four of those. That vessel is very good in the sense that it can beach as well as go into deep water so it can do the full length of the cable. Then we have 200 kilometres of cables joining between the turbines and the sub station.

Finally, the turbines themselves; This is a fairly standard size now for offshore; about 3.6 megawatt. The next generation will be 6 megawatt and 7 megawatt. We put it there against the London Eye to get a feel. So 175 of those is a fairly major site. They are 600 metres apart in one direction and 1,000 metres apart in the other direction so ships can go between quite comfortably. Nevertheless, it gives an idea of the scale I think.

Just to sum up then, we have a two phased project. The first phase is 630 megawatts; the complete farm 1,000 megawatts. The investment is 2.2 billion euros for that first phase; that is just under £2 billion. Going back to the earlier comment about terawatt hours, you can see that that first phase will be 2.5 terawatt hours itself. The target completion is December 2012 and we are on target for

December 2012. There is a long way to go yet and weather can have a big impact on this. Homes supplied will be 470,000 odd for the first phase. CO_2 reduction will be 900,000 tonnes. The wind farm is about 100 kilometres from where we are now.

Murad Qureshi (Chair): Thank you very much, Richard, for that informed presentation. We have been trying to get information on London Array for a little while. There are two things I have picked up: how busy the Thames Estuary is, from your earlier slides, and how much of the kit is coming from abroad. I will leave Mike to lead on the questions here.

Mike Tuffrey (AM): A couple of factual things first. I think it was 750,000 homes when the whole thing is completed. That is measured by a typical electricity need for a domestic home?

Richard Rigg (Project Director, London Array): Yes, it is.

Mike Tuffrey (AM): We are talking about a bit less than 20% of London's needs?

Richard Rigg (Project Director, London Array): It is based on an average annual household energy consumption of 4,478 kilowatt hours and a particular load factor that we have assumed for the wind farm.

Mike Tuffrey (AM): It is clearly very sizeable if one just sees it from a London perspective. I liked your 100 kilometres from City Hall; it is just down the river! Then I was interested in the financing. You mentioned Shell dropping out. It is noticeable that it is a Danish company, a German company and a Middle Eastern company; the three you have put up there. In terms of the national scene of moving towards renewables, you said that you were not involved in that side, but do you have any comment on any lessons from what you have been through for a national situation in terms of funding and partners?

Richard Rigg (Project Director, London Array): If we start with the particular. The two large shareholders are actually doing this project on balance sheet. Interestingly, Masdar, the one you would not expect is the one who is looking for bank financing. Certainly up to this stage the finance would not be available for an offshore wind farm of this scale very readily from the finance markets. Refinancing, when the wind farm is built, is a totally different issue. To get it to that stage it was generally - I am not quite sure how far it has changed - difficult to raise that sort of money through project finance. As time goes on it will have to happen, otherwise the investment will not take place.

Mike Tuffrey (AM): OK. That takes us beyond our business today but we are sitting across from the City of London and it has come in for some stick recently so certainly I would hope that it steps up to the plate in terms of helping.

Darren Johnson (Deputy Chair): In terms of the 2016 completion date, will that be maximum capacity by then for the wind farm and you would have to look at other areas, rather than try to squeeze anything more into this particular project?

Richard Rigg (Project Director, London Array): 2016 is on the assumption that the second phase goes through, which we hope it will. We would very much like to be able to expand a little bit further north but that part of the seabed is occupied by aggregates licensees for the Crown Estate and until those aggregates' licences are - I am afraid one of them is an ever green licence so it is going to be quite a long time before that sort of area might become available. We were interested in that area to be part of Round 2.5 as well, but I am afraid those licences prevented us from expanding further north.

Darren Johnson (Deputy Chair): So, effectively, if you wanted to expand you would be looking at completely different areas, as we saw on the original map at the start?

Richard Rigg (Project Director, London Array): That would be a different project and possibly even a different consortium.

Darren Johnson (Deputy Chair): That is helpful. Thank you.

Mike Tuffrey (AM): In which case we have got a set of questions for all our witnesses around the potential for renewables to close this gap that we were talking about in the first section. The first question is around the UK Government's 15% target and an assessment of whether that is likely. Let's start with Alastair and then get comments.

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): It is clearly challenging but it is also achievable. Certainly on the electricity side the industry is planning to achieve it. To do that we need to deliver some very big projects on time. Richard mentioned the Round 3 projects. They are much further out at sea than yours - newer engineering challenges there. Delivering those on time - there are risks there. Again, it is about clearing away all the problems that we face now. That is up to Government to bulldoze out of the way all the barriers so that we can do this and focus on delivery.

On the energy side there is also in heat quite a lot of challenges as well around delivering renewable heat because that is about going in and retrofitting boilers and that is quite difficult to do compared to building wind farms or whatever in one place.

Mike Tuffrey (AM): We have talked about wind but there are other renewable technologies. Can somebody give us an indication as to solar and wave etc?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): Yes. To meet the 2020 target wind is going to be very important - we just talked about that - both offshore and onshore. Increasingly biomass generation as well: burning wood and that kind of thing. There are a number of proposals for biomass plants and, potentially, even converting some of our existing coal fired plants into biomass plants. Technologies such as photovoltaics (PV) will play a relatively small role until 2020 I think. We are talking a couple of percent. Then the marine technologies, the wave and tidal, where you are really looking slightly longer term. They are about to enter the demonstration phase and you are probably looking to the 2020s before they have a really big impact.

Mike Tuffrey (AM): In terms of other barriers and removing barriers, you talked about uncertainty about the regulatory framework and particularly the price of carbon. Presumably that is a reference to the basic cost of other energy sources? With oil at US$100 a barrel - and in the medium term projections nobody is expecting that to go back down to the figures that we used to see - is the normal projection on the price of other energy sources likely to make renewables in themselves economic, or does one need to have these mechanisms for pricing carbon to make them effective?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): There will come hopefully, and there should come, a time at which renewables become cost effective with other technologies. If you look at the economics at the moment, gas is the cheapest thing to do. Then maybe nuclear and I am sure wind and then other technologies are about bringing the costs down so that, in the long term, they are effective. At the moment, on the basis of fuel prices and carbon prices alone, that is not enough to incentivise these technologies so we need this additional support.

One of the issues we are facing at the moment is that, in an effort to ensure cost effectiveness, the Government is continually reviewing these support arrangements and what we need is some stability there so that the industry can see what it is doing and just get on and invest.

Mike Tuffrey (AM): Yes. OK. Moving then on to what role London or the GLA can play in this, what actions would you like to see the Mayor take to support renewable generation? I am not talking about the decentralised stuff - we are coming on to that in a minute. The obvious one for me - which has been knocking around for quite some years - is the London Underground which has a very predictable energy demand. I still do not understand - despite having asked questions for as long as I have been here which

is ten years now - why we are not using the certain purchasing power of that to kick start some additional renewable supply. Let's ask Peter as to why haven't we cracked it yet?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): I know the London Development Agency (LDA) is currently working with Transport for London (TfL) to explore how it might do that. I do not have the details I am afraid to hand but I am happy to come back on that point if that is OK.

Mike Tuffrey (AM): The problem is that is the answer I have had since about 2002. In other words, "We're looking at it. We're working at it".

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): It has been exploring a range of options. I can come back to you.

Mike Tuffrey (AM): I did not give you notice so that is fine. Can anybody then give us a broader perspective, away from the underground, as to things that City Hall can do to help on the renewables area? As I say, other than the decentralised route. Are we just dependent on central government doing its stuff? Silence!

Richard Rigg (Project Director, London Array): It is very difficult.

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): I guess the thing with City Hall is we have got limited regulatory power in this respect. Where we do have some regulatory power is through the planning system but that can only stimulate demand and supply for large scale decentralised energy and micro generation within London. Beyond that, it is really our capacity to set out the implications for London and to work with Government to ensure that it puts in place a regulatory framework that can provide London with low carbon, low or stable cost electricity and heat.

Added to that we are currently also doing a piece of work which is looking at renewable and decentralised energy potential capacity in London. It is updating a table. In fact we had the London Plan taking account of physical constraints for certain technologies and also economic constraints. That would give us a much better picture of what can be delivered there. I am sure Wayne [Hubbard] will go on to talk about the opportunities for waste in a moment. That would give us a greater accuracy of information as to what technologies can be deployed and where. We are looking to publish that with the Strategy in the summer.

Richard Rigg (Project Director, London Array): On that particular point, if you are going to decentralised generation I have a firm belief, a personal belief, that every little bit helps. If you can encourage micro generation for a raft of different means it will all help to chip towards the target that you are looking for. Every megawatt hour or even 50 kilowatts that you save importing off the National Grid also means that there are not the losses that happen as the power comes down through the National Grid to the local area. If you combine that with energy saving, which you are doing to the maximum you can, you might be able to make a noticeable difference, rather than perhaps a significant difference. I think it would be well worth doing. That probably is the sort of thing you are looking at in your report.

Mike Tuffrey (AM): Absolutely. OK. From a London perspective there is the demand reduction side which, as you said, we have been looking at in terms of energy efficiency, and then there is the local stuff which we are going to come on to. I suppose I am still just fishing. The Array was not a London-led scheme but clearly because of the proximity and your point about the transmission losses, there is a sense of affinity that it is close to us and it will cover 20% of our electricity demand, or thereabouts. There is no other technical big solution like that that we ought to be championing? We clearly do not have the £2 billion to invest and it requires national regulation, but are there any other big schemes that London ought to be championing or lobbying central government to get moving?

Richard Rigg (Project Director, London Array): I do not know what might come out of looking into this but has the river been looked at really effectively as a source?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): The river has been looked at as part of the renewable capacity study I was talking about. We have explored a whole range of renewable --

Richard Rigg (Project Director, London Array): River generation?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): Yes.

Richard Rigg (Project Director, London Array): A tidal equivalent being operated in the river?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): We have looked at the river within the constraints of the Greater London boundaries.

Mike Tuffrey (AM): Although your comment reminds me that I did see the Environment Agency presentation a few years ago in terms of flood protection, or rising sea level protections, a Thames barrier but out down the estuary which would both protect from flooding and generate electricity on a Severn barrage type thing but nothing on that scale. It was 50 or 70 years out and the economics are pretty - never mind the environmental impacts. Other than that sort of big scheme there is nothing else that our witnesses say we should be doing?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): We will come on to waste later but I think waste will play a significant role in provision of renewable energy for London. It will not be in one or two big installations; it will be a plethora of small to medium sized installations - a bit like the chipping away approach - but the combined scale of those installations will be about half of the renewable energy requirement that the Mayor set up. It has the potential to be quite significant. Of course the London Waste and Recycling Board can play a reasonably significant role in helping to encourage those kinds of facilities to invest in London. Maybe we will come on to that in a bit more detail later.

Murad Qureshi (Chair): Just before I hand over the area of decentralised energy to Roger, I just had a few questions. To what extent are transmission costs an issue from other parts of the country? I say that because some of us - the last time I was chairing the Committee - did pay a visit to Scotland and it seemed to be quite a live issue up there. They saw the exporting of their renewable energies to the rest of the British Isles as quite important. Alastair, do you have a view on that? What can be done there from a regional perspective on the national context?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): It is still a live issue, very much so. There is currently a review underway of transmission charging. It is an issue also that divides the industry depending on where you are plugged into the network! If you are based in Scotland at the moment you pay a lot more than if you are based down south near the demand. The general flow of the network is from north to south. It is a difficult issue. As I say, there is this project going on, led by Ofgem, to review it and then come to some sort of solution.

The issue here is, of course, for all the wind farms etc that want to connect in Scotland, they feel they are being penalised having to pay more to connect up there, where the resource is.

Murad Qureshi (Chair): It seems it is one of the ways of plugging the gap on the renewable front. The final thing, Richard, in your presentation. I take on board your points about the structure of London Array. Is there anything to interpret from E.ON closing down the proposal in Kingsnorth and, effectively, moving its investment into London Array? Is that significant? Does it show where the energy companies are going potentially or is it just down to unique features in London Array?

Richard Rigg (Project Director, London Array): I think the two decisions went absolutely in parallel. They were not linked.

Murad Qureshi (Chair): They were not?

Richard Rigg (Project Director, London Array): Though, of course, Kingsnorth was hoping, I think, to be the first to have the carbon capture and storage. For whatever reason that did not materialise.

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): I believe the official word on Kingsnorth was that, because demand fell as a result of the recession, it was no longer a viable project for the near future.

Murad Qureshi (Chair): OK. It is demand related. That is useful. Can I now move on to the next area of questioning which Roger will lead on; the role of decentralised energy?

Roger Evans (AM): This is a question really for Peter and the Mayor's staff. The Mayor has a very ambitious target for 25% of energy to be produced from decentralised energy sources. Can you tell us how you are going to achieve that?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): I am going to pass it over to my colleague, Ross Hudson, who, as well as leading on Low Carbon Zones, is also our lead for decentralised energy.

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): The first thing to point to is the renewables and low carbon capacity study that Peter mentioned earlier which looks at the large scale and small scale decentralised energy generating capacity within London and looks towards the 25% target, though not explicitly with the 25% target in mind. It really looks at what that capacity could be and the constraints that then limit that capacity.

What that study appears to be showing is that the largest potential within London is from the larger scale stuff, so the use of gas fired combined heat and power (CHP), waste, heat, waste to energy sources, biomass and those kinds of things to a significantly greater extent than most of the micro generation technologies.

There are a number of areas of uncertainty but, in terms of those projections, one key area of uncertainty is around air source heat pumps that comes back to the greater use of grid electricity for heat and the use of air source heat pumps. There are lots of technical issues and delivery issues with those sorts of heat pumps as there are with the other heat provision technologies, for example district heating fed by the sources that I have just described.

In terms of delivering the targets, the capacity is there - as this study will be demonstrating - but actually making use of it has lots of issues around it, many of which are similar to the infrastructure issues at the national scale. With district heating infrastructure, for example, you have got the problems of digging up the roads. The main capital cost of these projects is getting the pipes in the ground.

In terms of our programmes, our programme for decentralised energy, as with all our demand side programmes, is really around stimulating the market. We do not have the resources, particularly financial resources, from here obviously to deliver that target ourselves. It is around market creation where we can do that and that is what our colleagues at the LDA have been trying to do.

In the first instance it is about identifying the opportunities and that is what the London heat map and the decentralised energy master planning programme - which is around supporting boroughs to identify opportunities for large scale decentralised energy in their areas - have been about. It is about creating that pipeline of projects and the commercialisation then of those projects, such that they become

investable, either by public sector or by the private sector. For example, projects might be offered up to the London Green Fund where they are not immediately attractive to private sector investment.

We are almost certainly going to get a tranche of money from the European Union (EU) for a project team to take forward some of the projects that have been identified and to offer them up for investment. That is the European Local Energy Assistance (Elena) team.

A number of projects have been identified. Our bid to the EU identifies, I think, eight immediate projects and then a further seven projects that have been identified through the decentralised energy master planning programme. Those projects, if they come to fruition, will only deliver a small percentage of the target. I do not have exact figures. It really is about creating the precedent, creating commercial templates and creating the market for decentralised energy, particularly led by the provision of heat.

We are acutely aware that we cannot do this by ourselves and we need commercial investment but, probably more importantly, we need regulatory reform. The Government needs to help us create a market for heat through incentive mechanisms and through reform of electricity licence arrangements as well.

Roger Evans (AM): Are you saying that, without that reform and the commercial investment, then a 25% target is unrealistic?

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): I would not like to say whether it is any more or less realistic than, for example, the Government's renewables target. Both require the right regulatory and incentive framework to bring those markets through. The capital investment is not going to come from the private sector without that certainty.

Roger Evans (AM): Alastair, I think you are the industry expert. How realistic does this look from your point of view?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): Decentralised energy?

Roger Evans (AM): A 25% target for London.

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): I would agree; it is one of these things that can be done if you want to do it, essentially. There is going to be more scope for decentralised energy and particularly in heat. Heat is, by its nature, quite a local thing. These opportunities will only be realised where they make commercial sense. You cannot force companies to invest in these things. You will find, with renewables, more decentralised energy going on. That is going to change the nature of the distribution network in some way. It is not going to be able to do everything. You are still going to need the large scale generation.

Roger Evans (AM): You talked about commercial demand and things being commercially viable. Surely, if this sort of thing is not commercially viable in a city like London where you have all your customers sitting on top of each other, then it is not going to be commercially viable anywhere?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): Yes, but there will be costs there. For example, if you are thinking about a district heating network, the cost of putting all these pipes in, unless you can be sure that you have got customers there for a long time, you are going to want your product - for example, if you are building --

Roger Evans (AM): They are not going to move away are they - or, if they do, other people will move in?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): That is true. As somebody who is developing something that generates both heat and power you have got a trade off between the heat and the power. If you are going to do that, given that non renewable heat is not currently really supported by any financial incentive mechanism, you need to be sure you are going to make up the difference between what you are losing on the electricity and the heat side.

Roger Evans (AM): Peter, can I ask you about other barriers to decentralisation? A little while ago the Mayor and my colleague, Mr Cleverly, attended the opening of a gasification plant in Rainham, in my patch actually. I was not there because it was not necessarily a good news story in that it had been opposed vociferously by local residents when the planning applications came through and it had been a big fight to get it built. Are your projects, your 15 projects that you talked about, dependent on planning permission and have you factored in possible delays or refusals of permission to your plan?

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): I do not have to hand the details on those projects but all those obstacles will need to be overcome on all those projects and there will be local issues and local planning issues.

One of the things that we are trying to do through these programmes is to demonstrate how these projects can be brought through planning. The projects that are being brought through in the Thames Gateway, for example, one of the key things we are trying to do is work with the local authorities to develop borough-wide local development borders which create planning consent without a planning application for the heat network infrastructure.

What you are talking about really is more around the generation of infrastructure as well. I think that is more of a perception issue possibly as much as anything and that probably needs to be tackled as well.

Roger Evans (AM): OK. We have identified the commercial viability, changes to regulation and the planning process as possible obstacles to the plan. Are there any other significant obstacles that we need to be aware of?

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): The projects that we are talking about are technically proven. There are a lot of European cities that have heat network infrastructure as the primary source of their heating. There is huge latent demand in London, the building density that you described earlier, so it really is about the appropriate regulatory framework, particularly the heat market framework and it is about electricity market reform and licence reform that allows local generators of electricity to sell electricity at retail prices through the local distribution network. That can dramatically change the economics of schemes and it is something that colleagues at the LDA have been leading, on in terms of driving that through Government, and are having some success with.

Then it is about cost of capital and the attractiveness of the initial capital investment and that, again, comes back to the security of that long term demand. That is the key reason we are working with local authorities, local housing providers and public buildings because they can provide the long term anchor heat demands for these projects. Projects are coming through: the Royal Free Hospital, the Olympic scheme. There is real potential there.

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): There is a technical capacity issue too. There are some key players in this and their ability to drive forward some of these projects - which was the philosophy behind the Elena bid we put in and were successful with - to enable us to provide that support on projects in terms of technical issues, finance structuring and structuring of delivery vehicles for these kinds of projects. We have identified that as an area where the capacity is not really there and it needs to be built up. That is the approach we are taking to do that.

Roger Evans (AM): You said a little while ago that you are doing work with the LDA on this. Is this project safeguarded with the move of functions from the LDA and where will that sit after the LDA has gone?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): Yes, it is safeguarded. The team working on this at the LDA forms part of the climate change programmes unit over there and they are being folded in, I understand, over the summer. As I mentioned, the funding we have secured through the European Investment Bank which is 3 million euros over three years will effectively allow us to continue that work.

James Cleverly (AM): Peter, the thing that strikes me is that decentralised energy production happens already. Most homes in London have got a boiler in there and we have incredibly inefficient micro generation. This Committee has done work in the past, as we discussed, about both the air quality implications and other implications of household boilers. Do you think we run the risk of missing the sweet spot between trying to move away from that ultra decentralised inefficient energy production, making a big jump to very large scale heat networks built on, to support still fairly significant scale energy production? Might there be somewhere in the middle where we are looking at smaller clusters? You mentioned about the Olympic Park. It strikes me that that ultimately will be made up of a series of clusters. Are we missing the opportunity to get decentralised energy, fairly moderate scale, centred around a cluster - it would probably be unfair to call it a heat network - of recipients?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): The reality is decentralised energy rolls out at a range of scale. For example, in the draft replacement London Plan we have a hierarchy of options so we ask developers to look at the opportunity to connect to a network if it exists and that goes down then to a site-wide solution as the bottom of that. I do not think that is excluded. The way it is being rolled out at the moment is that small, medium and large scale.

James Cleverly (AM): OK. Is it getting as much intellectual focus as district heating? I think it is a standing declaration that, as a Board Member of the LDA, I know there is a lot of talk about decentralised energy schemes, certainly in East London both north and south of the river. The scale of these things I always felt was prohibitive. I hear considerably less about those mid scale supporting decentralised energy production in some of the social housing schemes that the Mayor is promoting or using our planning powers or using our bully pulpit to encourage local planning authorities to be a little bit more aware - not forcing their hands - of the opportunities there.

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): Ross, do you want to add something on how we do that?

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): Absolutely. That really has, as a policy, been our primary focus. The LDA is doing both those things. Even the Thames Gateway heat network project would have been taken forward piecemeal so you are talking, for the most part, about smaller clusters that then link up at the appropriate time. The reason that we are driving towards scale is because, at that scale, you get greater efficiencies and you get greater carbon savings.

Nobody is going to invest in a massive pipe running right through the centre of London upfront so it does need to be built up by clusters. The decentralised energy master planning programme is working with boroughs to identify those local opportunities and to build the capacity within local authorities to take those projects forward, either themselves or to offer them up to the market. A lot of those are based around housing estates, around public buildings and around smaller regeneration areas. The projects that the ELENA team will be looking to build up will be at a range of different scales and a lot of them will be under these two to five megawatt engines so serving equivalent to 5,000 to 20,000 homes, for example, rather than a huge pipeway through the Thames Gateway in the first instance.

James Cleverly (AM): It strikes me that we are coming, hopefully, towards the end of a period of stagnation when it comes to house building. The economic climate has not been particularly favourable

and there has been a bit of a hiatus. That is, I would like to think, an opportunity to inject into the minds of property developers - my colleague discussed some of the barriers to decentralised energy and its efficient use - to make sure that where barriers do exist, where possible, they are stripped down so that when the tap does start opening up again in terms of private sector property development, not necessarily stimulated by the Mayor but just in London generally, small scale heat networks attached to decentralised energy production is part of it. I go through Lewisham every day on my way into work and there is now a very significant housing development right in the heart of Lewisham. I have not checked - and I know there are people around this table who are perhaps slightly more knowledgeable than me - but I am concerned, and I rather suspect, that does not have the most efficient energy production dissemination system. It is projects like that that I think we really need to break the back of.

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): We totally agree with that. We have had extremely stringent planning requirements, particularly on strategic scale developments, for a number of years. We have changed those to make them carbon driven, rather than tied around particular targets for types of measures. That is absolutely what we drive through the planning system. The reason that these new developments are so important is not just about reducing demand from those new developments but that they provide the opportunity in a lot of cases to get some of this key decentralised energy infrastructure in the ground and then to feed out to the existing buildings that surround those developments as well.

Murad Qureshi (Chair): Thank you. At this moment can I welcome Park Walk Primary School from Chelsea to the Environment Committee? If you are wondering what we are talking about, we are talking about whether there is an energy gap in the future and we just want to make sure there is enough energy for you to switch on the lights when you are adults. If we do not get that right you can blame some of us around here and some of the people over there! It is of interest to you although it may sound very boring and turgid!

Mike Tuffrey (AM): It is getting boring and turgid because I have been sitting round this table with people talking about the potential for decentralised energy if we get the economics right - agreed - and if we get the regulatory regime right. Ross, you mentioned that. What are the regulatory problems and why have we not fixed them, given that there is a White Paper coming and given everything seems to change nationally on every other front? Why are we not getting this fixed? What are the regulatory problems to make this happen in London?

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): The issue at the national scale is DECC clearly has a national focus. It has a predisposition to looking at large scale electricity generation and then everything else has tended, thus far, to sit around that. Alastair talked about the absence of a properly constructed heat policy, for example. There is an assumption, I think, within parts of DECC at the moment that heat production in the future will be about electricity, air source heat pumps and then biomass out in the countryside. Our analysis suggests that that is not necessarily going to work in London and it is not necessarily going to be the most cost effective solution in London. I guess what we would love but we are unlikely ever to get would be some kind of capital support for putting the heat network pipes in the ground.

Mike Tuffrey (AM): I am just talking about regulatory framework that will unlock the underlying economic reality, rather than coming cap in hand for subsidy because nobody is getting any subsidy.

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): There are a few things. There is an incentive framework like the renewal heat incentive which we think should probably be opened up to low carbon heat as well. I do not think that is likely to happen but that is what we pushed for through our consultation responses and through our lobbying. There is the electricity licence reform for small scale generators that I mentioned earlier. Those two things really are key.

I must also mention the electricity market reform proposals that Government is thinking through at the moment. This is this idea for a large scale feed in tariff really for low carbon electricity generation. Our position is that that should support demand side measures as well. That really would help a lot.

Mike Tuffrey (AM): Have we taken London's needs - they are probably not unique to London - to national government? What has been that process?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): We currently have a secondee from the LDA working for DECC part time in the heat team. That has enabled us to, it is fair to say, get our voice heard on some of these issues that face cities, not just London. That is starting to change the mindset. We are starting to see a change in DECC's approach. We talked about the emerging Heat Strategy. That is on the agenda - and some of these other reforms that are going through. This kind of thinking is being fed in by my colleague.

Mike Tuffrey (AM): What would be useful is if immediately after the meeting, in the next week, we could have a written something from you just setting out exactly what London needs sorting from national government because that may well feed into anything we want to say as a result of this study and each of us in our different ways has ways into the national scene to try to unlock some of these things, particularly if we are waiting for a White Paper. I am frustrated that we are here again, X years on, saying, "Oh the regulatory thing. I want those sorted".

Could I ask, specifically, what has gone wrong - again, I did not give you notice of this - in Elephant and Castle? If Nicky [Gavron] was here she would be telling us about multi-utility service companies (MUSCOs) and Energy Service Companies (ESCOs) and various other 'COs'. The Elephant scheme is going ahead. It is not 100 kilometres from City Hall; it is about two kilometres from City Hall. I understand the great prize of some sort of local energy thing has been scrapped. I do not know. Does anybody know the ins and outs of that?

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): I know the ins and outs of it. There still will be a low carbon energy solution at a location scale within Elephant and Castle. The planning system will require that. Obviously it is disappointing that the current commercial deal that was offered up appears to be not attractive to whoever was planning to invest in that infrastructure.

Mike Tuffrey (AM): There was Clinton Foundation money coming in. I am told that it is still sitting on its website as a live project even though it is not live. Again, I probably should not be going into a scheme that you have not had notice of but I am frustrated that the buck does not seem to stop with anybody on making this stuff happen. People talk about these schemes and demonstration projects and Bill Clinton [former President of the United States of America] flies into town to give out some money and everybody goes "ra ra!" and then it disappears. There seems to be no real gripping and making things happen. It is frustrating.

Murad Qureshi (Chair): That is useful. I will take up your suggestion, Mike, that we will do it under delegated authority to write to the Mayor to give us an update on what you think needs to be done on the national scene and we will take up your offer as well of getting through to Chris Huhne [Secretary of State for Energy and Climate Change]. I think that is what you were suggesting. I just hope he is still there!

One final thing that I wanted to ask on this section was one of the things that I always picked up which was going to be the big stimulus on decentralised energy was the feed in tariff. I have only come across one or two instances in the GLA group where that has been operative. It came into being in April 2010. It was one of the last things the Labour administration did. Is there a verdict yet on whether it has helped do what it was intended to do in the London context? It would be useful to hear from the energy sector because, presumably, it means a bit of competition on your part and how you respond to competition?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): I cannot speak about the London context on the feed in tariff. I do not have the figures. Nationally it has been successful and if you look at the figures the take up of PV has been pretty extraordinary. The trouble with the feed in tariff is that it has been too successful and the Government, because of the Spending Review, has had to implement cuts to the support mechanisms and now it is reviewing the levels of support for the feed in tariff, in particular at the moment for large scale PV. Not the stuff you have got in your house but the larger schemes. What you were getting was a lot of schemes being proposed covering fields in solar panels. Now it has put in place an emergency review for the levels of support there, slashing them really quite substantially.

Again, it is this problem of putting in place an incentive mechanism which has made lots of people sit up and go, "That looks like a very good return". It has encouraged the industry to develop but then it has changed the goal posts.

Murad Qureshi (Chair): Peter, is that the picture? In London we do have 350 farms. In places like Bexley and Bromley you will find a lot of them. Is that the same picture here in London?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): Alastair makes a good point. If you look at the feed in tariff it is a very similar scheme to what has been operating in Germany for ten years now. The first review of the pricing mechanism in Germany happened after ten years and we have reviewed it within the first year. There is something around that signal to the market and giving people confidence to invest. That is quite an interesting observation. It certainly has been successful. I seem to remember seeing figures recently that, in the first six or seven months, the amount of capacity installed UK-wide was something like the same as had been installed over the last 15 years. It was in that sort of quantum, to give you an indication.

Murad Qureshi (Chair): That is useful. James, that has prompted you?

James Cleverly (AM): Following up from that, Alastair, do you feel that the price set for the feed in tariff from the offset was too generous?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): I think there was a feeling in the industry, when the levels were announced, that they were unsustainable for PV.

James Cleverly (AM): Right. You mentioned what happened here. Peter mentioned what has happened in Germany. Spain went through a similar situation where it started off with incredibly generous feed in tariffs, realised that it was going to be financially unsustainable and then cut it, and they have now had the flipside where no one is building anything because even though feed in tariffs exist there is no confidence in the longevity of that. Do you think there is a lesson that we have got to learn here whereby feed in tariffs are like a puppy; it is not just for Christmas?! Conceptually it is sound but the tariff has to be set at a level which is attractive but not so attractive that it comically distorts the market. Covering fields just at the end of London with PV cells instead of brussels sprouts and peas is really not the direction that we want to go in.

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): I would agree. The big challenge in renewable support schemes at the moment is that trade off between providing appropriate certainty and providing cost effectiveness for consumers. The nature of a feed in tariff is that it requires the Government to set the right level of support and governments, traditionally, are not very good at that. The trouble with the feed in tariff is that you give lots of support, the industry develops, the costs come down and then you are paying too much. They have at least agreed the principles of grandfathering so, once you have already invested, then you continue to get the same levels of support, which is very welcome. As an industry we will have to have an ongoing conversation with central government around how does it best set these levels in a way that provides us with the confidence we need. In fact, the electricity market reform might provide a way of doing that.

Murad Qureshi (Chair): Can we now move on to the final area of our discussion this morning; waste energy.

Darren Johnson (Deputy Chair): We looked at this as a Committee previously and flagged up the potential way, particularly in terms of anaerobic digestion. Can you tell us what the London Waste and Recycling Board is doing to encourage investment in this area?

Wayne Hubbard (Head of Business Development, London Waste and Recycling Board): Yes. The London Waste and Recycling Board has an amount of money. It had an amount of money, over the last spending review period, of round about £58 million and has round about £20 million going into the next spending review period. Looking at the requirements for waste management through the Mayor's Municipal Waste Management Strategy, in the broader context of commercial industrial waste and local authority collected waste, we have targeted our investment in terms of infrastructure against those areas where more investment is needed. That has been particularly around anaerobic digestion (AD), a bit of thermal treatment, some waste fuel production and also reprocessing and recycling - which I appreciate we are not talking about today but that is the context in which we operate; on a whole waste lifecycle perspective.

In terms of the energy infrastructure - and I suppose infrastructure in general - our perception of the market is this. Because of the current economic climate infrastructure development is difficult and tricky. There is a lack of capacity of certainly bank debt and although venture capital has come into the system, because there is an opportunity for venture capital to take greater risk, there is still a capacity issue around that capital and it will obviously flow to those projects which are 1) wanted and 2) seem to be the least risky. Obviously there is a link between the two.

In terms of waste you have risks from the feed stock, getting hold of the feed stock, getting the right feed stock, the technology risks around waste, around anaerobic digestion and gasification and even around so called mature technologies like incineration there are massive risks. The scale of development is relatively small for AD and gasification plants compared to, for example, the kinds of things we have heard today. Banks are looking for big projects, not small projects, so they are less inclined to invest. We have talked about planning risk.

All these things that are applicable to energy projects are also applicable to those projects but I would say more so because, traditionally, waste has been a Cinderella service that takes place in the Shires and a hole in the ground as opposed to in London in a flashy piece of kit. Obviously we have got the two incinerators but that is about it.

What the London Waste and Recycling Board (LWARB) does is asks for projects that have some substance and that are almost ready but, for whatever reason, have failed to attract completely the necessary investment from the private sector. We look at those projects in detail and we pitch a small amount of capital to take some of the sting out of the expensive capital that they have probably got through a high level of gearing towards equity capital and we will offer that either as a debt structure or as a mezzanine structure sitting between equity and debt. We will typically structure those lines over a five to seven year period with an exit allowing the plant operator to refinance having demonstrated the plant's ability to deliver and source feed stock. Rather than a grant system using that approach we have been quite successful in attracting good quality projects from a range of different technologies.

Also, it is probably the kind of thing that the Green Investment Bank will be looking at in terms of how it will seek to inject capital into similar projects.

Darren Johnson (Deputy Chair): Alastair, do you see potential in this sector in terms of making a significant contribution to energy needs?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): In the waste to energy sector? Yes. If the fuel stream is there, why not use it? There are companies who are

certainly looking at doing that. One of our members is. The project you mentioned in Rainham earlier; one of our members is doing that.

Darren Johnson (Deputy Chair): Not all waste to energy can be regarded as renewable can it? It depends on what is going into the kit. Obviously anaerobic digestion, where it is vegetable matter and is not including any plastics or anything like that, would be completely renewable, but others would not be would they?

Wayne Hubbard (Head of Business Development, London Waste and Recycling Board): Absolutely. You have really got to the core of the argument. Traditionally waste management has taken an energy from waste approach which means a small amount of energy from the energy in the waste feed stock is extracted and, typically, around half of that is fossil fuel derived energy. It ticks the decentralised energy box in the sense that you have got a big piece of infrastructure but, at the moment, it is delivering poor carbon energy. The thing that you can do with mass burn is be a bit more selective about what you put in it, try to get your biomass content higher and extract the heat. Those are quite tricky things.

At the London Waste and Recycling Board we have to accord with the Mayor's strategy. The Mayor is setting out a principle that energy from waste should be at least as carbon intensive as the energy that it is displacing. The kind of technologies that we invest in can displace a range of different energy sources. As an example we are looking to invest in an anaerobic digestion plant seeking to do gas grid injections, so biogas injecting into the national gas grid to provide renewable gas for heating, displacing fossil fuel gas. Or it could use that gas as a transport fuel. We also hope, in future, to be looking at some innovative arrangements around, for example, the use of hydrogen fuel cells, either in stationary or transport applications.

Whereas incineration is quite inflexible, the kinds of things that we are looking at can be more flexible in terms of displacing more fossil-dense energy sources. Also, because we are investing in refuse-derived fuel production processes, one particular plant is Orchid, opposite the Belvedere incinerator. It looks to produce a range of different quality fuels up to waste-derived fuel with an 80% biomass content. They are pulling out the plastic through a mechanical heat feed in plant and reprocessing that plastic - which is what you want to be doing with plastic rather than burning it and releasing that fossil derived carbon.

Darren Johnson (Deputy Chair): Absolutely. Can you point to any projects that have come on line, or are about to come on line, as a result of the work of the Waste and Recycling Board?

Wayne Hubbard (Head of Business Development, London Waste and Recycling Board): We have invested in four or five projects but, in terms of anaerobic digestion, probably three projects that we have been involved in. One which is in the public domain is a project called TEG which is an AD plant and also has an in-vessel composting component - about 30,000 tonnes of anaerobic digestion capacity - in the sustainable industries park in Dagenham.

The way we get involved is we are in discussions pre-financial close. Once that deal is done and financial close is achieved then there will probably be a lag of around 18 months to two years before that plant becomes operational. We are at the stage of making these plants happen prior to financial close. It is a brave political decision by the Board I think because trying to make projects happen has a long timescale. These things do not happen overnight. The biosense plant, for example, was not an inauguration of the plant, but an honorary digging of the soil. That plant will actually open probably in about 18 months to two years as well.

Darren Johnson (Deputy Chair): So by 2015 then how many plants are we expecting?

Wayne Hubbard (Head of Business Development, London Waste and Recycling Board): From an LWARB perspective that LWARB has been involved in?

Darren Johnson (Deputy Chair): Yes.

Wayne Hubbard (Head of Business Development, London Waste and Recycling Board): Probably around four to five with a probable combined capacity of 150,000 to 200,000 tonnes.

Darren Johnson (Deputy Chair): What is the mix between different types of technologies with those four to five?

Wayne Hubbard (Head of Business Development, London Waste and Recycling Board): In tonnage terms they will be weighted towards gasification because the biosense plant is around 100,000 tonnes. In numbers it will be weighted towards AD but they will be of a smaller type so round about 30,000 tonnes.

For example, one of the plants that we have been involved in no longer needs our money so we have helped to evolve that business plan --

Darren Johnson (Deputy Chair): So you dangle the money and then you can take it away if they do not need it!

Wayne Hubbard (Head of Business Development, London Waste and Recycling Board): They found additional sources of finance because they had developed their business plan to such an extent that it has been attractive to the market, so our involvement has levered in that finance without us having to make the loan. It is a double-edged sword for us because we would like to claim the credit but we have not made the loan; they have gone to the market. It is a great result; we can use that money elsewhere. That is 100,000 tonnes of AD capacity in that one facility.

Darren Johnson (Deputy Chair): A bit like Mike on the topic of decentralised energy, we have been sitting here for the last decade now discussing schemes like this and the potential and when we will see things coming on line and so on. When do you envisage things starting to speed up so that these become a very significant part of our energy contribution and also become the rule, rather than the exception, in terms of how we deal with vegetable waste and so on?

Wayne Hubbard (Head of Business Development, London Waste and Recycling Board): I hate to disagree with you, Darren, but ten years ago we were not having these conversations. Ten years ago, as John Lennon said about Elvis, before LWARB there was nothing. We were not having these conversations. We are now having these conversations. We have got a plethora of waste schemes coming forward because of LWARB. Because of other things too but the development of waste in London has been held back because of the financial crisis, because of the lack of capital and because municipal waste contracts are really slow beasts to deliver.

You were probably referring to municipal waste authorities who were having these conversations ten years ago about starting to think about the start of a strategy that might, in three years' time, lead to a procurement process, that in five years' time would lead to a procurement and in another five years would lead to the development of plant. Whereas, at LWARB we can say, "We'll talk to the plant developer that in three years' time will lead to the start of that plant operating" and local authorities can then bid in through their procurement processes for access to that infrastructure, negating the need to go through these long unwieldy processes.

LWARB's proposition is that we would help to create numerous plants in and around London operating on a commercial basis that are not predicated on the back of municipal contracts that local authorities can bid into without the necessity of going through a public private partnership approach which requires the local authority to help our partner to build and design, finance and operate that facility, because somebody else is already doing it.

If we can engender a real market place for waste technologies for local authorities they also get the benefit that the price they are paying is cheaper because they can enter into 5, 10 or 15 year contracts, rather than 30 year contracts which they are currently having to do.

Murad Qureshi (Chair): Wayne, I think your boss wants to ask you a few questions as well!

James Cleverly (AM): Thank you very much, Chair. I apologise for my slightly late arrival which meant that I did not explicitly add a declaration as the Chairman of the London Waste and Recycling Board, so I think it is only fair that I confess to that sin in the here and now.

Wayne, one of the things that we tried to achieve at LWARB - and I would not mind you expanding upon and you were just highlighting it towards the end of the answer to Darren - is the move away from the creation of bespoke waste management solutions for municipal clients. A need is identified at the municipal level - whether it is borough or joint waste authority - and then the industry creates the infrastructure to support that. The Belvedere incinerator is a classic example of that. It is a bespoke build for a municipal client. One of the things we have discussed at LWARB is moving to a more merchant market, so create the infrastructure and allow the municipal players to be buyers in of off the shelf solutions. Moving from a bespoke to a prêt-a-porter model.

I was wondering if you could elaborate on that a little bit to give us an idea of kind of leverage in terms of how much private sector money each pound of public sector money through LWARB drags in and whether you think that is more broadly applicable to other energy production types? What lessons can we draw across from LWARB through other decentralised energy and renewable energy production facilities?

Wayne Hubbard (Head of Business Development, London Waste and Recycling Board): I do not know about the last part of that but certainly the model is something that is touched upon in the Mayor's Municipal Waste Management Strategy, partly through discussion with LWARB. The traditional way of disposing of waste from a local authority point of view is through landfill. Now landfill is being squeezed out of the market, quite rightly, through environmental regulation. That gives an opportunity or a requirement to build facilities. In building those facilities a local authority traditionally, before compulsory competitive tendering (CCT), would have gone out and built and operated the thing itself. After CCT it would tender out to do that through some project finance arrangements. They would be big facilities. There would be banks involved. One or two scale waste management companies would have been involved in that process.

What we see is a lot of small to medium scale entrepreneurial players in the market who are reaching a point where they are developing a range of technologies and they are interested in getting involved in the market from a commercial perspective. One thing we can say about London is it is densely populated with waste so it has a lot of commercial industrial waste. It does not require, necessarily, municipal contracts in order to make the things work. The problem is that banks take a very different view of that approach and require municipal contracts to the traditional 80% debt/20% capital project finance model does not work in that instance.

We see an 80% capital/20% debt model where LWARB takes a part of that debt, either at full debt rates or some kind of mezzanine rate. This thing operates for five years and then refinances and LWARB exits, leaving a plant which is operating more or less on commercial industrial waste. As the municipal contracts arise they are able to bid into those contracts and they will displace commercial waste to get hold of 10, 15 year municipal waste contracts. Local authorities then have maybe two or three AD plants bidding against each other for their waste, two or three refuse dry fuel plants or gasification plants, rather than having to go out for a full three to five year European tender - they will have to go through the European route but it will not be so significant - with all the attendance management costs that that involves, say, £1 million just to go through the tendering approach for the local authority and £1 million for the company tendering.

This is a real win/win situation. You have not got a 30 year contract; you can go for a 5, 10 or 15 year contact. It can be more flexible. Local authorities should save money efficiency, they should save money through paying a lower gate fee and they should also have a more flexible waste contract. All of these things LWARB hopes to achieve through that process.

We are looking for, at least, 1:4 leverage. We are getting a bit higher. We put about £30 million into infrastructure and we have got about £170 million from the private sector. It is better than 1:4. We are looking at no more than 20% of the total capital cost as the LWARB investment.

As regards the model, it seems to me the problems that we encounter in the waste sector are very similar to the problems in the energy sector in the sense that there are planning issues, there are feed stock issues and availability issues. There is technology risk. The people bringing the technology forward are small and medium sized players; they are not big companies. The big companies are looking at this and seeing if they want to invest on balance sheet. Where is the capital going to come from? Who is helping make these things affordable, guaranteeing some of the returns?

There is a lesson that the Green Investment Bank at least could learn in terms of the LWARB approach and rolling it out, not just for waste but other projects.

Murad Qureshi (Chair): One thing that did occur to me. We have had the Renewables Obligation Certificate (ROCs) market. That was really to stimulate energy companies to invest in the waste industry on these kinds of things so it would not be as dependent on dollops of public subsidy. Has that taken off in the London context?

Wayne Hubbard (Head of Business Development, London Waste and Recycling Board): The two ROC thing really helped. The biosense plant that we are investing in, for example, has been on the market for a long time and suffered from, "The house has been up for sale for a long time now, why is no one buying it?" That project had been around for a long time and banks thought something must be wrong with it. It was a victim of this changing of regulatory approach. The ROC system was put in place. Then there was discussion about two ROCs so they put the project on hold to see what the outcome of that would be. Then there was a discussion about grandfathering or not grandfathering. Now of course there is a discussion about what is the fit regime and how does that link in with ROCs and we are going to get rid of ROCs anyway. There has been a tinkering of the incentives regime around generation for the last eight to nine years, since the ROC system was introduced in 2002.

It has helped. The subsidy definitely helps in terms of interest of the market. What does not help is the almost annual change. Investors cannot invest until they have some certainty about what the returns are going to be so they can work out what returns they are going to get on their investment. It is obvious I suppose but it does not stop governments from continually changing the regime.

Murad Qureshi (Chair): Does the energy industry have a perspective on how it has worked, or not?

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): On the success of the Renewables Obligation?

Murad Qureshi (Chair): Yes.

Alastair Tolley (Head of Renewable Energy, Association of Electricity Producers): For renewables in general it has actually been reasonably successful but it comes back to exactly what you just said - originally it was one type of scheme. It was all technologies are equal, one ROC per technology. Then they decided to band it to give different levels of support to different technologies. Now something else is going to happen after 2017. We do not know quite what that is yet. There has been this constant change which has not helped. The other thing that has not helped with the Renewables Obligation is all the other problems. For a long time getting grid connections was an impossible thing to do. Planning consent has held back loads of projects.

It has been successful but there have been things that have stopped it being as successful as it could have been.

Murad Qureshi (Chair): Just one or two housekeeping questions I want to ask so we tidy things up. Peter, could you confirm again when we can expect the final Climate Change Mitigation and Energy Strategy from the Mayor's office?

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): In the summer. We are saying late summer. July.

Murad Qureshi (Chair): July. That is useful for our programming purposes. You also mentioned, Peter, the involvement of GLA Economics in some of the early work that was done. I know the projects that are coming on line and not. Would they have some idea of the implications this will have on energy prices?

Ross Hudson (Environment Programme Officer - Low Carbon Zones, GLA): They did not look at the impact on consumers. We could certainly ask them to do that work but I think that they would probably just draw on stuff that is already published by Ofgem.

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): In terms of price impacts on consumers the £200 billion figure we have talked about today is from an Ofgem piece of work called Project Discovery and in that piece of work they have tested different scenarios for delivering the infrastructure we need and that has impacts on bills within that report. I can share that with you if that helps.

Murad Qureshi (Chair): You are right; ultimately we are talking about London consumers and the impact it has on their energy bills. If we have got people here who have at least done some work on that we will probably go to them at least to look ahead and see what the implications are in terms of the prices people say.

On that front, finally, Committee Members, I will be attending the Health and Public Services Committee meetings on fuel poverty. There is a natural link here. I will come back to you if there is anything which I think is useful. Clearly, if prices go up, the further the hikes we have, the more Londoners will go into fuel poverty, particularly when incomes are not going up at all.

We will get a copy of the London Array presentation, I presume?

Richard Rigg (Project Director, London Array): Yes.

Murad Qureshi (Chair): If there is any chance of getting some of us out there I would welcome it. I suspect we would have a few other takers.

Peter Daw (Policy and Programmes Manager, Climate Change Mitigation, GLA): There are plenty of ships going that way!

Richard Rigg (Project Director, London Array): It would probably mean travelling to Ramsgate to go out there.

Murad Qureshi (Chair): That is not a problem. We will do that. Can I thank you, Richard, for informing us about the progress on London Array. It has been in and out of the public arena. Can I thank Alastair for giving us the energy industry's perspective on the role of renewables in plugging the gap, and our officers - Peter, Ross and Wayne - on telling us the Mayor and the GLA's perspective on this? Thank you very much for coming along and giving us your pearls of wisdom.