



Energy and Climate Change Committee

Oral evidence: [Foreign Secretary's Special Representative for Climate Change](#), HC 1190

Tuesday 25 March 2014

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Members present: Mr Tim Yeo (Chair); Ian Lavery; Christopher Pincher; Mr Peter Lilley; John Robertson; Sir Robert Smith; Graham Stringer; Albert Owen

Questions 1 - 86

Witness: **Sir David King**, UK Special Representative for Climate Change, Foreign & Commonwealth Office

Examination of Witnesses

Witness: **Sir David King**, UK Special Representative for Climate Change, Foreign and Commonwealth Office, gave evidence.

Q1 Chair: Good morning. It is a very great pleasure for us, and for me personally, to welcome you to the Committee in your new role. It is the first time you have appeared before us in this particular capacity. Were you going to make some opening comments, or shall I just crack on with the questions?

Sir David King: It is entirely up to you. I could make opening comments.

Chair: In view of our long-standing friendship, why do you not make some opening comments? We will accord you this opportunity, which we do not usually.

Sir David King: Thank you very much. Very briefly, I have been given what the Foreign Secretary said is the biggest diplomatic challenge of our time, in the sense that my

task is to try to set up the wheels of the machinery of Governments around the world so that we get an agreement in Paris in December 2015 that matches up to the nature of the challenge before us. I can answer questions about what I think that would look like, as a good agreement, and what is required of it. Quite simply, if we take Copenhagen as an example of what went wrong, we know what we have to expect in Paris, in terms of the difficulties on the way. Trying to get that through the system as smoothly as possible is the task that the Foreign Secretary has given me. I should say that I was delighted to be given the job, because in a sense I am coming back full circle to what I feel I started when I was chief scientific adviser.

In my first few months in post, I was involved in trips around the European Union and, more extensively, trips to the outside world, so that I could get a sense of how things were moving along. I would say at once that the big challenge within the negotiating process is the rapid change in the global economy that has happened since the 1990s, when the United Nations Framework Convention was initiated. Most starkly, if we count middle-class people as those who spend between \$10 and \$100 a day, we have gone from 1 billion in 2000 to 2 billion last year. That new middle class is 95% in the Asia-Pacific region. Of course I am referring to the middle class because these are the people who are consuming energy and producing the greenhouse gases in our atmosphere, which are the cause of the problems.

We are no longer in that process that was being discussed in Copenhagen, where the world could be divided into annex 1 and non-annex 1 countries, in this peculiar terminology, annex 1 being the emitters and non-annex 1 being the non-emitters, because the International Energy Agency is estimating that by 2035, overall emissions of carbon dioxide from non-OECD states will exceed that of the OECD states. There is the changing nature of the world and that is an important message to get across in the negotiations. There are groups of countries; they all have different acronyms. The BASIC group—China, India, and Brazil are the big spokespeople of that group; South Africa as well—I believe holds the key now to the future of this agreement, together with the United States. The difficulty with Copenhagen, of course, was that President Obama of the United States was unable to sign an internationally binding agreement of the nature of Kyoto because he did not have congressional approval, and China had said that it would not sign if the United States did not sign. We know that those are the four key nations that could block progress towards an appropriate agreement. I will not use the word “ambitious”; I think we have to use the word “appropriate”.

I had some very good meetings with China, including two meetings in Warsaw with the Chinese delegation, including Minister Xie, a high-level Minister whom we spoke with for some length of time. He gave a very revealing and, I would say, positive account of the ongoing work by the Politburo to green their economy. At the same time, we are all aware of the tensions within that economy, its need to grow rapidly more or less to keep the Communist party going, and at the same time its need to de-fossilise as it grows this rapidly. For seven or eight years, they have been trying to put a cap on the amount of coal they burn in a given year, and they have never announced, this simply because China will not announce an intention until they are quite sure they can deliver. While it seems that cap is likely to come into play by 2020, and that their emissions will pass through a maximum by around 2025, nevertheless in China there is discussion about that not happening until say 2030, and of course the key to whether we manage this problem, to a large extent, is this rapid growth in China. Roughly 23% is my estimate of the amount of emissions in China from goods that are

then exported, largely to the United States, Japan and Europe, so we need to just remember that embedded carbon in exported goods is a significant part of that equation.

Chinese progress can also be marked by the discussions that are now taking place between the Chinese and American delegations. On the one hand, we all must all be very pleased to see that happening, but on the other hand a driven-through G2 agreement may not be appropriate to the nature of the challenge of managing to stay within that 2° C rise that the United Nations is committed to.

India is difficult around the negotiating table; we always find that. I had a very good visit to India. I was invited twice last year to speak to the Indian Parliament, and I believe there is a great deal of listening taking place and a great deal of action. Good work being done in India includes the removal of subsidies for coal, and that is a major step forward. It has been said that if the Indian National Congress does not get re-elected, it will be because they have removed subsidies for coal. There was quite an outcry, of course, when that was first implemented in one fell swoop; one day there was announced a 50% reduction, and it has been trickled down since then.

The Indians are busy constructing a 2 GW entirely solar-driven power station in the desert in Rajasthan. I felt that my most fruitful discussion was with the deputy chair—the chairman is the Head of State—of the Planning Commission, who made it very clear that although the estimates of 200 years of coal remaining in India at the expected rate of consumption are probably correct, nevertheless a good part of this coal is under forests that are populated by tribal people, and it is politically very difficult and challenging to mine the rest of the coal in India. If large-scale energy storage was available at good market prices—and I believe this is the biggest technological challenge remaining—I believe the Planning Commission would go very heavily for solar energy. It is far cleaner, and both China and India of course are suffering terribly from carbon-particulate matter in the atmosphere; the health of the people of both nations is suffering badly. If they can de-fossilise their economies, this will be a benefit to the health of the people as well.

There is much to be done. In negotiating, India and Brazil tend to take the line of the annex 1/non-annex 1 division: “This is your responsibility, OECD countries; you get on and do it, and once you have reduced your emissions, we will step up to the plate.” Of course, that is a line that we have to be persuasive about. One of my tasks in travelling around the world—and I have travelled extensively, to 16 countries since 1 October—is to try to understand each country’s viewpoint from its perspective. I am very proud of the fact that I was in Durban representing not Britain, but Rwanda. In other words, I am proud of the fact that I was able to look at the whole negotiating scene through the eyes of the Rwandan Government and to have their trust as a member of their team, and therefore got exposed to the internal discussions of the least developed countries in the G77 nations. It is very important to show that we understand the challenges country by country, and then see in what way we can assist that discussion—to understand the internal dynamics.

The countries we are talking to are not always just the most obvious countries. Fortunately, I receive delegations here, so I do not always have to travel. The most recent delegation was a very high-level team from Burma, and we have very close relationships, of course, with the US team. They visited us, and I have been out to Washington DC to talk to them.

Brazil has so much going for it, in terms of hydro power. Most of the electricity is from renewable sources, but of the 17 GW of installation over the last 10 years, 15 GW is renewables. They have managed to maintain a very low level of energy from fossil fuels, and they have a very proud record of avoiding deforestation. My view is that Brazil should proudly tell the world what it is doing, rather than belabouring the point of the old Kyoto process and telling the annex 1 countries to get on with it. I think that if we can persuade Brazil to boast about what they are doing, rather than to complain about what others are not doing, we would be in a better position. I will be visiting Brazil in April.

One of our closest allies worldwide is Mexico. The Mexican Government has more or less copied the British Government's Climate Change Act. President Calderón's leadership on the whole climate change impact position has been well known, and the positioning of Mexico alongside Britain and Europe is very important in the negotiations. During my visit to Mexico, it was made very clear that the current, post-Calderón Government is completely on track with the Calderón process.

My first visit was to Moscow. President Putin had just announced his first decree on climate change; the decree was to say that Russia would reduce its emissions by 27% by 2020. Although a good deal of that reduction was due to the economic downturn following the break-up of the Soviet Union, nevertheless it was very significant that the President was making a climate change commitment. Public opinion in Russia has shifted dramatically following the number of fatalities in the heat wave in Moscow, and the loss of infrastructure due to melting permafrost—railway lines, roads, villages and so on. The realisation that if climate change is going to happen, it will not just mean longer growing seasons, has come through to the Russian people. Every country is well adapted to its long-term climate, and as the climate changes, those countries find that their infrastructure and their mode of living is threatened. I established a very good relationship with the Russians on that visit, and particularly with the head of their negotiating team, Bedritsky. Bedritsky and I had a one-on-one meeting in Warsaw subsequently. Of course, the current situation means that the positioning of Russia in any international process is made much more difficult.

In the run-up to the Secretary General's meeting in September this year, the positioning of Europe is obviously very important. It is also very important to get Heads of States to commit to attending the meeting and make clear statements of commitment to action over climate change. I see that as a crucial part of what I am attempting to deliver—going to countries and attempting to persuade Heads of States to make a prior commitment to attend.

My first trip overseas this year was to Lima in Peru. I wanted to underline the importance of the COP meeting in December this year. We should understand from the Copenhagen meeting that leaving a decision-making process until the very last minute is not going to be the right way forward. We, the British delegation, alongside our European partners, are very keen to emphasise that Lima is the place where we need heads of agreement to emerge, not just a process but heads of agreement. We take the Lima meeting very seriously and attempting to focus all minds around delivery at that meeting in Peru is absolutely critical.

I want to make one more comment, and that is about the double narrative that I am attempting to develop as I travel around. I give a lot of talks. I talk to stock exchanges—the Bombay stock exchange, for example—the business community, the policy-making community, and the academic community. First is the risk narrative: how do we manage what is clearly the biggest global risk that we have faced as a civilisation on record in history? We need to spell out the nature of that risk, as we did in Britain when I headed up a flood and coastal defence foresight team and reported to Parliament on that in 2004. Britain’s major risk comes from flooding and the recent floods should have underlined that to everyone in the nation, but the nature of the risk varies from one geographical area of the world to another—that needs to be spelled out—and managing the risk is a twofold process, both adaptation and mitigation. Second is the opportunity narrative. I believe this is the greatest opportunity for recreating that connection to science, technology, spin-out into companies and wealth creation—recreating that circle that, out of the industrial revolution, created our economies in the first place. When I talk to young people, spelling out the opportunities that this represents is a major part of what I attempt to do.

Q2 Chair: Thank you for that tour d’horizon. It raises lots of questions that we might come on to in due course.

Regarding your role as the special representative for climate change, I think you have indicated that your focus, at least to start with, is going to be Paris. You have this two-year run-up—just under two years, now. Do you think, in the context of British foreign policy, your role can have a genuinely significant influence that will help to achieve a positive outcome?

Sir David King: I do think so. This is going to sound a little immodest, but in the negotiations and in all my discussions, I find that I am a reasonably lone figure in having a good grasp of the climate science—I can talk to the scientists in some detail about that—a good grasp of the technological opportunities, and also a good grasp of the challenges associated with climate impact. Having this scientific vantage I think places me in a fairly unique position in the negotiations. That is just giving a personal viewpoint. Being able to speak for the Foreign Secretary in these situations is an enormous advantage. Quite clearly, the European Union leads for us in the negotiating process, and in that negotiating process the Department for Energy and Climate Change leads for Britain, but nevertheless as a persuader I think I have a particular role to play.

Q3 Chair: Good. One of the themes that your immediate predecessor, Neil Morisetti, developed in his relatively brief period in the job was around climate security and the concern of the defence establishment in many parts of the world, including—significantly, I think—America, about the threat of climate change. One of the things that I am very conscious of is the fact that there isn’t universal acceptance of the policy consequences of where the science is at at the moment. There is still some resistance. Do you think the security element is something that can be deployed to persuade some people who have not yet really bought into the agenda, but who might be influential in, for example, helping to get a positive outcome in Paris?

Sir David King: Yes, I do. In any case, the security issue needs to be carefully addressed. The Department of Defence in the United States is said to be the biggest single body, in terms of oil users, around the world. We know from our 20th century history—Churchill was certainly very focused on this—that managing oil supplies in any war situation was absolutely crucial. The engagement of North Africa in the Second World War was certainly not accidental from that point of view. The Department of Defence in the United States has a very clear understanding of the threats to its activities that this whole issue brings to bear. I think this is a continuing discussion. Neil Morisetti was extremely well placed to make these arguments. His position in Afghanistan, having to get oil supplies to our forces there, is a stark reminder of that. One of the biggest problems was not just the amount of oil, but where the oil had to be shipped from: Pakistan. The ability to use, for example, solar blankets in the desert was transformational for our forces. We need to understand that alternatives to oil are a major strategic advantage for us.

Q4 Sir Robert Smith: I should remind the Committee of my entries in the Register of Members' Financial Interests, in particular to do with the oil and gas industry and a shareholding in Shell.

From your past role and your six months in this role, what is your assessment of the UK's progress on greenhouse gas emissions?

Sir David King: The first reference I would make is to the work of the Climate Change Committee, which has assessed the 2008 to 2012 period—the first four-year period—and given a green light to that process.

The second point I would make is that the amount of renewable energy installation since 2010 has increased very significantly. We have doubled the installation of renewable energy. That has gone well. I think that the emergence from the Department of Energy and Climate Change of an extraordinarily useful computer program, along with the work of the Energy Technologies Institute, which I am very proud to say I was involved in setting up—it is a public/private body, and Shell is one of the companies involved—and the engagement of modelling to enable us to take scenarios forward in Britain to 2050, which take us into an effective zero-carbon position on the electricity grid, is very powerful. It is powerful because it gives certainty to investors. Having the carbon budget set, at the moment, out to 2028 was pressed on the Government by the private sector, which wanted certainty in returns on long-term investment in low-carbon futures; that is paying very handsome dividends.

Let me just make one other point. Oil imports to every European nation have become very costly. There has been a seven to eightfold increase, in real terms, in oil prices since the year 1999, which is not very long ago; it was \$15 a barrel, and we are now talking about \$120. That has impacted quite severely on the economies of the countries around the world that are non-oil-producers. We are now, of course, net oil importers quite extensively. The generation of indigenous energy sources is very good for balance of payments as well.

Q5 Sir Robert Smith: It is interesting that the huge increase in price has not suppressed consumption that much. Climate change committees do seem to be a bit concerned that we are okay so far, but that going forward, we are going to have to redouble our efforts.

Sir David King: That increase in price has not deterred usage; far from it. In the year 1998, the net demand for oil was 65 billion barrels a day. Today we are at about 93 billion, and in 2005 it was about 74 billion, so there has been a continued rise in oil usage. I believe that is almost entirely driven by that new middle class I referred to. In other words, the increase in oil demand is not occurring from OECD countries; it is occurring outside the OECD. One of the unfortunate features for the OECD countries faced with a debt crisis is that we do not have cheap commodities to regrow our economies on, which is the situation we had in 1929 to 1932. Then there was an oversupply of commodities, commodity prices collapsed, and the feedback of that was an ability to regrow economies off the back of cheap commodities. Because of the growth of this large new middle class, we do not have that luxury this time.

Q6 Sir Robert Smith: Are you coming across any barriers in Government to tackling climate change fully?

Sir David King: You mean placing a carbon tax?

Sir Robert Smith: Or any measure. There is a sense in the coverage of politics that there is a division within the Government over strategies for tackling climate change and the levers and measures that can be used.

Sir David King: Following on your earlier comment, I think we just need to bear in mind the elasticity in the oil demand process: prices have risen and yet the demand still goes up. A carbon tax is not on its own, in my view, going to deliver the response that is needed. My first comment is that regulation and obligations are a vital part of the process. That regulatory process includes feed-in tariffs. Perhaps the most important point to make about feed-in tariffs is that it is a short-lived process because feed-in tariffs—let me take solar photovoltaics as the best-case example—have meant that as the volume of production has gone up to meet demand, the cost has kept coming down. On average, for every doubling of photovoltaic installation, the cost has come down 17%. That means that over the last 10 years the cost of photovoltaic installation has come down by a factor of five, and that is why India can be installing 2 GW of photovoltaic-driven power: because it is competitive with gas and coal in installation. I think the good outcomes of these other levers must be borne in mind. Carbon taxes are never popular. That is one argument for a cap and trade. However, a cap and trade does not really work very well unless you have an appetite for pressing the caps down. In a sense, the lack of that appetite is the same as the lack of appetite for a carbon tax.

Q7 Sir Robert Smith: In your new role, how is the debate within the UK helping or hindering you in spreading the message to others of the need to tackle climate change?

Sir David King: My position when I am overseas is very clear and, you might say, very simple. I refer directly to the Climate Change Act, to the fact that we had all-party

agreement, and to the fact that when the Foreign Secretary offered me this position and I pointed out that I had previously worked with the Labour Administration, he said, “Your appointment underlines that all-party agreement in the Climate Change Act”. I point out that the Climate Change Committee has now set carbon budgets for Britain out to 2028, and that the budget for 2032 will be established after we see the commitments internationally from the Paris process. I think the British position, Sir Robert, is seen as robust on that basis.

Q8 Sir Robert Smith: Although the Climate Change Committee does seem to be concerned, going forward, that we are going to have to do more.

Sir David King: I am not going to demur from that. You are quite right: the Climate Change Committee is concerned that we do more. I think it is fair to say that the Department of Energy and Climate Change has a very good record on this issue. There is a real commitment there. The mix that we are aiming for, including nuclear energy, I believe gives us confidence that we can manage the process.

Q9 Chair: On the question about policy, are you entirely comfortable with the Government’s approach to shale gas, which I think is broadly bipartisan and broadly supported by the Labour party as well? Does that cause you any concern, the proposal to try to roll out shale gas in the UK?

Sir David King: No, I think gas is a very good interim primary energy source. It is certainly much better than burning coal. It is cleaner in both senses of the word: no carbon particulates, and less carbon dioxide emissions. I am very much in favour of proceeding with the three-year period of exploration.

What I would simply say, however, and this is quite important to establish, is that it is very unlikely that there will be a major contribution to our economy from shale gas in the shorter term. We are talking about three years’ exploration, during which time 20 to 40 wells will be drilled. In the United States, they are drilling 30,000 wells a year and have to keep drilling that number to keep up supply, because the output from every well diminishes on average by about 70% in the first year after fracking. It is a very intensive process. We are talking about delivering roughly 1,000 large lorry loads of sand, 10 tonnes of chemicals and 10 times that amount of water and sand to every well that has to be fracked. It is quite a large-scale process on the roads of our country.

Q10 John Robertson: Sir David, you said right at the beginning that the Prime Minister said to you that the biggest diplomatic challenge of our time was your job. How much time do you spend in dealing with Europe issues, compared to the rest of the world?

Sir David King: I did not mention Europe and I am very happy to have the question. I have travelled in particular to Berlin, Paris, Rome, Brussels and Warsaw. The point of those journeys was to try to establish a European Union commitment to 2030 that matched up to the nature of the challenge, the British position being at least 40% reduction in greenhouse gas emissions by that time. We now have a green group of nations within

Europe, 14 nations who are committed to that position. The European Commission has backed that position and we now await a final outcome, which will happen, we now know from last week's meeting, in October this year.

Q11 John Robertson: In terms of diplomacy, time-wise, compared to the rest of the world, is it more consuming or less consuming?

Sir David King: It depends on what the issue of the day is. In the run-up to last week's meeting, I did spend a fair bit of time on the road in Europe, whereas I imagine that between now and October I will be spending most of my time on the rest of the world. Overall, the answer must be between 15% and 20% in Europe.

Q12 John Robertson: DECC is confident the UK will meet its 20% EU target. The renewables industry is less sure they will make it. What do you think the prospects are of meeting these EU renewables targets?

Sir David King: The EU greenhouse gas target is 40% reduction, minimum. The renewable target is 27%. We were not in favour of having a renewable target. We felt each nation should have flexibility in how it achieves that reduction. On that 27% figure, the slack can be taken up if it is needed—and it will be needed—by some countries. In other words, it is an average figure, not demanded for each nation in Europe. I think the 27% is a realistic figure on that basis. Germany, for example, is very high.

Q13 John Robertson: Would you include nuclear as a renewable in this case?

Sir David King: I would like to, but the rules do not allow it, no.

Sir Robert Smith: Even a fast-breeder reactor?

Sir David King: That gets about as renewable as we can have.

Q14 John Robertson: Overall, you think the 27% target is realistic?

Sir David King: I do.

Q15 John Robertson: Do you think the renewables target should be nationally binding on member states?

Sir David King: Yes.

Q16 John Robertson: What are the chances of that happening?

Sir David King: Let me rephrase that. The 40% should be a domestic target for Europe, and therefore when I say “domestic”, it should not count offsets from Europe to outside Europe. When we say minimum 40%, we are actually saying in negotiations, if other nations are doing better, we could go up to, say, 50%, but then we would want to use offsets to make the difference. That is by way of saying that the 40% is deliverable and equally the 27% is deliverable. However, in the discussions last week in Bonn, it is clear that Poland’s position will have to be worked on. Getting a full agreement across all European nations—28 plus two peripheral nations is 30 nations—prior to October will require careful negotiation with Poland and this will require some process, which may mean not every nation going—

Q17 John Robertson: What you are saying, basically, is that some will do better than others, and we should not expect anything else other than that. Where does that leave the UK? What end of the spectrum are we at?

Sir David King: The UK’s commitment is already in that 2028 target.

Q18 John Robertson: Will we need to do more, then, to allow Bonn to do theirs?

Sir David King: No, I believe the 2028 carbon target set by the Climate Change Committee will keep us within the frame.

Q19 John Robertson: Just, or ahead?

Sir David King: Ahead.

Q20 John Robertson: So we will help out these other countries, then?

Sir David King: We are in a position where we might be able to help other countries.

Q21 John Robertson: Should the EU adopt our 50% emissions reduction target, if we can get an international agreement on it?

Sir David King: I believe the best negotiating position is to go in saying, “Our position is 40% minimum”, but to leave headroom for the negotiations, yes.

Q22 John Robertson: How do you think we could achieve a target like 50%? Some countries, as you said, will make it; others will not. How are we going to, shall we say, encourage?

Sir David King: By including offsets. At the moment, offsets are not included when we say 40% domestic reduction. The offsetting process, which already occurs, and where Europe is heavily involved, would enable us to achieve that.

Q23 John Robertson: There will be enough offsets to allow the target to be reached of 50%?

Sir David King: Yes.

Q24 Chair: If there is a sufficiently tight and tightly policed target for reducing carbon emissions overall, does that make a target specifically for renewables redundant?

Sir David King: That is the British view. The German view is that they would like three commitments: greenhouse gas reduction, renewables and energy efficiency. The argument for the three is, first of all, in terms of renewables, the industry needs to have these targets set in order to make the commitments that they require for the investment in renewable energy. Britain is, therefore, not demurring from the 27% commitment that I have just referred to. The energy efficiency target becomes a “Let us go for the low-hanging fruit” target, and the difficulty with that is that some countries can rightly say they have done much more already on energy efficiency, so further improvements may not be low-hanging fruit.

The other argument within Germany, let me say to be fair, is that they argue that the low carbon price in the carbon cap and trade is because of the lack of the triad of commitments. I believe that that is essentially because the caps have not been pressed down hard enough.

Q25 Chair: It is not difficult for us to refrain from demurring from the 27% renewables target because it is not going to be enforced on individual member states.

Sir David King: That is right.

Q26 Chair: Would our efforts be better deployed at trying to make the cap within the ETS much tighter?

Sir David King: I think this is coming to the point of how we make sure that across the nations of Europe we meet the overall target. This is where cap and trade comes in as a major instrument. Nationally, I have just said regulation and obligation is the major

instrument, but as soon as we get a group of nations together, then cap and trade, a trade process, is possibly the only way of ensuring that we achieve this. I would say, Chairman, you are raising a very important point there.

Q27 Sir Robert Smith: One of the real challenges for cap and trade is confidence, because the commodity is all policy-driven. It is not a real thing you can get your hands on. The security that the market is going to be policed, and works, is crucial for its delivery, I would have thought.

Sir David King: The ETS does not have a very good record, so in terms of trust for such an arrangement, there may be seen to be a difficulty. However, we are now seeing cap and trade beginning to roll out in other parts of the world. California has been running a system, and they are now bringing Quebec into their cap and trade. We are seeing China introduce cap and trade in the five most economically powerful provinces of China. What I think will be interesting as we emerge with all these different processes is we will have different prices for carbon dioxide within each cap and trade area. I believe the WTO will probably step in at that point and say, “Let us bang a few heads together. We cannot have multiple processes”. I think this evolution towards a global process is a very healthy way forward.

Q28 Ian Lavery: Turning to the security of supply, what assessment do you make of the UK’s security of energy supply?

Sir David King: The UK’s position is that we are in a very changing world all the time. For example, we have passed our peak in oil and gas production from the North Sea. Although the reserves from fracking within the land mass of the British Isles is likely to be about one third of that of the North Sea, I do not think it is going to all come on stream very easily. We are either going to generate energy from within our shores from other sources such as offshore wind, solar and nuclear, or we are going to have to secure a whole range of different supplies, particularly of gas. Keeping an eye on every possible supplier is going to be very important.

When I say this is changing, I think it is quite possible that the deserts of North Africa will become a major source of energy supply to Europe. The project DESERTEC has been on the table for some time. There is now a British company actively looking at setting up solar-driven power stations in the Tunisian desert with a linkage into our electricity supplies across Europe by putting a line into the toe of Italy from Tunisia. These are all very important projects for Britain. The exploitation of gas in the Caspian Sea is another example of these—Azerbaijan is getting involved in that. It is about making sure that Britain is engaged in all of these supplies. The only way we are going to secure our energy for the future is by seeing that we have a diversity of energy supplies.

Q29 Ian Lavery: The former Ofgem chief, Alistair Buchanan, said that there is going to be a heavily increased reliance by the UK on gas. He said that we as a nation will have to shop around looking for imports. First, what impact do you think that might have on the price of

energy in the UK? Secondly, how might diplomacy help in terms of securing affordable gas imports?

Sir David King: You are beginning to ask me questions outside of my area of expertise, but let me very quickly say that the Government has done rather well in securing relatively low gas prices, imports of LNG, over the past three to four years. We have made some good deals, which means that gas in Britain is among the cheapest in Europe. I think we have done quite well under our privatised utility sector. Of course, this is going to have to continue to be worked on. I would rather not skate on very thin ice in terms of my expertise there.

Q30 Ian Lavery: I wonder whether the next one is within your expertise or your remit. The current dispute with Ukraine and Russia has meant there has been an increased gas price in Europe. How involved is the Foreign Office in ensuring that we have security of energy supply?

Sir David King: I can honestly answer that one: yes, the Foreign Office is directly involved and heavily involved through the Foreign Secretary in that process and, in particular, in discussions with Ukraine to secure their own energy supplies going forward. There is a considerable amount of work going on through the Foreign Office in Ukraine, but also to ascertain that the situation with Russia does not mean that we end up paying over the top for energy.

Q31 Ian Lavery: Do you think the Foreign Office is doing enough, or could they do more?

Sir David King: Well, I have to say that my boss is doing enough. I am sure he is.

Q32 Ian Lavery: How important is gas storage to insulating the UK from potential price shocks?

Sir David King: Just-in-time delivery always creates risks, whether we are talking about fuel, food or water. It is absolutely critical to have storage facilities, but the demand is so high that getting enough storage to last a significant amount of time is very challenging. You are asking a very good question.

Q33 Christopher Pincher: I am sure your boss is doing quite enough to ensure the security of our supply, but in concert with his European colleagues, what more do you think they could all do, collectively, to diversify energy supply into Europe, given the Ukraine problem that Mr Lavery has referred to, particularly from the Caspian area? I chair the all-party group for Azerbaijan, so I have an interest in that particular area. I just wonder whether Europe is doing enough to get gas, which Azerbaijan has quite a lot of, out of the South Caucasus and into Europe to help diversify their supply of energy.

Sir David King: Mr Pincher, let me just say you are probably in a better position to comment on that yourself than I am. I am sure that we are going to have to do more. It is not as if we had, back in October, for example, predicted what has happened in Crimea. I think that we will all have to up our game going forward. I mentioned the Caspian Sea simply because it is likely to come on stream, and it could be very timely.

Q34 Christopher Pincher: How timely do you think it needs to be?

Sir David King: Ah, well, as soon as possible, please.

Q35 Albert Owen: You partly answered, Sir David, the question I want to ask when Mr Lavery was talking specifically about security of supply in Ukraine. The issue is also the price going forward and how that will impact on domestic prices in this country. Is the Foreign Office engaging in that dialogue now with the big energy suppliers, as well as the countries and our European colleagues?

Sir David King: The answer is yes, it is, but if I can just bring the question back, security of supply is an issue, but all the issues around energy efficiency gains are also critical. Alternatives to gas and energy—

Q36 Albert Owen: No, I fully understand that, but the dialogue over the recent days and weeks has been that we rely on only 1% from Russia, and we do not have to worry. My point is that we do have to worry, because it will have an impact on the global price of gas. I am sure diplomacy channels are being explored through the Foreign Office. Is that the case?

Sir David King: Yes, and again, just to broaden it, LNG is a major source of imported gas. It does not all have to come down a tube. Britain is well positioned, in terms of ports, to access availability of LNG, and the United States may, of course, become a supplier.

Q37 Mr Lilley: Since we are talking about influencing foreign Governments, I should declare, and draw the attention of the Committee to, my interests as vice chairman of an oil and gas company operating in central Asia. Which countries are least willing to accept that the costs of preventing climate change are less than the costs of adapting to it?

Sir David King: Can I add to your question: and managing the risks—in other words the damage from the risks?

Mr Lilley: Yes.

Sir David King: The floods have probably cost us between—

Mr Lilley: No, I was asking which countries have been most—

Sir David King: I am coming to that, yes. I am just explaining why I think you have to look at the costs of the impacts as well. It is very clear that there is only one country that is positioning itself in the place that I think you are describing, and that would be Canada. The Australian Government has retained its commitment to reducing emissions, and in our discussions with the Australian Government, it is still committed to action on climate change. Canada, I think, is the outlier.

Q38 Mr Lilley: You think China, India and the African countries are willing to pay the price of higher energy now to prevent higher temperatures in 50 or 100 years' time?

Sir David King: I am afraid I have to take apart your question again. Paying the price is one way of putting it. I believe that the green growth and climate resilience strategies of some of the least developed countries are beginning to show that this gives rise to faster growth, not slower growth. Let me be very explicit with an example I am very familiar with.

I take the case of Rwanda. The country's economy was such that exports of coffee and tea would bring in dollars, which would then buy in oil, and oil was burnt for creating electricity. With an eightfold increase in oil prices, it meant that it was very difficult to manage their economy with infrastructure investment as required. By finding alternative sources of energy in-country, which is what the focus of the green growth strategy has delivered for them, including considerable energy sources from geothermal energy, gas from Lake Kivu and solar energy, they can massively reduce their need to import oil to create electricity on the grid.

Moreover, most of the villages of Africa and India are off-grid at the moment. The cost of installing solar photovoltaics in those villages is considerably less than the cost of extending the grid. On average, it is about three times less at today's prices for installing photovoltaics. By focusing on green growth, their economies can also accelerate. I think it is very, very important that this message is got across. There is, of course—I must insist on this, Mr Lilley—a very large cost in not managing these issues. If I can come back to the floods in Britain—

Q39 Mr Lilley: Sorry, I was not really asking your views; I was asking about the views of other countries. We are aware of your views. You think that—

Sir David King: Sorry, if I could interrupt with my view—

Mr Lilley: No, I would rather you did not. Can I get on with my next question?

Sir David King: No, my view, in answer to your question, is that these countries are realising that managing climate resilience is good for their economies—and this means mitigate and adapt—because then the climate impacts will be less.

Q40 Mr Lilley: It is good for their economies because there will be less warming in the future, rather than because they will grow more rapidly?

Sir David King: Mr Lilley, it is already happening in many countries. The average temperature rise in Central Africa is 2° C more. I am answering your question.

Mr Lilley: No, you are not. Never mind, go on, you think it is—

Chair: I think some of us are interested in what Sir David has to say about that. Do you want to finish the answer you were trying to give?

Sir David King: 2° C is the average Central African temperature rise. Moscow and the Arctic Circle are at three times the global average. There are parts of the world that are already experiencing damage. The most intense hurricane ever to hit land was Hurricane Haiyan; the first hurricane to hit so far north in America was Hurricane Sandy. What we are already seeing are climate impacts and the costs of those, including the floods in Britain, are severe. We managed to reduce the costs in Britain precisely because I put in process a plan to manage climate resilience in Britain—that flood and coastal defences plan. Our major assets were not flooded; we managed to save them. That is what climate resilience is about.

Q41 Mr Lilley: That is extremely interesting and, as the Chairman said, we are very interested in it.

Sir David King: Good.

Mr Lilley: But my question was: are countries like India and China—half the world's population—seriously going to forgo the use of fossil fuels and grow their economy more rapidly by following the example of Rwanda, or by installing solar panels in their villages? Is that what you are saying? If so, that is wonderful. If they can make themselves better off without using fossil fuels, that is great.

Sir David King: Well, the answer is yes, that is what they are doing. They are beginning to do it, and it is happening on quite a large scale. For example, the biggest photovoltaic producer in the world is a company in China called Hanergy. I met the owner

and CEO, Mr Li. Because of what I said about photovoltaic prices coming down, he is managing to export photovoltaics around the country. If you go to IKEA you can get Hanergy photovoltaics for the roof of your house. The economy of China is massively benefiting from the exports of photovoltaics.

Mr Lilley: Not from the use of photovoltaics.

Sir David King: And from the use. It used to be 93% export. That percentage is dropping very rapidly as the use of photovoltaics in China rolls out. The Chinese Government is more committed on this low carbon route, I think, than any other Government. The challenges in China are even greater than any other country, though. I think China is on a good pathway. I believe India would like to be, and understands the advantages that I am describing. Brazil is already doing quite a lot.

Q42 Mr Lilley: You mentioned—I made a note—that if large-scale energy storage were available, solar would be the answer, but it is not, is it?

Sir David King: Large-scale energy storage is available in the form of up-pumped reservoirs in Wales, for example. This exists wherever the geography suits it, but you do not build mountains to create up-pumped reservoirs. Large-scale energy storage exists as molten salt. You can do direct solar heating in the desert, but not in countries with cloud where you need photovoltaics. In Spain, half of the solar during the day is deflected to melt salt, and at night, the molten salt solidifies and the excess heat is used to keep the turbines running, so you get a constant output day and night. There are several forms of energy storage available. My belief is this is the research, development and deployment Cinderella.

Mr Lilley: I agree with you, absolutely. I entirely agree with you.

Sir David King: Any company that comes into this field will find it is a very large market.

Q43 Mr Lilley: But it does not yet exist. My breath is taken by your optimism that these countries with 2 billion people are going to be able to increase their growth by adopting energy—renewables, rather than fossil fuels—that in this country we have to pay twice as much for as fossil fuels. We are committing to a price for onshore wind that is twice that for generating electricity from coal and gas, three or four times that for offshore. You are saying India and China are in a happy position where they can go to renewables at less cost than fossil fuels. That is great, but it is news to most of us.

Sir David King: Mr Lilley, you seem to be missing a very important point in your comment, if I may say so. These costs are time-dependent. They are volume of production dependent. The cost of photovoltaic installation has come down, I repeat, by a factor of five in the last 10 years. The technology keeps improving as the volume production—

Q44 Mr Lilley: Why do we have to subsidise it?

Sir David King: You subsidise, as with feed-in tariffs, initially in order to bring the price down.

Q45 Mr Lilley: So it will be cheaper in future, but it is not yet?

Sir David King: Again, let me repeat that photovoltaics have reached that point where for a sunny climate, which is where most of this world is we are talking about, it is already cheaper to install photovoltaics than to put up installations for gas or coal consumption. I could go on and on, but the point is that in India and in China it is also understood that the 900 C 2.5 count in Beijing that has been experienced—the average is down at 100 to 200—is enormously bad for the health of the people in those countries. Coal has never been good for people.

Q46 Mr Lilley: I know; I entirely agree with you that PM 2.5 is a real reason for getting rid of coal and it is very sad the world is so dependent on coal. I just wonder, in that context, whether you have read a report by Guy Turner, who used to be Bloomberg's renewables energy chief economist, on the coal market. There is no particular reason you should; it came out only a few days ago. He is a constituent of mine and sent it off to me because he knows I disagree with him on almost everything. He does say, analysing the coal market, that half the emissions come from coal; three quarters of coal is used by developing countries. Its significance is that developing countries are the least able and arguably the least willing to shift away from coal and any prospect, therefore, of reaching the 2° C target by persuading them to do so is simply unrealistic. He is clearly wrong, is he not, on your assumptions?

Sir David King: He would not be wrong if we go down a business-as-usual road—if the whole process that I am involved with now, full-time, was simply not taking place. The International Energy Agency has figures that agree entirely with what you have just read out, and I am in very close contact with Fatih Birol, the Chief Economist at the International Energy Agency.

Mr Lilley: He came to see us last week.

Sir David King: So I am very familiar with the numbers. Installation of coal-fired power stations that are still taking place by 2017 at the present rate will mean that we

cannot possibly stay below that 2° C limit. I am an optimist, but I have my feet on the ground; I am aware of the problems. This does not mean that I take any joy from hearing these factors. The United Nations says we should stay below a 2° C rise. Let me, if I may, Chairman, take a moment to explain what that means.

At the moment, because of the figures that Mr Lilley is reading out, we are increasing greenhouse gas emissions at 1.8% per year. We have been doing this for about 15 years. We are on an exponential growth curve. Most of the rise is happening in the non-OECD countries now. If we go on at 1.8% per annum rise, when do we run out of the carbon budget left to stay below 2° C? The answer from the Intergovernmental Panel on Climate Change is 2043, so it is imminent. If we get a good agreement in 2015, what do we have to do? From 2020, when it comes into play, we have to start decreasing emissions at 3.2% per annum thereafter, and then we stay within the 2° C carbon budget. Mr Lilley, I think that is an enormous challenge for the global community, but an even bigger challenge for the global community will be if we do not achieve that; in other words, from the impacts of climate change. I am simply expressing the view of 99% of the scientific community.

Q47 Mr Lilley: What I still do not understand is how you are going to persuade a poor country with millions of poor people—who are poor because they have no energy to run a refrigerator, air conditioning unit, fuel a tractor, light their homes, help with the cooking—that it is worth adopting energy sources that are more expensive than fossil fuels.

Sir David King: The funny thing is that you keep repeating that, and I have told you that is no longer the case. You are repeating something that—

Q48 Mr Lilley: You live in a dream world, Sir David. If you think these countries are using fossil fuels even though they are more expensive than photovoltaics, it is because they want the lights to come on at night as well as during the day. They have no means of storing solar electricity. I am just breathtaken that you live in such a dream world.

Sir David King: I am sorry that I take your breath away, but what you are saying now does not match up to what I hear in India, to what I see in Africa. I have been advising Governments in Africa. Where would you like to take as an example? Which part of the world? I will take you through it in some detail. The use of feed-in tariffs in Europe is producing the lower costs that are needed to crack the very problem that you are talking about.

Q49 Mr Lilley: Charging higher prices to users in Europe is producing lower costs, which will pay dividends in future, is that what you are saying?

Sir David King: That is exactly what I am saying.

Q50 Mr Lilley: But it has not yet done so, otherwise you would not have to charge the higher costs.

Sir David King: It has done so on photovoltaics and the next—

Q51 Mr Lilley: Why are you still continuing to subsidise them at several times—

Sir David King: Can I finish your sentence for you in the following way? The next volume roll-out of photovoltaics is not needed, in my view, from subsidies. The next volume of roll-out is in those villages that are off-grid in Africa and India, precisely because they have no electricity at the moment. They will never be on grid at the costs of extending the grid to all of those villages. Putting photovoltaics in those villages, plus micro-grids, plus batteries, is what is already rolling out, and that is the next volume. Mr Li of Hanergy understands this big market.

Mr Lilley: You go and try to tell that in the villages of India. I have been adviser to an energy company in India. If I had known that they could get cheap electricity from solar, I would have told them how to do it. For the average villager, it is patronising to think he has to rely on this little thing up there. I hand over, Chairman.

Q52 Albert Owen: I was very interested in your opening remarks with regards to China; you mentioned a cap on coal. This Committee has been very interested in China and we have done our inquiries into what they are doing. We have asked them questions. Yes, they are world leaders already in wind generation, and in solar—producing and usage—because of their vastness, but Peter makes an important point, and rightly asks about their path as regards fossil fuels. The perception is still that they are building a new coal power station every week. That is the jargon that you hear, and what the energy commentators are saying in the newspapers. Is that a fact? Is there still that growth in fossil fuels? Are you talking about percentages? Are they increasing the percentage of renewables? Are they taking definitive action on either closing coal power stations, or not building new ones? It is hard to get the west, if you like, to be interested in decarbonisation if this is the perception. I will make one final point: nuclear in China is massive. They have 20 nuclear power stations and they are building another 28. They are moving in the nuclear direction—I understand that—but are they cutting coal?

Sir David King: Because of the rapid rate of growth of their economy, it is very challenging for them to cut coal. I repeat they have not yet managed to do it. I believe that they will reach their cap—

Q53 Albert Owen: But that is their aspiration, you are saying? They have never said it to us. They are basically saying they are improving their renewables, but they have never said they are going to do a cap on coal, from what I have heard from them. We have asked at their climate committee.

Sir David King: Internally, they have been discussing a cap on coal for seven years. I believe they will only announce it when they know they can achieve it.

Q54 Albert Owen: But would it not send the right message if they were saying, “Yes, we are going to have a cap on coal for decarbonisation” or even CCS?

Sir David King: I would love them to do that. I believe they are aiming to cap coal, as I said before, by 2020. I have published papers with people at Tsinghua University, and you must know most Politburo members come from Tsinghua. The ambition is to have a policy that matches the British, by 2050 to have fully greened their electricity industry, but that ambition has to be achieved while growing their economy. What they have managed to achieve year on year for the last 15 years is a big decrease in their emissions intensity, so emissions divided by GDP growth. They have a policy on this and they have managed to follow that very closely. That is done through more nuclear new build than any other country in the world, more photovoltaic installation and more wind than any other country in the world, even other countries put together. The problem is this enormous consumption of energy. It is very, very big.

Q55 Albert Owen: I will make one final point. Are you really telling this Committee now that China are going to continue to build new coal power stations and close them down almost immediately?

Sir David King: I believe that it is fair to say that because of pollution, rather than because of the need to reduce emissions, they will be closing coal-fired power stations, particularly around the large cities. That is a big challenge for them, because many of these polluting coal-fired power stations are producing electricity for their manufacturing industry. It is a big challenge, but that is their intention.

However, having said that, their ambition is to reduce C2.5 particles in the atmosphere around Beijing by 2017; I will have to give you the figure in writing afterwards, but I think it is no more than a 15% reduction by 2017. They would, I am sure, love to be able to reduce it more quickly but there is precisely the point you are making: the cost to their economy in shutting down coal-fired power stations.

Q56 Chair: Do you think there are ways of framing the climate problem and its solutions that could incentivise action more quickly?

Sir David King: Well, I think that the British Government did get this in 2004. Quite simply, if we go forward adapting and not mitigating, sea level rise will put our coastlines at risk. Rising sea levels means, of course, that during storms at sea the incursion of the waters inland becomes more and more problematic. Often the storms at sea are coupled with storms on land in Britain. We predicted that in 2004. This is the kind of behaviour this winter that was predicted, and hence we said we should manage.

If we go forward to 2080 and beyond on the business-as-usual scenario, and head for a rise of 75 cm to a metre—so far there has been a 25 cm rise in sea level—we would have to look at whether we can defend the city of London under those circumstances. The Thames barrier, Mr Lilley, was designed to be used once every six years. One of my predecessors as chief scientific adviser very wisely said it should meet the demands of a one in 2,000-year event. Unfortunately, because of climate change, the language of one in n thousand years no longer applies. The rising background in temperatures, rainfall patterns, and sea levels, means that the challenge gets more and more as we go forward in time, unless we go on a different pathway. It is the sheer cost. We used the Thames barrier over 50 times during these recent floods. That is a massive usage. Every time it was used, London was saved from flooding. We saved hundreds of billions in assets through this policy of managing to save assets. We do get to the point where that becomes more than a challenge. We would have to be very optimistic in our view of the way forward.

Q57 Sir Robert Smith: You mentioned Canada being one of those that is not taking part in the process at the moment. Have they given you a reason or anything that would change their mind? There seemed to be a federal scepticism, but in some of the provinces, there is a strong will to act, and some developments on CCS as well.

Sir David King: Yes, I think it is fairly obvious that the major driver for Canada is tar sands. At the moment, crude oil production has stalled at 74 million to 75 million barrels a day, and non-crude oil sources are meeting the difference between that number and the 92 million barrels a day that consumers are demanding. The world needs oil from tar, and that process is very heavily based in Venezuela and Canada. I think the Canadian economy is seen to be strongly benefiting from this oil dependence, and that is a very persuasive factor. We may see a change in Government in Canada before December 2015. There is an election due.

Q58 Graham Stringer: As the Permanent Special Representative on Climate Change, what can you do that a Minister or a civil servant cannot do? What extra do you bring to the party?

Sir David King: It is, in a sense, Mr Stringer, the same as bringing a chief scientific adviser in from outside Government. It brings somebody who is close to the current state of research in our university sector. I am talking specifically about my case and I come back to my history in the research world, but also my history as a chief scientific adviser. I would, however, say that the Foreign Secretary has an enormous amount on his plate. On having a special representative who has a complete focus on climate change, his feeling is that this is required in order to meet this massive diplomatic challenge.

Q59 Graham Stringer: A senior civil servant could take pressure off Ministers, or a junior Minister could do it; you are saying that your technical expertise as a scientist is what you add to the party.

Sir David King: Yes, I think that would certainly be the main thing. My seniority and the fact that I am quite well known also mean that when I travel abroad I get to meet people in very senior positions, including Heads of State.

Q60 Graham Stringer: There has just been a recent Conference of the Parties in Bonn, is it?

Sir David King: Yes.

Q61 Graham Stringer: Can you tell the Committee how that went? What were the successes and failures at that conference?

Sir David King: The meeting in Bonn was an inter-COP meeting of officials, and it was very heavily focused on process. The discussion was really about the process leading up to Lima, how the agreements will be made, how the various nationally determined contributions from different countries will be pooled together, and so on. From that point of view, I think it was a stepping stone on the road.

Q62 Graham Stringer: There were no obvious disagreements, failures or successes, are you saying?

Sir David King: There are disagreements, failures, and successes all the way down these discussions.

Graham Stringer: I would be interested in knowing what they were then.

Sir David King: Right. I was not there. I do not get involved in process. The officials who are there would be very heavily from the Department of Energy and Climate Change but also from the Foreign Office, and they would be civil servants. There was nothing problematic; that was my briefing following the meeting. Process is what it was about. There will be a meeting in June this year. That is more important.

Q63 Graham Stringer: Is that the Lima one?

Sir David King: Yes.

Q64 Graham Stringer: Will you be going to that?

Sir David King: I may be going to that.

Q65 Graham Stringer: Paris, will you be going to that?

Sir David King: Paris, yes. Yes, I will go to the COP meetings. I will be in Lima as well.

Q66 Graham Stringer: Right. What are the main objectives in Lima and Paris?

Sir David King: The main objective in Lima is to get heads of agreement sorted out. This was agreed at Warsaw; Britain and the European Union were pushing for that. Out of those heads of agreement, this means that we have a year between Lima and Paris to hammer out the detailed nature of the agreement that the Heads of State can agree to in Paris in December 2015.

Q67 Graham Stringer: When we had the Minister of State here, he said that Paris was certainly not a done deal. What particular issues should be hammered out between now and Paris, in your opinion?

Sir David King: There are a number of issues. I certainly think Paris is not a done deal. On the issues I mentioned right at the beginning in respect of the positioning of India and Brazil in the negotiations, it looks from a negotiator's point of view as if India and Brazil are stalling on an agreement being reached in Paris in December 2015, because they keep harking back to positions—annex 1, non-annex 1—and responsibilities that differ according to which groups you are in. I think there may be some stalling there. I am going to Brazil shortly. Certainly, that is an issue that may cause problems, but the other part of the problem is whether the agreement that is reached is appropriate to the United Nations commitment to stay below a 2° C temperature rise.

Q68 Graham Stringer: That is the next question. In your opinion, what would be a successful outcome in Paris?

Sir David King: A successful outcome in Paris would mean that we are likely to deliver that pathway I mentioned of on average, from 2020 going forward, decreasing greenhouse gas emissions by 3.2% per annum.

Q69 Graham Stringer: If there is failure, as there was in Copenhagen, what should the next strategy of the British Government be?

Sir David King: The strategy of evolutionary process, country by country, has already proved very effective. I mentioned all the good things happening in Brazil, for example, and in India. Avoided deforestation is a major factor that has changed dramatically, although there is much more to be done in Malaysia and Indonesia on that

front. I think action country by country, and pressure on countries in agreements, is a way forward, so that we aim to evolve towards processes that can produce the required result. In other words, we certainly cannot give up on the failure to reach agreement in Paris in December 2015. To be honest, my job is all focused around reaching that agreement.

Q70 Graham Stringer: In your answers to Mr Lilley previously, you mentioned a particular storm being related to climate change, whereas the IPCC and most of the scientific opinion say that you cannot relate individual storms to increases in the carbon dioxide in the atmosphere. Do you think that was a mistake to say that you could?

Sir David King: No, and thank you for raising this, Mr Stringer, because I think you have misunderstood what I was saying. What I was saying about the floods in Britain—is that what you are referring to?

Graham Stringer: No, it was a hurricane you referred to further up the coast in North America. I cannot remember what it was called.

Sir David King: Hurricane Haiyan in the Philippines. Let me repeat as a scientist that it is impossible to attribute any single event to climate change. However, the climate impacts that are anticipated are an increased frequency of severe events. When I referred to events, I am referring to the frequency of these extreme events. There the climate scientists are in agreement that instead of events happening every one in 100 years, an event of that extremity is now more likely to happen once every 50 years, or once every 10 years, given that it is changing with time.

Graham Stringer: I am glad you clarified that. Thank you.

Q71 Albert Owen: Can I move on to your role for getting Whitehall Departments to co-operate and carry out the UK's climate change objectives? How are you doing this? How does it work? How do you get the different UK Whitehall Departments to work together?

Sir David King: By communicating with each other. This is in negotiations, how does DECC, for example, work together with the Foreign Office?

Q72 Albert Owen: Yes. You have mentioned some issues, and I know we are the Energy and Climate Change Committee, but some of the big challenges are transport; some are outside DECC's and the Foreign Office's remit. How do you make sure that the Government is speaking with one voice on this and carrying out its objectives?

Sir David King: The simple answer, if I may give it this way, is that I do not.

Q73 Albert Owen: What is your view on it?

Sir David King: My position is that I am involved in negotiations and bilateral—

Q74 Albert Owen: Yes, I am not saying that you singlehandedly do it. I will put the question again. Are Government Departments, in your view, working together? What is your role in working with those other departments?

Sir David King: I think it is very important that it is understood—and that is exactly what your question is implying—that the issue is not simply down to one Department. The Department of Energy and Climate Change cannot deliver everything that is required. Whether we are talking about energy efficiency in the built environment or transport policy, I think it rolls out right across everything.

If I can make a comment, for example, on high-speed rail, I see high-speed rail as a critically important pathway to delivering a low-carbon future, because transport is roughly one third of our carbon dioxide emissions, and high-speed rail will deliver many more rail passengers than before, so it switches ground transport more heavily on to the electricity grid. If we can produce an electricity grid that is de-fossilised and we are switching transport on to the grid then we are moving towards that low-carbon future. That is absolutely critically important.

Q75 Albert Owen: That is an interesting example you give there. We do not hear much of that argument when we are talking about HS2. We talk about cutting commuter times down; we talk about linking the north and the south of England, as it happens; we do not hear much about the energy savings and the cost of diesel going up and maybe other costs. Do you think there should be greater emphasis on that, and different Departments dealing with it?

Sir David King: Mr Owen, I certainly do. For me, one of the most persuasive arguments for—is it HS2 or HS3?—the overall system up to the north-east and north-west from London through Birmingham is about the increased passenger miles that will go on to the electric rail system. We will take passengers off the road system and off air by that mechanism. Speed is important to compare with flights, but we have not had a major roll-out in railway lines in this country for a very long time. We are approaching capacity in terms of passenger miles, so I do think that it is a very important argument.

Q76 Albert Owen: I will come back to the crux of the question. I understand that you, as an individual, cannot barge into Departments and instruct them to do things, but I am asking a very serious question here. We have Departments in Whitehall; do they work in silos, in your opinion, or are there enough cross references on climate issues?

Sir David King: There cannot be a Government in the world where Departments do not work in silos, so the answer has to be how well do we—

Q77 Albert Owen: It is frustrating for a politician—sorry to cut across you; that is what we do all the time, probably—that when we are asking departmental questions, we often get fobbed off. We will ask a question and they will say, “Well, that is not for me as the Minister. That is someone else’s responsibility.” I am asking whether, in your specific special role, you see things differently and believe that Departments are working together on the critical issues that you have raised on climate.

Sir David King: I am going to refer back to my previous role as chief scientific adviser, because I have managed to persuade ministries and Departments to set up their own chief scientific advisers. Now all departments, as a result of my actions, have chief scientific advisers, and they meet through the chief scientific adviser to the British Government, Sir Mark. For example, we ran foresight processes, which were trans-departmental, that cut through the silo boundaries from the chief scientific adviser’s office, and the use of the chief scientific adviser in each Department to carry that through is absolutely critical. The chief scientific adviser in Transport was a key player in looking at future infrastructures through one of our foresight programmes. I think that was quite an important part of this breaking down of the silo walls.

Q78 Albert Owen: We are also conducting an inquiry into low-carbon innovation, and some of the evidence we have had from different witnesses has been rather critical of DECC’s involvement with working with other Departments, such as UKTI, on exports and so on. Do you have an opinion on that, and do you have in your role a responsibility to make sure that the Foreign Office and other Departments are working with DECC on exports of innovation that will help meet objectives both on the economy and on climate change?

Sir David King: Absolutely. I work within the prosperity directive of the Foreign Office. Our work has to be justified in the terms you have just mentioned. I come back to the narrative that I have not dwelt on in this discussion, which is the wealth creation narrative that underlies much of the work that we are involved in. I mentioned, in discussion with Mr Lilley, the importance of energy storage, and I certainly see a roll-out of energy storage technology as a massive new potential for wealth creation.

Q79 Albert Owen: It is not new, is it? You mentioned the example in Wales. That has been there for decades, and it was—

Sir David King: Hundreds of years.

Albert Owen: No, it is not hundreds of years, but it was when the energy requirements of this country were in one pot, and it was seen as something that could be done. Since it has

been fragmented and there have been private energy companies, there has not been that kind of investment in that innovation. So it is not new, is it?

Sir David King: It is not new, but the roll-out to, say, a part of the world that was relatively flat is quite challenging. I believe that the potential for energy storage technologies is enormous. The Department of Energy in the United States is investing \$400 million in this area and they certainly expect to see a big roll-out. The uptake of photovoltaic technologies and director solar technologies, in my view, will be massively increased once large-scale energy storage emerges into the marketplace. It is a big opportunity.

Q80 Albert Owen: I did not quite hear the answer you gave on whether you think DECC and UKTI are working effectively together. Do you think they are, or is it work in progress, with regard to low-carbon innovation?

Sir David King: UKTI are based in BIS; then there is DECC and the Foreign Office. The Foreign Office is a key interlocutor in that process. They do work together on this, is the answer. I do not want to make too much of a meal of it, but for example—

Albert Owen: The evidence we get from the business community, from academics and from DECC is differing.

Sir David King: Let me mention the catapults. There are now eight not-for-profit companies stimulated with Government finance through BIS. I am chairman of the future cities catapult. The object of that is to enable the British players in the construction, engineering and architectural industries to play a bigger role in the development of new cities around the world. It is engaging a BIS project with the Foreign Office directly, and because energy and transport are a key part of that process, we actually cut across all Departments. Those catapult projects are a very good example.

Q81 Albert Owen: A final question: you have a very ambitious role and you have explained much of it today. Do you think you have enough resources to carry out that role? You are away a lot; you did say that in your opening remarks. Is a lot of work being done? Do you have enough resources, or are we just listening to the advice of Sir David King?

Sir David King: No, I have good resources, Mr Owen. My resources amount to climate attachés around the world. If you count somebody who is an attaché in an embassy spending 30% of their time or more on climate, then we have about 80 people in the embassies around the world. I have a good team to work with in the Foreign Office here, in King Charles Street. As I land in a country, every half-hour is committed to high-level meetings, because we have people permanently stationed in our embassies.

Albert Owen: So you have the back-up and resources.

Sir David King: Tremendous support. Particularly overseas, I would say the support for my activity has been superb. I could not have possibly have made these trips, and had the impact that I think I am having, if I did not have that support on the ground.

Albert Owen: I am going to finish on that happy note, Chair.

Q82 Graham Stringer: I just want to follow up those points. You have talked a lot about research and the improvement in the efficiency of renewables. Do you think we have the balance right in this country between putting public money into research on improving the efficiency of alternative sources of energy and storage, as against the costs of renewing the power infrastructure in the country, which is, compared with renewing like-for-like, very expensive? Do you think we have that balance right, or would we be better putting some of that money we are putting into the energy power supplies into research, so that we get into the next generation of renewables?

Sir David King: Mr Stringer, it is a very good question you are asking, because I do not think we are putting nearly enough public money into research in this area. When I was in Government previously, I was heavily involved in setting up the Energy Technologies Institute, which, as I said, was a public/private enterprise, half the money coming from Government, half from the private sector. I think that was a good model. But in terms of the importance of infrastructure roll-out, £200 billion is the estimate over 20, 30 years, whichever form of energy roll-out we use going forward in time—I am talking about old stock being replaced—I do not think there is enough support going into publicly funded alternative energy research, infrastructure development and so on, but we are moving in the right direction.

Graham Stringer: Thank you.

Q83 Mr Lilley: Just briefly, you said you persuade people by showing them the opportunities and warning them of the risks. You have, in the past, asserted that the mass-extinctions at the end of the Mesozoic were because CO₂ at that time reached 1,000 parts per million, and it might do so by the end of the century. Do you stick by that assertion?

Sir David King: I have been reported as saying that—

Mr Lilley: Yes, to Parliament, among other things.

Sir David King: If you can quote me from *Hansard*, I would be interested—

Mr Lilley: No, it will not be in *Hansard*; it would have been in a Committee. Well, if you did not say it, that is fine.

Sir David King: I certainly would not say anything quite as unscientific as that.

Mr Lilley: “Professor King claimed that” 60 million years ago “No ice was left on Earth. Antarctica was the best place for mammals to live, and the rest of world would not sustain human life,’ he went on, warning that, if humanity did not curb its burning of fossil fuels ‘we will reach that level by 2100.’” On an earlier occasion you said it to MPs, but if you did not say it, that is fine.

Q84 Chair: Where is the reference from, Peter?

Mr Lilley: The book is Christopher Booker’s book.

Sir David King: Christopher Booker is a very accurate reporter.

Mr Lilley: He is. He is very useful, but if you are denying it—

Sir David King: I am actually not suggesting that he isn’t, but can I say what I did say? Yes, 60 million years ago we went through a climate maximum in temperature, and at that point there was no ice left on Antarctica. Antarctica, which is a large continent of course, was a sub-tropical forest at that time, and there were large mammals. If you drill down through the ice and get to land, you will find evidence of these very large mammals that existed in Antarctica at that time. The temperature between the tropics was excessively high, and for large mammals not a good place to survive. That is what I said. What I then said—this has been totally misquoted both there and in the media—was that as we go forward in time, we could, if we burnt all of the fossil fuel available to us, return the planet to that sort of condition. I would never say that we could do that by the end of this century, which I think was a newspaper reporter distortion of what I said. I think it is likely that by the end of this century temperature rises will be of the order of 4.5° C, not 12° C, which would take us back to 60 million years ago.

Q85 Mr Lilley: You don’t think the mass extinctions that happened at that time were due to CO₂? I thought most scientists thought they were due to other reasons, the extinction of the dinosaurs—

Sir David King: No, I would never have said mass extinctions were due to that. In fact, I specifically referred to the large mammals having a comfortable life on Antarctica.

Mr Lilley: It was the dinosaurs that were extinguished. We survived.

Sir David King: Dinosaurs were extinguished well before that.

Mr Lilley: 65 million years ago, yes.

Q86 Chair: We are just concluding an inquiry into the IPCC risk assessment report, or that part of it that has been published so far. Do you have any observations to make on the document?

Sir David King: On the IPCC AR5?

Chair: Yes.

Sir David King: I think it is an enormous piece of work by the scientific community and it can only be said that there is no better account of the current state of understanding of climate science than represented by that report. It is a very hefty piece of work. It has been extremely carefully constructed and the summary is exemplary in its presentation. It has been very carefully presented.

Chair: Thank you. We have had a good run round the issues this morning. You have been very generous with your time and we are very grateful to you.

Sir David King: Thank you very much, Chairman.