



HOUSE OF COMMONS

Scottish Affairs Committee

Oral evidence: [Renewable energy sector in Scotland](#), HC 745

Wednesday 2 March 2016

Ordered by the House of Commons to be published on 2 March 2016.

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Members present: Pete Wishart (Chair); Kirsty Blackman; Mr Christopher Chope; Margaret Ferrier; Chris Law; John Stevenson; Maggie Throup

Questions 68-110

Examination of Witnesses

Witnesses: **Joan MacNaughton**, Executive Chair of the World Energy Trilemma Study Group for the World Energy Council, and **Angus McCrone**, Chief Editor, Bloomberg New Energy Finance, gave evidence.

Q68 Chair: Good afternoon and sorry to keep you waiting. We have had a little bit of private business that we had to attend to, so we are grateful for your patience. To start the session, if you tell us who you are, what interests you represent and if there is any brief opening statement you would like to give the Committee. We will start with you, Ms MacNaughton.

Joan MacNaughton: Thank you very much. I am Joan MacNaughton and I do not represent anybody. I do some work with the World Energy Council pro bono; I chair their annual policy assessment of countries' energy policies. I sit on various academic boards and I do work with the International Emissions Trading Association and the Energy Institute, but I don't have any conflicts or any agenda, other than my interest in energy and climate policy.

In terms of opening remarks, the Committee will probably be, if not familiar, possibly even tired of hearing calls for predictability and certainty in policy. I think that is something that we do need to pay attention to. Most of the concern is over the announcements last year on renewables subsidies and changes in policy, including to zero-carbon homes and the

carbon capture and storage pilots; the cumulative effect is to increase uncertainty for industry and investors and to increase the perceptions of risk.

In 2014 we worked with business leaders and investors to understand what it would take to get the required amount of investment flowing into clean energy. The two issues that were highlighted by business leaders and investors were the nature of the risk and reward equation, as they put it, and perceptions of policy risk. They stressed to us that they could manage market risk—they were used to that—commodity risk, technology risk, execution risk. But policy risk they find very difficult to deal with because it is so unpredictable.

Of course, we have heard about the reasons for the changes and there seems to be some general agreement, including from the Committee on Climate Change, that the rate of deployment of renewables is on track for the 2020 target, at least as regards the power sector, and that deployments being higher than planned, so the pipeline is already full. I think the difficulty is that, although the recent changes have been justified in their own terms in relation to keeping a cap on cost and on affordability, that is quite a short-term perspective on cost because it is not taking into account this perception of risk and the risk premium in the medium to longer term. Indeed, as far as carbon capture and storage goes, we have seen a move away from that as a solution, and yet I think the Committee on Climate Change says that would halve the cost of meeting our targets long-term.

Q69 Chair: Thank you, Ms MacNaughton. There are a number of things in there and what we hope to do, during the course of this conversation today, is explore some of these issues in detail. Unless there are any concluding remarks that you have?

Joan MacNaughton: I would just make one point, if I may, and that is that to give the certainty and to enable the industries to build—and they do need time—we need a sense of what the vision is. We need a sense of what the future is going to be beyond 2020 and beyond 2030, because these are very long-term issues and, essentially, what we are doing is transitioning from a legacy capital stock, which has been built up over a century, to a whole new way of doing things. Therefore, I would urge the Committee to think about that longer term perspective and that overall vision when it comes to look at some of the detail of its inquiry, if I may, Chair.

Q70 Chair: Great, thank you ever so much. Mr McCrone?

Angus McCrone: Thank you very much, Chairman. Good afternoon. I am Angus McCrone, Chief Editor of Bloomberg New Energy Finance. New Energy Finance was originally an independent company set up in 2004. We were taken over by Bloomberg at the end of 2009. We are about 200 people and we look at what we call the energy transition on a worldwide basis. Those 200 people are sprinkled through almost every corner of the globe. We are looking not just at renewables but also what we call energy-smart technologies, which means things like energy efficiency, demand response, the balancing of the system, electric vehicles. We also look at gas because, whether you like it or not, gas is going to be part of a lower carbon transition for quite a while. We crunch a lot of the numbers that people use as their authoritative gauge of how investment is going in the sector worldwide. For instance, in 2015 clean energy investment was \$329 billion worldwide, up 4%, and that was a new record. For the first time developing countries invested more in clean energy than developed economies, so that was an exciting change.

Q71 Chair: This is the second evidence session we have had. We had a couple of representatives from the renewables sector last week giving evidence to this Committee. What we heard is that the UK Government's changes to support for the renewable energy sector would have a significant and adverse impact on Scotland in the future. What was your reaction to the changes the Government has made to the ROCs, the Renewables Obligations and Feed-in Tariff, and what do you make of the delays that have been made to the Contracts for Difference? What are the impacts that you have assessed? We will start with you, Mr McCrone.

Angus McCrone: I would certainly describe it as an unfriendly term in terms of policy towards renewables that we have seen with the new UK Government. The previous Government, with the Liberal Democrats in the hot seat of the Department of Energy, had achieved a lot in terms of renewables deployment. The percentage in the electricity mix had gone up from 6% in 2008 to 23.5% in the third quarter of last year and it would probably be around 25% for the whole of last year. But, as you say, the new UK Government has taken steps on ROCs, on delaying the CfD auctions, on subsidies for onshore wind and cutting back the Feed-in Tariff for solar, which have all amounted to a fairly unfriendly term and they have prioritised, at least in words, the building of gas and nuclear rather than renewables.

The lodestar of the whole policy is the Levy Control Framework, which is a formula for renewable energy support and it is on the basis that the Government works it out. It is sort of bumping up against the limits that they have set. However, we have fairly strong reservations about the Levy Control Framework and we question whether LCF should stand for low credibility figure. We think it is right to measure the amount of renewable support, but it needs to be done on a better basis than it has been done.

Q72 Chair: We want to come to the Levy Control Framework, if we can, in the course of our questioning to you this afternoon. Ms MacNaughton, you raised concerns that the recent policy changes were not signalled beforehand and that there has to be some sort of predictability about what is going to happen. It was a clear intention of the Conservative Party manifesto that the Renewables Obligation would be phased out. There was every indication given that this was going to happen to the sector, so shouldn't the sector have been prepared for the changes that were going to be coming?

Joan MacNaughton: I would make two points in relation to that. The first is that I think the actual commitment was to—I think the term was—no new subsidy. It is possible to interpret that in different ways. One might be that you weren't going to offer new subsidies post the planned closure of the Renewables Obligation. It is sometimes very difficult for industry to interpret Government or political language in trying to make their plans. One should not underestimate that.

The second point I would make is the way in which it has been done, because what we have seen is some very specific changes but also some ambiguity and uncertainty around the future. We still don't know exactly what further CfDs there are going to be in this Parliament. We have been told there will probably be two and there will be terms set out, but that hasn't been made clear yet. There is a consultation on the FIT scheme, which has just closed and the Government just announced that last week, but at the time of the changes last summer what was happening there at the small end of the sector was not clear. At the time of the announcement some of the exemptions were not made clear so—

Q73 Chair: The Government have every right to fulfil a manifesto pledge that has been given and that is exactly what this Government are doing. Is there any way they could have achieved their objective in terms of the policy change; it could have been handled differently perhaps or even handled better?

Joan MacNaughton: I think a counsel of perfection would be if the industry were consulted about the announcement. I know the announcement was in terms of a consultation because you have to consult before you go firm on a policy, but it was pretty clear what the intention was when the announcement was made. As I understand it, large parts of the industry were not clear just what the exemptions would be, what the grace periods would be, at that time and they didn't have long from the announcement last summer until the closure. I think there is something about the way in which you handle the change, the way in which you allow people the time to adjust.

One of the issues is that, if you do that and you are looking to 2020, quite a lot of the capacity that has built up will now be eroded. It will leave the market. Once that has gone it is very difficult to get it back and people will have had their fingers burnt. Some people who might have made commitments might not be so willing to do so again. Yet we know, post 2020, if we are going to meet more ambitious targets, that we are going to need that kind of industry and we would like it to be thriving and we would like it to be home-grown.

Q74 Chair: Mr McCrone, the Government have taken action to end any new public subsidy for onshore wind farms in line with their commitment in the manifesto, but you say that if the Government can come up with a form of words to the effect that the CfD is subsidy free there might be room to go forward. Are you proposing that a CfD with a strike price doesn't offer any subsidy and, if you are, how does that work in practice?

Angus McCrone: It is not just me putting the idea forward; there is quite a bit of talk in Government circles and in the industry about it. We are in realms of semantics to some extent, because the wholesale electricity price is so low that there isn't any form of generation that could be built solely on the basis of the wholesale electricity price. In order to get gas-fired power stations built or nuclear or renewables, there needs to be some other way of making it economically viable. A price could be set that could be regarded by the Government as effectively subsidy free, but it would inevitably be above the wholesale price because nothing is going to get built at that price.

Q75 Chair: Are the Government likely to look sympathetically on that type of approach? Has there been a conversation with Government to see if it is something they are attracted to?

Angus McCrone: I do not have my antennae that close to them, but I have heard that being mentioned as a possibility by Ministers and by civil servants as something that they are prepared to look at.

Q76 Chair: Lastly, on the recent announcements, were you surprised with the decision to end all support to onshore wind coming in earlier than the range of options that seemed to be available to the Government? I think the manifesto commitment was over the period of a Parliament, and then we heard onshore wind was to be curtailed earlier than the rest. Did that

come as a surprise to you and what has been the impact of that decision on confidence in the sector, for example?

Angus McCrone: There has been that impact and certainly we are expecting a big fall back in onshore wind deployment in the UK, so inevitably there are going to be businesses lost, jobs lost and companies looking elsewhere. Was I surprised by it? In some ways, yes. On the other hand, I think one of the effects of the Conservatives not being in charge of the Energy Department in the last Government was that they were not focusing on it that clearly, so a lot of stuff got into the manifesto that maybe had not been thought through that carefully. Then they had to put it into practice. So I am not surprised that things got off with what I would regard as some missteps in the new Parliament.

Joan MacNaughton: Yes, I was surprised. I was surprised at the suddenness and the lack of preparing the ground and slightly disappointed at the sole focus on 2020, because we know that this isn't a process where you just hit a point target by a point time. This is a long-term transition. It is about building the capability and I don't think the suite of announcements go with the grain of that. We know that there are going to be real challenges in meeting the carbon budgets after 2020.

Chair: I am grateful to you.

Q77 Mr Christopher Chope: Joan MacNaughton told the Scottish Parliament that, in terms of energy prices, the relative affordability ranking for the United Kingdom had become much worse as a result of things that had happened in the last three years. How much worse? Where were we in the world rankings and where are we now?

Joan MacNaughton: We were eighth on affordability in 2013, 22nd in 2014 and 30th in 2015. I should make clear, we measure what we measure for this work and that ranking was driven by the cost of electricity but it covers affordability of things other than electricity, so it also covers petrol. We look at it in proportion to household expenditure on other things. It is quite a complex measure. Of course, the other thing is that if other countries are doing things that make their energy more affordable, for example by reducing taxes or because wholesale prices represent a bigger proportion of their expenditure on energy, which is the case in many countries, then they will have come up the rankings and that will have depressed the UK ranking.

Q78 Mr Christopher Chope: What you have described is bad news for UK consumers, you would agree with that?

Joan MacNaughton: In one sense, yes. But I think one needs to bear in mind, first, that the amounts involved are quite small, that they do not take account of energy efficiency benefits, which is one of the things the Government puts great emphasis on—it is not just the unit cost of energy but the overall bill—and that we have a long-term vision to make this transition. We are going to have to fund the transition at a time when we are operating the old system as well. We are going to have to fund that investment. The question is how we best do that in the most affordable way over the medium and long term.

Q79 Mr Christopher Chope: So if the Government had not intervened to say that it thought too much money was being spent under the Levy Control Framework, things would get even

worse for the consumer. As I understand it, you have been arguing that you would be quite happy for things to get even worse for the consumer?

Joan MacNaughton: I don't think I have said that the Government should not have intervened. I think I said that you can see that, in terms of the Levy Control Framework, the announcement could be justified in those terms. I can absolutely see that you would want to control the costs, particularly in the current economic circumstances, but I think you need to take the broader view around what that impact will be on the costs going forward. If you increase the cost of capital for investment, then you are going to increase costs for the future. That is a very, very significant factor, which Angus is far better qualified to talk about than I am. What I have been saying is that the way the intervention was handled probably added to costs and it came on the back of—this is not a point directed at one particular Government—some pretty strong announcements on energy prices, which also damaged confidence and damaged perceptions of political risk in this country.

Q80 Mr Christopher Chope: What else do you think the Government should have done?

Joan MacNaughton: Obviously with hindsight we all have 20/20 vision, but the electricity market reform is incredibly complex. It is possibly over complex. I don't think the interaction of some of the elements of the reform are ideally configured and probably, at the outset, one ought to have had some indication that, if deployment was faster, the changes would be triggered and some indication of what those changes might have consisted of.

Q81 Mr Christopher Chope: That is with hindsight, you are saying. You are saying there should have been more notice of this but the opportunity for that has passed. We are now where we are. What do you think the Government should be doing that it is not doing?

Joan MacNaughton: Good policy in this area involves two things. First, consultation with industry about what is feasible to achieve and what the review points are likely to be. I don't think one can set out on a policy in this area, given the longevity that the policies will have to have, without envisaging review points. I think one should say that and then one should say what the triggers are for them. A lot of people have been saying that for many years, and not just with the benefit of hindsight.

Q82 Mr Christopher Chope: What does Mr McCrone think about all this?

Angus McCrone: I think the whole thing is exaggerated. The cost of support for renewables is the equivalent of half a cappuccino a week per household at this point, so it is not big bucks. We have next to zero inflation and it has been blown out of all proportion, to be honest. That does not mean that you should not measure it and you should not keep tabs on it, and you should not do your best to keep costs coming down, but in the end the previous Government had hit upon a good mechanism to do that, which was the CfD auctions. You will see that prices for projects, onshore wind and offshore wind, for instance, in the February 2015 auction were 10% down on the previous support levels, so it was a way of pushing prices down and encouraging companies to look for cheaper ways of doing it. They had a good policy but they have now thought differently and are pursuing a different direction.

One example at the moment is Hinkley. You have a project there that is 3.2 gigawatts but, in subsidy terms, if we had a constant wholesale electricity price it would be the equivalent of subsidising 30 gigawatts of onshore wind. It is hugely expensive and it is perhaps the world's most expensive power station. Yet the Government wants to do that but it has cut back massively on renewables at the point at which costs were coming down in quite a satisfactory way.

Q83 Mr Christopher Chope: Obviously nuclear is a baseload, and we are not discussing that now. You express the affordability in what might be described as rather Islington-type terms of cappuccinos. If one looks at it in terms of percentages on bills, we are talking about 14% on a household's energy bills. When one thinks about the big row that there was when a Conservative Government increased VAT on fuel to 15%, and then had to reduce it as much as it was allowed by the European Union to 5%, that is the area that we are talking about. We are talking about 14% extra on the cost of people's bills just as a result of this issue.

Angus McCrone: One thing that the Government does is it publishes bills on the basis of an assumption of constant usage. On that basis electricity bills have gone up by 25% over five years, but electricity consumption has come down pretty heavily. If you look at what has been the increase over five years, as a result of all causes, it is only 14%, not 25%, so they ought to be focusing on what people are paying rather than an assumption of constant electricity consumption, which is what they are doing at the moment.

Chair: A supplementary from Chris Law.

Q84 Chris Law: My question has changed because you have answered most of what I thought, but isn't it a question that the UK Government's view being shut down is penny wise, pound foolish? That if we are going to be meet the 2030 targets and we are not investing now, as we reach that time getting closer we suddenly find we have to invest inordinate amounts of money, whereas if we started right now going forward we would not have such a surge. Would you agree with that position?

Angus McCrone: I think I would but I would also say that, particularly in relation to offshore wind, there is an industrial policy area as well. Britain is great at being early with new technologies but then not following them up and then somebody else ends up with the expertise. At the moment, in offshore wind, the UK is the world's largest market, followed by Germany. The Chinese are just getting into it now. If there is a significant hiatus with the offshore wind programme then a lot of those skills will end up going elsewhere and we will not get the inward investment that we would get if the policy was more consistent.

Q85 Chair: Is Mr Law right that if we make the investment just now, particularly when we have targets to meet and we have had the Paris conference and there is a whole range of Scottish Government and UK Westminster Government targets, surely it would be considered an investment if we did invest into new plant at this stage in order to try to meet these targets at the same time? Once it is in place as a resource, is it not the case that it will be self-financing and self-funding?

Joan MacNaughton: I am not sure whether it will be self-financing, but one of the things that one is struck by is the fact that the costings have all been done in a very specific way, in relation to the cost of electricity in particular. Whereas in fact, if you look at things

like the job creation and the potential for export earnings of the expertise that has been built up, in relation to the wind sector in particular, then you may be looking at a more balanced scenario. The International Energy Agency calculated, I think two years ago, that any mitigation action that you take that you delay, you are talking about a huge multiple of how much more you have to spend to reduce your emissions if you leave it longer. We do know the clock is ticking on greenhouse gas emissions and we have to at least do as well as we have set out our plans to do with the carbon budgets.

Q86 Chris Law: One last question, going back to the point about the subsidising of nuclear energy, in particular the new Hinkley Point. Frankly, do you think this is an ideological decision that has been made by this Government? Because I cannot for the life of me, scratching my head, look at it in any other way, given the costs involved and so on.

Angus McCrone: I would hesitate to give it that description, but I am not going to fight too hard with you if you want to give it that description. I think there is maybe an outdated, rigid differentiation between baseload and variable generation. When I started in this job nine years ago or whatever, there was a view around, “You can have 5% intermittent generation and anything beyond that is going to be a real problem to integrate into the grid.” Whereas in the UK we are now in the mid-20s and will soon be in the high 20s; in Germany they are around 30%; in Denmark they are 40%. Grids have become a lot better at coping with variable generation sources, and within sight there are a lot of technologies that will enable balancing to happen much more easily than would have been the case in the past, power storage, for instance, being one and quick ramp up gas-fired generation demand response. Ways are going to come through that are going to enable renewables to be integrated in a much higher percentage, so I think this kind of rigid split between baseload and intermittent is a bit past it, as a concept.

Q87 Chair: We have already heard a few issues about Hinkley that may be becoming apparent in the course of the next few weeks, with some of the difficulties that that project is beginning to descend into. We were discussing what is perceived as the subsidy towards renewables and we don’t get the same sort of transparency when it comes to the other sectors, oil and gas and nuclear. It is a little bit unfair that, because it is transparent, because there is an obligation to include the renewables section into this in terms of bills, there isn’t an equivalent when it comes to the nuclear part of it.

Angus McCrone: I would say the Government is right to have a measurement of support for renewables, but also, in the same breath, it should be giving us figures for support for fossil fuel technologies. It is not good enough to say, “That does not come through in the electricity price in the same way.” But the public do end up paying for it one way or another, so the two should be talked about together.

Q88 Margaret Ferrier: This is a question on investor confidence. You mentioned earlier that the UK has dropped in rankings. The figure I have is from eighth to 11th in a list of the most attractive countries to invest in, in the renewables sector. Reducing or removing support, do you feel this has confused investors and companies and will they look elsewhere? Would you attribute that only to the recent policy changes or is it a bigger picture; are there other reasons for that? That is to you both.

Joan MacNaughton: I would say that it is not just the individual policies, but it is the sense of the short-term decisions and a short-term focus that is the issue. If you have a very clear route to where you want to be and what your proportion of renewables will be in, say, the mid-2020s, then you would expect the industry to be able to weather some changes in the orders, because that is the sort of thing that industry copes with. It copes with ups and downs in the order book. But is there going to be a market, how big is it going to be and is that going to be enough to sustain capacity from which people could then go abroad with their exports? I think the investors have a lot of potential places to invest and, as I said at the beginning, if the political risk is perceived as very high, they will go to the places where it is perceived as less high, even if you know it is going to exist in most countries, because countries will have to respond politically—that is why we have democracies. But it is about how you do it. It is about how much you signal what the parameters are of that uncertainty for the future, and it is about giving a sense of what the direction of travel is. We don't have that post 2020 at the moment. We don't know what is going to happen on the CfDs, which, as Angus said, is a good mechanism for driving cost down. I do not know—none of us knows—what is going to happen with the Levy Control Framework. This creates a situation in which it is very difficult to start making plans for large investments.

Angus McCrone: What I would say to the question is that investor confidence was very high in the UK as a place to do business in renewables. In 2015, the UK saw the fourth highest level of investment of any country worldwide, and the biggest in Europe by some margin, so it was certainly in good odour with investors at that point. At the moment, there is certainly a wobble. One thing the Government has not done, which it should be commended for not doing, and that is it has not made any retroactive changes to the support that was promised for existing policies, unless you count the cut in the climate change levy support, but that is an arguable one. Some countries in southern Europe did make retroactive changes to support for projects—Spain in particular, but also Italy and Greece and the Czech Republic—and they paid a heavy price in terms of investor confidence, not just in this sector but investor confidence generally.

Q89 Kirsty Blackman: I want to ask about intermittency to Mr McCrone, who has already mentioned this but just one further question on it: in terms of our energy supply, how can the system be managed? What kind of energy mix do we need in order to ensure that we have security of supply?

Angus McCrone: By “we” we mean the UK rather than—

Kirsty Blackman: Yes.

Angus McCrone: There are a lot of choices. Nuclear has a role, if it can be done at an economic price; gas certainly has a role, partly as baseload, partly as back-up for renewables and to deal with demand spikes; interconnectors have a big role. That is a focus that Europe has at the moment. It is trying to encourage the building of more interconnectors between countries so they can share energy when one is short and the other is long. Also intelligence in the grid has a big role, so one of the big changes over the last few years is that the National Grid has become really good at predicting exactly when it is going to need extra power and how much wind generation there is going to be at a particular hour of the day in a day or two's time, not just on the immediate horizon; demand response, where industrial customers can turn on and off devices in order to balance the demand and supply in the grid; electric vehicles, when they become more important, will

be part of this as well. There are a lot of different options and it is an area of great interest on the part of investors at the moment, of how this is going to be done in a modern economy.

Kirsty Blackman: Would you like to add to that?

Joan MacNaughton: I would. I agree with everything Angus has said. I think it is quite important, though, that we recognise that we don't know what the Government vision is for how much of a role the smart grid will play, how much of a role demand side response will play. The point about gas is that it is really valuable as a transition to a very low-carbon energy mix in decades to come, but it will not be if it is not accompanied by carbon capture and storage. There are real concerns that in the mid-2030s, the emissions from gas-fired power generation in the EU are going to be higher than those from coal-fired power generation. A lot of people think that carbon capture and storage is just about coal. It is not, and it is absolutely crucial to getting renewables to play as big a role as they can in the grid in the future and in managing the transition overall.

One of the points I think we probably need to think about as a matter of public policy is how much value we place on diversity, as such, because we do not value that explicitly at the moment. I think if we did, that would be of interest in thinking, "What would be the extra value that you have from having a nuclear component to your generation? How important is it to keep your gas for the future and what kind of new risks arise when you are moving to a system in which you have all these extra components, the storage and the electric vehicles and so on and so forth?" It is articulating that over the medium to longer term, and by "medium" I mean mid-2020s—I don't mean 2018—because, for industry, 2020 is tomorrow.

Q90 Kirsty Blackman: In terms of diversity, is there a value in having a plan about what the energy mix is going to be 10 years down the line, and is it possible for the Government to predict what our energy needs will be in 10 or 20 years' time?

Joan MacNaughton: I think it would be a mistake for Government to be over-prescriptive. That might sound a little bit inconsistent with what I have been saying about the vision, but I think you need some broad outlines. You need to have processes and criteria for how you are going to get to the kind of system that you envisage, which will be an aspiration. You need to design your market so it is designed to get you there, but with trigger points, so that you can review and see whether it is getting you in the right direction at the right pace and which industry understands and buys into.

In terms of policy, I would give an example of this very long-term policy with flexibility built in. The Swedes said some years ago that they were going to take oil out of transport by 2030. What they do every so often is get together with the transport industry and look at the progress that has been made. They look at the instruments they are using, and they look at whether they need to be tweaked and what changes need to be introduced. Then they give notice of those changes, they monitor progress and then they review again. It is that kind of process approach but with some kind of parameters around what your ultimate goals are, and then the roadmap, which is obviously much more defined in the early part of the period and gets progressively vaguer and subject to review as you move into it.

Q91 Chair: I am interested in something that Mr McCrone said earlier about intermittency, and I think it was the relative comparisons you made between Germany and Denmark. What are they doing? Are they reducing the demand-side reduction or do they have improved technology for the storage? What are they doing that we are not, that we are so far behind when it comes to catching up on that type of issue with intermittency?

Angus McCrone: I do not think we are behind. I think our grid is as sophisticated as theirs; it is just that they were earlier into the whole process of building out renewables. The Germans and the Danes were ahead of us in terms of onshore wind, which is why they have the manufacturing industry concentrated so much in those countries, so they have just reached those higher percentages more quickly than we have. At the moment, I don't think the grid is screaming that it cannot cope with the renewables that it is dealing with. That is not the position.

Q92 Chair: Maybe you could help me with this one too. Are we ever going to be in a position where we will be able to deal with all issues to do with intermittency, or is that always going to be a feature for renewables? Is there any long-term solution that deals with all the difficulties with this?

Joan MacNaughton: One of the things you can do is invest in how you manage flexibility on the system, and invest in your forecasting. The grid has been doing that, but there is probably more you could do in the future: look at the whole value chain from residential use right up to what is happening at the power station and how you manage all of that in an integrated way, which implies a rather different role for the distribution companies from the one they have at the moment. It implies trying to utilise the demand side response, not just from your very big consumers but also from your smaller ones. With modern technology that should be feasible. But if you are going to do that, you need to be incentivising those kinds of services. To some extent, Ofgem started down that road with its last price review for the distribution companies and it has incentivised innovation there, but I think there is probably a lot more that could be done. Whether you can cope without the traditional concept of baseload depends on how affordable and manageable your storage becomes over that period because, with the way that technology is evolving on storage, it is quite conceivable we will get a point that you can do it with intermittent sources and storage and these sophisticated management approaches to the system. The cost of that transition will be dependent on getting the right policies and getting it right over time. Clearly, to the extent that you stop using assets in which you have invested and make big upfront investments in new assets, like large amounts of storage, you are adding in cost. There is something about pace there and the way in which you manage that transition.

Q93 Chris Law: I have raised more questions than I will have time for, but you have talked about incentives there. In a nutshell, given the current UK policy changes to the mix, do you think we are going to meet our obligations in terms of reducing carbon?

Joan MacNaughton: The Committee on Climate Change has done some very, very detailed work on it. They think that the Government is on track for its 2020 commitment, but they say that the underlying fundamentals are not yet on track for post-2020. That does not mean we are going to miss the targets. It means that you are going to have to put in place incentives, levers or regulations in order to bridge the gap. The gap gets wider the later you go through the 2020s, although we have not stipulated what our targets are after

2027 and we won't until the Government makes a judgment on the Fifth Carbon Budget, which it has signalled it will do by the end of the year.

Angus McCrone: I think you can take a view on the basis of what Government policy appears to be now, but I would expect Government policy to improve during the Parliament. Ministers have come in without necessarily having done this beat before and they will become better attuned to it over time, so I would hope that policy would improve and that there will probably be a more optimistic prognosis for the 2020s during the course of the Parliament.

Q94 Chris Law: I am not sure I share your optimism, given the recent things we have heard with regards to reducing the time in which we are going to support onshore renewables.

I also want to turn to another area, which is carbon capture. We had a £1 billion fund that was to be invested in Peterhead at the gas-fired stations. You just mentioned that if we don't start to tackle these now, by the mid-2030s we could be falling behind. Do you think that it is now impossible for us to meet international climate change targets with these kinds of policy changes that we are making?

Joan MacNaughton: I think there are two ways in which we could still meet the targets. One is that we buy the technology in. This is a great pity, because the UK had a lead. We have some very considerable assets, including storage under the North Sea and elsewhere, and I think this could be an area of growth in industrial capacity that we should be trying to build on. I think the withdrawal of the £1 billion is very unfortunate from that point of view.

The second thing that might happen is that we might see quite new approaches to capture of carbon and other greenhouse gas emissions. The technology is evolving all the time. There are new technologies appearing in relation to industrial emissions of carbon and, again, CCS is not about just the electricity sector; it is about industry generally. So they could be quite important. Given that we are going to be saving a lot of emissions through electrification—electrification of heat, electrification of transport—we have to get as low an emission grid and as low an emission power sector as possible. We need carbon capture and storage on the power sector, and the way to do that is through the kinds of projects of which Peterhead is one.

Q95 Chair: You probably did not hear this because you were travelling here, but there was a Prime Minister's question about carbon capture and storage. The Prime Minister said in response that they had a look at this and it was uneconomic. I don't know if you have any particular views: this £1 billion is an awful lot of money and I am certain that there would be lots of civil servants poring over this to see if it is value for money. Is it value for money to have a carbon storage plan in Peterhead, for example?

Joan MacNaughton: We do not know what Peterhead would have cost, because they were partway through their front-end engineering design, their feed study, which would have put the figure on it. But it would have been several hundred million. That would have been expensive, but that is a prototype. What we have seen in relation to wind and solar is it is the learning through deployment; it is the scale-up effects that bring the costs down. That would have happened with carbon capture and storage. There is no reason to think it is the only technology where costs do not fall as we scale up and as we deploy. That learning is

going to take place outside of the UK, certainly for the next few years, as we do not seem to be investing there. I do think it is a priority; it is a priority globally, not just for us.

Angus McCrone: I would say that progress on CCS has been pretty disappointing worldwide for the last few years. There are some projects going ahead, but often it is paired with enhanced oil recovery, so it only becomes worth looking at from an economic point of view if you can use the CO₂ to squeeze more oil out of an oilfield than would have been the case otherwise. But it has been disappointing and we cannot rely too heavily on it.

In response to Mr Law's question a moment ago on the carbon commitments, energy efficiency is going to be important to that and so are electric vehicles. If we can have a strong rollout of electric vehicles in the transport fleet, then that can make a big contribution, so there are different ways to skin this particular cat.

Joan MacNaughton: Can I come back on the disappointing progress? I should declare an interest here. I did work for a company that had carbon capture and storage technology and we did quite a lot of detailed costing. At that point, we could see costs of electricity generation and of cost per tonne of CO₂ avoided—if I can put it that way—that were entirely comparable in the future. That depended on Governments investing in the prototypes and on there being a market for carbon capture and storage. We don't have either of those, so I think it would be wrong to say that progress is disappointing and imply it is because the technology is not capable of delivering. I am not sure whether Angus meant to do that, but certainly the jury should still be out until we have done the work.

Q96 Chris Law: I am glad you have raised that point: it is not just about costs and about the impact of the cost on the renewables, but also about skills and jobs that we are losing long term as well. We had been world-leading in this and now it is passing us by. Sadly, sitting on the Committee, we hear this repeatedly.

I want to turn to long-term strategy, Joan, in particular, because you have talked about this before in the Scottish Parliament's Economy, Energy and Tourism Committee—I think it was in December—and you said that we need a vision for how the UK is going to carbonise and a roadmap for how we are going to get there. Tell me, isn't this what the carbon budgets are meant to achieve and, if not, what would you propose?

Joan MacNaughton: The carbon budgets are really important and I think they have been a world-leading bit of policy for the UK. All parties have been signed up to them and they all take the credit for that. They give you a very, very high-level vision of what the goal is on carbon reduction. What they do not do is give you the roadmap of how you are going to get there, so what are the relative contributions going to be from transport and heat and the electricity sector and demand reduction and energy efficiency? What is the role in all of that of the electricity sector, the smart grid and so on? We have to be more explicit about how these pieces fit together, how the dossiers fit together because, at the moment, I do not see very clear co-ordination across transport, across energy, across what is happening in the building sector. One of the things that we found made for very effective performance on the overall energy goals of affordability, cost and security of supply and environmental sustainability was good co-ordination.

Q97 Chris Law: On that note about the strategy, in Dundee, which I represent, I am pleased to say we are leading in the UK in terms of electric cars; in fact, we have 150 taxis that are

electric at the moment. That is a local strategy and I want to touch on that. Would a long-term strategy on carbon be something for the Government, and how would Scottish interests and the goals of the Scottish Government be represented in that?

Joan MacNaughton: What is interesting about this area—and one of the things that make it so fascinating—is that it has the geopolitics, the climate agreement in Paris. It has national politics and national policies of real importance, covering the economy, energy, covering social policy in terms of affordability, fuel poverty and so forth, and health. Then you have what happens on the ground, so what some cities are doing—and I have been travelling to Dundee recently for various reasons—is tremendous. They could be very valuable petri dishes because, at that local level, it is possible to have a co-ordinated approach around this stuff, which you cannot do at the national level. For example, you can have a city that is looking at the contribution of district heating, electric transport, what that will mean for the infrastructure, local initiatives on demand reduction, community schemes for provision of energy, which often has the feedback effect of making people more conscious of the energy they are using. I think cities and regions can have an important part to play here in showing what can be done and how these pieces can interlock together, then that can be looked at and lessons learnt for making policy.

Angus McCrone: I would say that on electric vehicles it is a very exciting area. Our forecasts are that by the mid-2020s—even if we continue with a very low oil price—electric vehicles are going to be cheaper on a total cost of ownership basis than gasoline vehicles, and that, by 2040, something like 35% of new car sales will be EV. I think there is a huge area to aim for here. What localities can probably do best is to look at emissions limits and also at the charging infrastructure, what they can do on those areas to try to help this process forward over the next 10 years.

Chris Law: May I welcome both of you to Dundee in the near future to see what we are getting on with? Thank you.

Q98 John Stevenson: You have both touched on my question to a large extent. It is about transport and heat, which is obviously a major part of energy use. How does the renewables sector contribute to the decarbonisation of transport and heat?

Angus McCrone: One of the interesting things about electric vehicles is obviously that, to a large extent, the contribution that they make to getting emissions down depends on where the electricity comes from. If you are driving an electric vehicle but the electricity is coming from a coal-fired power station, then it is not nearly as low carbon as if it is coming from renewables. The contribution that renewables can make there—at least, zero-carbon electricity—is to amount to as much of the electricity mix as possible that will then drive the electric vehicles. In heat, as Joan was saying, we are going to see greater penetration by electricity in the heat network, so again a similar consideration applies there.

Joan MacNaughton: I would add one point on heat and one on transport. The Government have announced quite a significant investment, up to 2020, on renewable heat and they have published some evaluation. What that seems to show is that people are still not very comfortable with new technologies. There is rather a preponderance of using biomass for renewable heat, woodchips and so forth, compared to new technologies, like air source heat

pumps. The point I want to make about that is that if you are going to move beyond the familiar, you need a lot of effort to educate people; you need them to feel comfortable that the technicians will be qualified and will be able to sort out any problems, if they have something that is not just a boiler with a different input of fuel. I don't know that we have been thinking hard enough about the skills challenge for the future and training people in the right way there.

Q99 John Stevenson: That is an interesting point. From the consumer's perspective, you are absolutely right, there are too many alternatives; they can get a little bit confused and, therefore, stay with the traditional and what they know. Where should the industry focus, then? Should there be a focal point? Should they concentrate on one issue, one thing, to take the consumer with them?

Joan MacNaughton: It is a question of the interaction between policy and the market as well. What kind of market is the policy going to create? Should Government be comfortable with the fact: well, if biomass is what people want then that is fine. Or should there be the question of: well, we know there are going to be limits to the production of biomass and biofuels and there is other competition for those resources, and so we ought to be nudging people into the other area? We do need to think about the skills piece here, both for actual things like heat pumps, but also the whole insulation piece and so forth. The challenge is huge and I am not sure the pipeline of people coming through with the right skills is there. I am not sure it is there for traditional building, never mind this.

On transport, there is an important point of public policy and that is in relation to rural communities. Many rural communities have to travel quite a long way to get their cars filled up, whereas it would be very, very easy to put in place charging infrastructure, much easier than having the kind of frequency of petrol stations that we used to have in some parts of the country.

Q100 John Stevenson: What do you think they should focus on?

Angus McCrone: I suppose I think that renewable heat is going to be a pretty difficult area to make big headway in. Heat pumps have some potential, biomass heating has some potential, combined heating power has some potential, but you are not going to make the same fast progress in that that you have made in electricity. The area where a lot can be done is efficiency in terms of heat. That is probably the area that Government should focus the most resources on.

Q101 Chair: I have a figure here—I do not know whether it is accurate or not—that says that only 3% to 4% of non-electric heat and transport needs are currently met by renewable sources. Is that about right, 3% to 4%?

Angus McCrone: 3% to 4% of?

Chair: Of non-electric heat and transport needs, are currently met by renewable sources. That is non-electric heat and transport.

Joan MacNaughton: I would think it is very small.

Q102 Chair: This is from Scottish Renewables, who have given us that evidence. I think it surprised this Committee that it is so low. That is why it is interesting hearing you talk about this just now and some of the things that could be done to improve it. It is pretty depressing if we are saying that, in terms of heat, there is going to be very, very slow progress in order to try to address this.

Q103 John Stevenson: Can I continue? Just picking up on that point, what do you mean by “efficiency”?

Angus McCrone: I mean things like insulation. I mean intelligent thermostats that can mean that houses are heated on an optimum basis and—

Q104 John Stevenson: Just so I get to your point, you think that is an area that Government should concentrate on?

Angus McCrone: Faster progress is possible there than on ramping up the percentage of overall heat that is going to come from renewables. They should try that too. I do not know whether Joan agrees, but I think it is going to be tough to get those percentages up.

Joan MacNaughton: It is going to be tough. I agree with the focus on efficiency, but I don’t think it is either/or; I think it is both. The challenge there is that you are going to need the right incentives, the right awareness and education, and you are going to need the right skills in the pipeline. These could be good jobs. These could be absolutely right for the whole apprenticeship initiative, but it needs some thought and you need to link up the work that is going on on apprenticeships with the energy requirements and with this point about starting from a very low base, and how quickly can you build that expertise.

Q105 Margaret Ferrier: My question is on the co-ordination and engagement between the UK Government and the Scottish Government. According to Scottish Renewables, it is not clear what part the Scotland Office played in recent decisions and things such as the Renewables Obligation, to onshore wind and the Contracts for Difference allocation around last year. With the UK and Scottish Governments having their own carbon emission targets and energy strategies and different powers for pursuing them, do you have any views on how the devolution settlement affects support for the renewable sector in Scotland, and how specific Scottish interests are represented when the UK Government are forming the policy?

Joan MacNaughton: I am not familiar with the co-ordination that has gone on. I would say that it would be good to have visibility of what the interaction is between the Scottish targets and the UK targets, because there must be some assumptions in the UK targets about what the progress is going to be in relation to the Scottish targets. It would seem sensible for there to be discussions to avoid the situation where you get different approaches north and south of the border.

I am not saying you cannot have difference, do not get me wrong. Obviously, you are going to have differences. But what you do not want is a policy in one part of Great Britain that will damage the achievement of policy in another. It could be either way: either Scottish policy damaging the UK achievement or the UK policy overall impacting adversely on Scotland. That is said conscious that there are some very significant powers

that the Scottish Government has, which it can use and some of which it has been using in pursuit of its own targets. I think it will be very interesting to see how the planning powers work out, which of course are devolved, because I think in many respects it has probably been easier to get planning permission for some renewable developments north of the border than south of the border.

The emphasis there on innovation and R&D funding from the Scottish Government could be powerful. It would not matter if you are having a bit of a competition there, because we need a lot more innovation and R&D, so personally I would not mind if both sides of the border were working very hard to build up there. What you would not want to do is be building up in one area and then poaching from the other in a very explicit way that damaged the prospects of attainment in the other area. I make that point symmetrically: it is not just about what the UK might do that might be uncomfortable north of the border; it is also about what Scotland might do that might be uncomfortable.

Q106 Margaret Ferrier: Obviously, the Renewables Obligation is a big one—how that policy will affect Scotland—so I feel that that is a wrong move by the UK Government, so that is going to impact on Scotland. I do not know if you agree with that?

Angus McCrone: One area where Scotland has done something that the UK has not necessarily done to the same extent is on wave and tidal, where the Scottish Government has rolled the dice pretty hard in both of those two areas. So far it has rolled one on wave because some of the companies that it backed have gone out of business and progress has been quite disappointing. On tidal, it has also backed that sector pretty hard, and so far the prognosis seems a bit more promising. There is a lot riding on the MeyGen project that the Scottish Government and some of the agencies have put a lot of money into. That is one area where there is definitely a different emphasis between the two.

Q107 Chair: One thing we heard last week that was quite interesting was that there may be a difference in approach between Scotland and the UK, where we stand to look at this perhaps a bit more organically, with some of the micro industries that have emerged and that are becoming community assets and community-based, as opposed to being the big, prescriptive models that are imposed upon communities. It is certainly something that we heard last week that interested this Committee. I don't know if you have a particular view or if it is something you have observed or something you feel, given that we have this huge resource in Scotland, which we are always told is about the most valuable in the whole of Europe. There must be more creative things that we can do to harness this, to involve communities in terms of the planning of this and making sure it is seen as a resource and not just something we have to purchase and use and buy. Is there anything you could help the Committee with in relation to that type of approach?

Joan MacNaughton: As I said a moment ago, the evidence is that when communities do get engaged there are all sorts of other benefits, from increasing awareness of use of energy and climate change and so on. I am sure there are other benefits in terms of cohesion generally. It is obviously a very good thing. I think that you are very dependent on having people prepared to put in the time in communities, because clearly these things cannot be managed or run, by definition, from outside. It does depend on whether the community is willing to engage, but if people feel that they are being encouraged and incentivised and the pay-off is going to be worth it—

Q108 Chair: We would be interested in Mr McCrone's view. One of the other things we heard from the Secretary of State, as part of the change of policy and the restart, was that communities would have the final say on any onshore wind applications. I have a massive rural constituency with loads and loads of wind farms. I am a veteran of many debates in community centres and church halls, where communities have been totally hostile and opposed to even the suggestion of a wind farm but who now live side by side with community funds that help to support and supply these communities with resources and facilities. Is that going to be a difficulty, where communities are encouraged to have the last say and the initial hostility might not grow into a great, deeper affection over time and an accommodation?

Angus McCrone: Germany has been very effective at having community buy-in much earlier on in wind projects than we have often managed in the UK, and I think maybe Scotland is a little bit ahead of the rest of the UK in terms of trying to get communities involved earlier on. It could work out, and the change of emphasis could work out quite well in the end, where people see an economic opportunity rather than something that they do not want on the landscape.

Q109 Chair: We are all off to Orkney next week. I do not know which of the two of you mentioned the island communities and the opportunities that they may have when it comes to this. We are interested to see how some of the island communities are responding to this, how they have been able to harness it and how they have been able to develop community assets. I don't know whether you have any particular view about some of the rurality issues that we have. Mr McCrone mentioned that this is an opportunity for rural communities. I don't know if you have any further views about how rural communities could start to use this asset and resource a bit more effectively?

Angus McCrone: There may be a huge opportunity for Orkney in particular, because it is not too far off the north coast, and the grid links necessary to link it up to the main grid are less enormous than would be the case in some of the other islands. There is a big opportunity, obviously, on tidal for them and a big opportunity in onshore wind, if the Government allowed island projects to get a fair crack of the whip in the CfD round, and that is not clear at the moment.

Q110 Chair: There is talk of islands being exempted, isn't there, from a lot of the CfD regulations and perhaps some of the Renewables Obligations? These are the sort of things that we want to explore and look at, too.

Angus McCrone: Yes, that is all up for grabs at the moment.

Chair: Yes, indeed.

Joan MacNaughton: Yes and the size of the community fund. I would say that there is a strong case for arguing for that to be as strong as it could be. Having cycled in Orkney last year, I can testify to the quality of the wind resource, but it is not necessarily in your favour.

Chair: We have the weather resources in Scotland, that is for sure. I am very grateful to both of you and you have really helped this Committee. If there is anything further you feel that you have not been able to put across, or any further evidence you feel might be useful,

please send it in and we will obviously take that forward. Thank you very much for attending this Committee session today.