



**Cynulliad Cenedlaethol Cymru
The National Assembly for Wales**

**Y Pwyllgor Cynaliadwyedd
The Sustainability Committee**

**Dydd Mercher, 9 Gorffennaf 2008
Wednesday, 9 July 2008**

Cynnwys
Contents

- 3 Cyflwyniad, Ymddiheuriadau a Dirprwyon
Introduction, Apologies and Substitutions
- 4 Ymchwiliad i Leihau Allyriadau Carbon yng Nghymru: Sesiwn Dystiolaeth ar
Gynhyrchu Ynni
Inquiry into Carbon Reduction in Wales: Evidence Session on Energy Production
- 22 Ymchwiliad i Leihau Allyriadau Carbon yng Nghymru—Sesiwn Dystiolaeth ar
Gynhyrchu Ynni
Inquiry into Carbon Reduction in Wales—Evidence Session on Energy Production

Cofnodir y trafodion hyn yn yr iaith y llefarwyd hwy ynndi yn y pwyllgor. Yn ogystal,
cynhwysir cyfieithiad Saesneg o gyfraniadau yn y Gymraeg.

These proceedings are reported in the language in which they were spoken in the committee.
In addition, an English translation of Welsh speeches is included.

Aelodau'r pwyllgor yn bresennol
Committee members in attendance

Lorraine Barrett	Llafur Labour
Alun Davies	Llafur Labour
Michael German	Democratiaid Rhyddfrydol Cymru (Cadeirydd y Pwyllgor Dros Dro) Welsh Liberal Democrats (Temporary Committee Chair)
Lesley Griffiths	Llafur Labour
Alun Ffred Jones	Plaid Cymru The Party of Wales
Darren Millar	Ceidwadwyr Cymreig Welsh Conservatives
Brynle Williams	Ceidwadwyr Cymreig Welsh Conservatives
Leanne Wood	Plaid Cymru The Party of Wales

Eraill yn bresennol
Others in attendance

Keith Allott	Pennaeth Newid yn yr Hinsawdd, WWF-UK Head of Climate Change, WWF-UK
Hans Jensen	Pennaeth Ymchwil a Datblygu, Cynhyrchu ac Ynni Adnewyddadwy, RWE Npower Head of Research and Development, Generation and Renewables, RWE Npower
Alex Lambie	Prif Weithredwr, Grŵp Pŵer Cymru Cyfyngedig Chief Executive, Welsh Power Group Ltd
John McElroy	Pennaeth Strategaeth Amgylcheddol, RWE Npower Head of Environmental Strategy, RWE Npower
David Porter	Prif Weithredwr, Y Gymdeithas Cynhyrchwyr Trydan Chief Executive, Association of Electricity Producers

Swyddogion Gwasanaeth Seneddol y Cynulliad yn bresennol
Assembly Parliamentary Service officials in attendance

Joanne Clinton	Clerc Clerk
Dr Virginia Hawkins	Dirprwy Glerc Deputy Clerk

Dechreuodd y cyfarfod am 9.03 a.m.
The meeting began at 9.03 a.m.

Cyflwyniad, Ymddiheuriadau a Dirprwyon
Introduction, Apologies and Substitutions

[1] **Michael German:** Good morning, everyone, and welcome to this meeting of the Assembly's Sustainability Committee. Today, we are continuing with our programme of taking evidence on energy production. I have the usual housekeeping announcements to

make. If there is a fire alarm, it will be a real one—there are no tests due—so follow the ushers, and we will all get out safely. Please ensure that all your electronic devices are switched off so that they do not interfere with the broadcasting equipment.

[2] You do not have to touch any of the buttons on the microphones—they will work automatically. If you need translation into English, it can be found on channel 1 on the headsets; channel 0 gives sound reinforcement, for those who need it to help them along. That will all be done automatically, and I am sure that the machinery in front of you will work. We have received apologies from Mick Bates, for whom I am substituting, as well as from Karen Sinclair.

9.04 a.m.

**Ymchwiliad i Leihau Allyriadau Carbon yng Nghymru: Sesiwn Dystiolaeth ar
Gynhyrchu Ynni
Inquiry into Carbon Reduction in Wales: Evidence Session on Energy
Production**

[3] **Michael German:** We are taking evidence today on energy production, as part of our inquiry into carbon reduction in Wales. We are focusing in the evidence that we are taking today on fossil fuels and carbon capture and storage.

[4] I do not know in what order you want to start, but please introduce yourselves, say what organisation you represent, and then say a few words about your paper, for a minute or two, and we will then go straight into questions. John, would you like to start?

[5] **Mr McElroy:** I am John McElroy and I am the head of environmental strategy at RWE Npower.

[6] **Mr Lambie:** I am Alex Lambie and I am the chief executive of Welsh Power Group Ltd.

[7] **Mr Porter:** I am David Porter and I am the chief executive of the Association of Electricity Producers.

[8] **Mr Jensen:** I am Hans Jensen and I am the head of research and development at RWE Npower.

[9] **Michael German:** Thank you. John, do you want to start by introducing your paper? The microphones will come on automatically.

[10] **Mr McElroy:** I just have a few remarks to make. RWE is a major player in the energy scene in Wales and over the next few years we have a fairly substantial investment programme in Wales, with about £3 billion-worth of projects in the pipeline, including a high efficiency combined cycle gas turbine and renewable energy projects. Wales is key to delivering our climate change commitment. We have a commitment in the company to reduce the intensity of our carbon emissions by 50 per cent, based on 1990 emissions, by 2015—that is about 30 per cent based on our 2000 emissions.

[11] We see the use of fossil fuels for electricity generation as having a key role to play in the transition to a low-carbon economy, particularly in its contribution to the diversity of energy mix and security of supply. The development of carbon capture and storage is critical to ensuring the long-term viability of coal, not just in the UK, but globally, given the current rapid increase in coal consumption, particularly in developing economies. The priority for us

is to demonstrate and to prove the technology on a commercial scale.

[12] In terms of support mechanisms, which are the key to this agenda, we see the EU emissions trading scheme as being the right policy instrument not only for capping emissions in the industrial sectors within Europe, but in developing a robust carbon price over the medium to long term. Ultimately, once CCS becomes a commercially available technology, that should be the mechanism that decides whether it is economic or not. However, in the short term, what we need is support to bring the technology to market, as it were. That is a summary of the key points in our paper.

[13] **Mr Lambie:** In terms of the energy route-map and sustainability, we submitted two papers. A key issue for us is to have a common investment platform, with a number of changes and issues in relation to EU emission trading scheme systems and other carbon reduction processes. It is extremely difficult from an investment point of view and one thing that would helpfully come out of any process is a clearly visible platform against which the various technologies are assessed.

[14] Historically, up to now, the generation sector has taken the largest hit in terms of achieving carbon reduction and targets, but, in fact, it is probably the least able to deliver major changes in a short time frame. The only way to reduce carbon dioxide emissions from an existing plant is to increase efficiency, but there is a limit as to how far you can take that. So, major reductions in carbon must be applied across all sectors, not just focused on one. Just because a sector is one of the largest producers, it does not mean that it can quickly achieve the biggest reduction. There are other areas where dramatic reductions could be achieved. However, that does not mean that we do not fully support the scheme that is implemented. We support the EU ETS scheme, plus the other carbon reduction schemes that the EU and this country have implemented, but we feel that they need to be broadened. We do not think that, at this moment, there is a need for additional measures. The key is how the existing measures are implemented fairly across the board.

9.10 a.m.

[15] **Mr Porter:** I should explain that the Association of Electricity Producers represents generating interests across the board in the UK, from the largest companies to tiny ones. The largest companies are the well-known electricity businesses and the smallest one that I can think of is a small hydro scheme on the west coast of Scotland, which is a family business. So we are a broad church, representing all the technologies. Between them, our members face massive investment in new electricity production, partly prompted by closures of power stations and partly because of environmental requirements and old age. The new investment has to be greener. The industry wants to achieve that. I operate at a European level quite a bit and I hear people stating confidently in Brussels that the European electricity industry will be free from carbon emissions by 2050. So that is the direction in which the industry wants to go.

[16] We have objectives other than the environmental one. We are expected to be competitive and to deliver the lowest prices, and security of supply is vital. With that in mind, I echo what John said: there has to be a transition to a lower-carbon electricity industry. Many critics of our industry seem to think, very naively, that it can be achieved almost overnight—it cannot, but we are going in the right direction. We would like the means to take us there to be a clear and stable political framework that Government sets at the EU level and at Westminster and Cardiff and so on, and then for the companies to decide which are the most cost-effective options to follow. We do not always get that, but it is important to us.

[17] It is fair to say that, from a Welsh point of view, whatever the Assembly decides to do, we would feel more comfortable if it were clearly consistent with EU and UK policy on environmental matters. That is vital for investment—companies that will spend possibly £100

billion in the next 12 to 15 years want a stable investment climate that they can understand and that gives them the confidence to sign very big cheques. It is very important that the UK should have an attractive climate for energy infrastructure. That is one of our key messages for politicians and also for the public, who like our product a lot, but do not seem to like power stations of any kind, power lines, gas pipes or whatever. So, we are very conscious of the need for the right investment climate.

[18] **Michael German:** Would you like to comment, Mr Jensen?

[19] **Mr Jensen:** No, I think that John has covered everything that I was going to say.

[20] **Michael German:** Brynle Williams has the first question.

[21] **Brynle Williams:** Could you outline your views on the Assembly's proposed target of a 3 per cent annual carbon dioxide reduction by 2011 in the areas of devolved competence, and have you had any discussions with the Assembly on this issue or any other issue relating to your operations in Wales?

[22] **Mr Lambie:** We believe that the target of a 3 per cent ongoing reduction is achievable. The issue that we have—you always have to qualify your answer—relates to the infrastructure. It is becoming increasingly difficult to connect plants to the grid. So, while it is achievable technically, the delivery of that target will require some assistance from our colleagues at the National Grid in terms of connections. However, the delivery of that target is technically achievable.

[23] We have regular discussions with Assembly officials in the environment and energy sector, and we have always found them to be very business-like and easy to deal with—not in the sense of being soft, but in the sense of being pragmatic and having sensible approaches. So, we feel comfortable that there is a possibility of a partnership through which we can achieve many of the goals, but the difficulties in putting the pieces together are quite sizable.

[24] To touch very briefly on the biomass plant that we are building at Newport docks, its cost is £110 million. That is for 50 MW. The combined cycle gas turbine is circa £750 million for 850 MW. So, the cost for a 50 MW biomass plant is very high. The fuel required is about 380,000 to 400,000 tonnes a year, so, in energy crops, between 35,000 and 45,000 acres of land would be required just to grow the fuel. So, those are the logistics of getting biomass plants on-stream, which are more sustainable in the sense that they offer constant production, whereas alternatives such as wind power are very intermittent, so we want to support biomass plants.

[25] On the coal front, co-firing has not really been supported, in my opinion. To get the maximum co-firing out of a coal-fired plant, you are looking at a fairly hefty investment. To make that investment, you need to know that you will get bit of a return. At the moment the number of renewables obligation certificates that you get for co-firing are very low, but you are substituting coal or carbon with biomass. You can do it very quickly and you can increase the volume, so you could reach targets quicker than through just trying to continually add new plant.

[26] **Brynle Williams:** As a farmer, I welcome the growth in biomass, but this brings in the conflict mentioned in the report published last week on biomass production. I am trying to envisage 40,000 acres of biomass production. It would help the agricultural economy in Wales, but we must look wider than that. Do you see that there is conflict, or is the game moving on so fast that to go on with using biomass you are going to have to go back to co-firing?

[27] **Mr Lambie:** On the logistics of the supply of biomass, you are looking at a worldwide market. The more people who build these plants—and clearly they are doing so, because the incentive is there, because you get maximum ROCs for a biomass plant that uses an energy crop—the more you are looking at worldwide sourcing, so you are shipping it around and handling it. Local energy crops are definitely better, but as an end user it is very difficult for us to contract with small farmers; there needs to be some type of infrastructure to enable this to work. We would prefer to take local energy crops because that is financially and environmentally better and so has a lot of plusses, but that needs some support. It cannot happen without support from the Assembly.

[28] **Michael German:** Before we move on to the next question, I would like to pick up the point that you made about the grid infrastructure. Has there been substantial underinvestment in it in Wales? Do we not have the break-in points that we want? We had a set of academics before the committee last week who told us that we should be investing in an interconnector with Ireland to interconnect with Ireland, running through to France and therefore putting this in a more European context.

[29] **Mr Lambie:** Interconnectors have a value in terms of the trading and supply of electricity. However, if you install a 500 MW interconnector you have a 1,000 MW swing, because if you are taking 500 MW and it swings the other way, you have lost 1,000 MW. Look at what happened in Italy when France switched off its interconnector: there were people stuck in lifts. Interconnectors are very important, because they enable broader trading in the marketplace, but people cannot look to the interconnector and say that it will solve their problems, because it could increase their problems. It is not automatic, but it is an important piece of it.

9.20 a.m.

[30] On the grid, I think that we would say that the grid is generally heavily underinvested. You can argue as to why. National Grid does not make speculative improvements to the grid; it will only upgrade the grid for technical reasons or because someone wants to connect. If you imagine that, with the exception of Immingham in 2001, there have not been many plants connected to the grid since 1997, the improvements in the infrastructure have certainly been limited. At the moment, I think that if you want to add as little as an additional 300 MW in south Wales, you have to upgrade the Severn interconnect, for which there will be at a huge cost—an astronomical cost. That cost is shared with the people who are connecting. For a company the size of mine, that is certainly an issue. In terms of the amount of money that we had to put up for the grid connection, for Severn we had to provide £40 million in cash to National Grid for security. That was just to start work on the actual grid connection. So, the system is difficult, certainly for smaller parties.

[31] **Mr McElroy:** I will just add a couple of comments. The mid Wales issue with regard to renewables and renewable access is well known. On the issue of the Irish interconnector, I have to say that, if we really look at the ambitions in terms of the level of renewables on the UK system and indeed the ambitions of the Irish Government in terms of the level of renewables on the Irish system, I am not necessarily certain that an interconnector with Ireland would help the UK. Ireland will be suffering from a lack of renewable supply at the same time as the UK will be suffering from a lack of renewable supply. Interconnectors certainly have a role in terms of managing renewable intermittency on a large scale across Europe, but at local level, they can actually exacerbate problems.

[32] **Alun Davies:** It is the mid Wales issue that I wanted to raise with you. I represent Mid and West Wales and when I speak to people who are looking at investing in power generation—mainly wind, in that region—the disincentive that they speak about is the grid connection. Could you quantify the extent to which that is a disincentive to invest in

renewables? Is the lack of grid connections or the need to invest in them a very great disincentive or is it more of an irritant?

[33] **Mr Lambie:** It is a huge disincentive. When you are setting out to build anything—be it a windfarm, a biomass plant or a combined-cycle gas turbine—clearly you have to go for the grid connection. The National Grid cannot just, in a certain period, do all the work to connect you, so it has a programme of work to upgrade the infrastructure, both to enable you to connect to the grid, but also for the power to be taken out into the grid and distributed. The time that that takes can be huge. The last quotation for a connection that I received, for a plant in south Wales, was that it would take until 2018. For it to take that long to connect a plant is impossible. It is not so bad in south Wales, because there are plants coming on stream, but if that was an area where you were seriously short of power, that would be a very serious issue. I do not know how you can speed that up, to be honest, because National Grid will not do speculative investments on the grid.

[34] **Mr Porter:** I think that it clearly is a disincentive to people if they can see that other investors have had ideas that they cannot actually implement or that they cannot implement for a long time. That is bound to be some sort of disincentive. The other side of that coin, however, is that it has not stopped large numbers of people preparing plans for renewable energy schemes, and not just in Wales—I am thinking of Scotland, where there is a huge number of schemes waiting to go ahead. So, yes, it is a disincentive, but that may not be exactly the right word.

[35] **Alun Davies:** One way to overcome this obstacle would be to look towards a more decentralised form of generation rather than the major power plants distributed across the face of the country. Members of this committee last week visited a community in west Wales, in Pembrokeshire, which is looking at a more community-based energy generation project. So, perhaps villages, communities and towns providing more of their own energy generation would be a way of avoiding the issue of grid connections.

[36] **Mr Lambie:** It is easier to get a local grid connection for smaller plants—smaller plants are much easier to connect into the local distribution system. It has, in my opinion, a much greater advantage in that, from an environmental point of view, the more distributed energy generation that you have, you are saving on distribution costs and losses. It is not efficient to transport electricity; there are huge losses, particularly when you step down from the super grid into the lower grids, into the distribution, where a large amount of power is lost, which is just wasted. I will give one example—I am sure that someone will come back on the numbers, but if you just accept these numbers as a general indicator, rather than an absolute calculation, because things move around. If we were at peak in south Wales and Uskmouth was running, and we took Uskmouth off and had to supply the power from central England, for example, you are looking at replacing 363 MW with something between 600 MW and 650 MW just to get the power into south Wales. So, the shorter the distance that you have to transmit power, the less you are losing, and, from an environmental point of view, that is important.

[37] **Alun Ffred Jones:** So, why are we building big power plants?

[38] **Mr McElroy:** Alex is quite right in the context that we need to do all that we can on the distributive front, but if you look at the scale of the challenge that confronts us, the simple fact of the matter is that distributed energy on its own cannot get us there. In volume terms, we need to tackle the problem on all fronts, so there is a need for large-scale generation and a need for reinforcement and expansion of the grid. However, we also need to alleviate that by doing what we can at the distributed level.

[39] **Brynle Williams:** We have large wind developments in mid Wales, but there is also a

potential there for biomass growth. Can those grid connections be diverted to a power plant from wind energy sources? Can those grid connections be utilised as they are already on site?

[40] **Mr Lambie:** If it is a grid connection, you can connect any type of energy generation. The only issue is the location of the grid connection and how much energy the grid can take in at that point. Other than that, you can do anything.

[41] **Brynle Williams:** Wales's emissions per capita are already well above the UK average, which we are all aware of. The EU ETS will only reduce our emissions by 1 per cent over the period 2008-2012. You say that Wales's emissions may increase, but the levels in the UK will decrease overall. How will the increase be dealt with within the EU ETS scheme, and do you believe that the Welsh public may be bearing an environmental burden on behalf of the whole of the UK?

[42] **Mr Lambie:** John can answer the difficult questions.

[43] **Mr McElroy:** The problem is that a lot of the investments that we are making are quite chunky. Therefore, while in the bigger UK and European picture a switch from coal to gas reduces emissions by 50 per cent plus, for that equivalent output, the problem is, if we close a power plant in England and build a gas plant in Wales, emissions in Wales could increase substantially, but achieve substantial emission reductions overall.

9.30 a.m.

[44] The point about the emissions trading scheme is that it is designed to deliver carbon reductions at optimal costs. If the market is designed correctly and all the players in that market are encouraged to hedge their positions in the market and manage their carbon risk, we should see the most cost-effective investments coming forward, and that cost smeared across all consumers in the European community. Therefore, in many respects, it should give the least costly solution and the least incremental costs for consumers, with the outcome that everyone should pay the same proportionate increase in costs.

[45] **Darren Millar:** You have all indicated your support for the emissions trading scheme, but to play devil's advocate for a moment, the reason for that is that it is not ambitious enough, is it not? The scheme has not driven up the cost of carbon in the way that it was designed to do, and you have done well, because, under the scheme, you have not had to deliver that significant a reduction. We see massively rising energy costs, yet the demand for energy is continuing to increase in the United Kingdom, so it is not working. Is that why you are supporting it?

[46] **Mr McElroy:** I would strongly dispute that, as you might expect. The emissions trading scheme has been up and running for four years and a lot has been achieved in that time just to get the scheme up and running and to get the monitoring and reporting verification in place. Understanding European emissions has been a huge achievement in itself. The market is functioning well, and liquidity is increasing in the market, as are the volumes being traded. In many respects, the UK industry understood its emissions better than other member states, and the electricity sector in the UK has been allocated less allowances than its emissions. Across Europe, I am afraid that a lot of member states have been trying to learn about their emissions. The commission took a tough line in the second phase national allocation plans, and we have seen the burden on industry increased. If you look at the proposals for phase 3, you will see that they are quite ambitious by any count, particularly if the EU signs up to an international agreement, and we will see a challenging time in the EU ETS system. Once phase 3 is in place, and we know what the rules are, because the phases are coupled—phase 2 is coupled with phase 3—we will see that feed into phase 2 and we should start to see phase 2 reflect phase 3 prices and the scarcity in phase 3. So, a lot has been

achieved in a short time, and as David said, change in terms of the electricity sector and the scale of investment that is required—£100 billion plus in the UK—does not happen overnight, so it will take time, and people must be a little patient. We are trying to deliver carbon reductions cost-effectively, and that is a key element that is critical to the success—

[47] **Darren Millar:** You have far greater expertise than I in this field. However, in his report, Stern said that carbon pricing alone will not be sufficient to reduce emissions on the scale and pace required.

[48] **Mr Lambie:** We would agree with that.

[49] **Mr Porter:** You said that you were playing devil's advocate, which you did effectively. I have faced this question many times from news-media people and select committees and so on. People's expectations in the early stages of the scheme were a little naive. The sort of people who readily knock our industry seemed to think that, once the EU emissions trading scheme started, the entire UK electricity industry would knock down its power stations and build something new. That is not how things happen and, in the first few years of the scheme, it was impossible to do that. We had certain allowances and certain targets to meet, and it was not possible to change the face of the UK power industry or that of the rest of Europe. That is coming, but it will only come if we have a firm scheme that everyone believes in. This sounds like a desire for self-flagellation—or flagellation on the part of the industry—but we know that this is coming, we are grown up, and we expect to have to meet much tighter carbon emissions targets. However, what we must have for the investments to be made are clear figures that we have to meet, and the confidence that politicians mean it for the long term. I do not think that anyone has said it this morning, although it has been implied, but investments in electricity production, be they small schemes in Pembrokeshire or large ones in the north of England, are large investments and are for the long term. Therefore, the longer that you have any doubt about how this will be implemented, the more hesitant the companies that have to make the investments will be. However, they know the direction that we are going, and they want to get there.

[50] **Mr Lambie:** A key thing that you have to remember is that, when the scheme was first implemented, everyone heard the horror stories about some eastern European countries having too much allocation and the wrong calculations being made. When you start anything up, there are always a lot of issues. It was always a process, because you are moving from an element of free allocation through to auction. If we take Uskmouth for example, which is the one in Wales, we see that our allocation of free emissions—and they may be called 'free', but there is a cost associated with those—equates to about 50 per cent of our running. Therefore, the balance is bought in the marketplace. If the price is high, the marginal cost is high and we do not run. So, the scheme works; it is just that it is evolving to the point at which we believe that, by 2012, it will be a full option, and then you will see the market dictating what runs and what does not. We will find out whether that is a good thing or not, but I believe that it will work. That is where we are.

[51] **Darren Millar:** So, you are confident that phase 3 will deliver significant reductions, much more so than the phase 2 that is currently operating. You have referred to your medium and longer term investment strategy, and to the need for some security and stability in delivering that. I think that it was you, Alex, who referred to the fact that there are many people out there, and that coal technology is an easy one to develop by sticking up a new power station. It is proven technology, and it is cheap at the moment. However, what are the barriers to allowing more coal-fired power stations? Furthermore, are there sufficient incentives for coal-fired power stations to undergo the transformation within their infrastructure—the future-proofing of coal-fired power stations—so that they can take biomass into the future? You touched on biomass earlier, but are there not huge opportunities there for existing power stations, which are currently coal fired, to make that switch?

[52] **Mr Lambie:** Yes, but it depends on the size of the plant. We have three 121 MW sent-out units. We have done studies on whether we could change one of those to a biomass plant. However, if you have one stack, you cannot have one unit that is renewable and two that are coal fired. You cannot do that; it is classified, and that is the classification. So, we would not be able to do that, and get the renewables obligation certificates, because it would still be classified as coal fired.

[53] **Darren Millar:** So, there are problems with the regulatory framework.

[54] **Mr Lambie:** Yes.

[55] **Darren Millar:** You indicated in your opening remarks that you were satisfied that the existing measures were sufficient. Are they? They do not seem to fit there, do they?

[56] **Mr Porter:** Sometimes, the regulations affecting the industry conflict with each other. I think that what we are talking about—unless I have got this wrong, Alex—is a conflict between the question on carbon dioxide and that on air quality. Air quality issues in directives from Brussels, transposed in Westminster, are having a big effect on the UK generating industry. They are leading to the closure of many coal-fired power stations, as well as oil-fired ones. Sometimes, there are conflicts between these air quality directives, which come from one bunch of officials, and the climate change agenda. However, John or Alex may want to enlarge on that.

9.40 a.m.

[57] **Mr McElroy:** I think that Alex has articulated the problem. The large combustion plant directive inhibits converting a single unit of a coal-fired power station to biomass. No matter what you do, it is still treated as a coal-fired station. What we are doing is co-firing, and we can do that at Aberthaw. We have invested in some kit to store biomass and to feed it into the boiler, and we expect that, over the next three years, about 3 per cent of the output will come from biomass. There is a limit to how much we can feed into a coal unit while maintaining stable combustion. I think that Alex is talking about a dedicated, purpose-built unit to burn biomass, but there is an issue about the volume of biomass that would be needed if you were talking about 120 MW power stations, or a 500 MW unit. That takes us back to your question, and the issue that we can go only so far on this. A number of dedicated biomass facilities are appearing around the country. In many respects, that is probably the ideal way to do it in the longer term.

[58] **Darren Millar:** It would be helpful to receive some more information from you on that particular point, on the conflict between the air quality regulations and the regulations that you have to meet as energy providers. You may be aware that there is currently a legislative competence Order being discussed with Westminster that will devolve responsibility for matters like air quality to the Assembly, and it may be that we can make adjustments in Wales that are not necessarily possible at Westminster.

[59] **Mr Porter:** We would be pleased to provide that information.

[60] **Michael German:** We will now return to the question of investment, which you raised earlier. I think that Alun will challenge you to put more cash in. [*Laughter.*]

[61] **Alun Davies:** It is always a good way to start, is it not? Mr Porter, in your paper, you estimate that £30 billion will be needed over the next—

[62] **Mr Porter:** That is absolutely the rock bottom figure.

[63] **Alun Davies:** That is just to maintain capacity.

[64] **Mr Porter:** Yes.

[65] **Alun Davies:** I am interested in the investment that you are making at the moment. You have discussed in your paper the fuel mix that will be required to maintain a secure energy supply in the UK, but, generally, if I may say so, you seem to be investing in mostly gas-fired facilities. I assume that that is the most cost-effective for you. To what extent is cost-effectiveness driving you rather than the need to lower carbon dioxide emissions?

[66] **Mr Porter:** The companies can speak more authoritatively than I can, because they pay the bills for this sort of thing. They have to find the most cost-effective answer because they are in a competitive market with customers to serve, but it has to be within the framework that environmental legislation imposes on them. That takes me back to the importance of that framework being clear to everyone, stable, and as long term as it can be.

[67] However, on how much money has to be spent, £30 billion is a pretty low figure, and it just covers the replacement of plant that we know will close. Our estimate for what will really have to be built—and we are talking roughly about 12 or 15 years' time—is about £100 billion. I know that there are one or two members who say that that is misleading and that, in fact, the cost is far more because that £100 billion includes lots of renewable energy projects, and many of those do not go ahead without network investment as well. We have not done those calculations, but it is true to say that the real figure includes the generation and the network changes, and we are talking about very large sums of money.

[68] John or Alex may want to explain what that means in real life, instead of what it means for a trade association.

[69] **Mr Lambie:** You have to make decisions based on the return you will get on your investment; that is what we are in business for. However, in addition, you also look at the security of your business, which is why you try to achieve a fuel mix. In the old days, when many European countries had indigenous coal supplies—Wales certainly—coal plants gave you a level of security that no longer exists. The coal for our plant in Uskmouth comes from Russia. We could take coal from Columbia and Indonesia, but there are no local or European supplies of coal for delivery. That does not mean that there is no coal, but France has closed its mines and Spain and Germany produce mainly brown coal, which you do not transport, so there is a limited supply of coal. The countries have reserves of coal, but there are few options for acquiring coal. Liquefied natural gas pretty much comes from Algeria, Nigeria and Qatar. Whichever fuel you look at, if you want security, you need a fuel mix, because you do not know the long-term security of individual supplies. This winter, for example, there is a shortage of coal in Russia, so some of that will be diverted and may hit exports. Most people in the UK now rely on imported coal, because it is low sulphur or for various other reasons, so there is quite a security issue. Sustainability is one thing, but you also need to keep the lights on, and the only way to do that is with a mix of fuel.

[70] **Leanne Wood:** You talk about a fuel mix, but what percentage currently comes from renewables?

[71] **Mr Lambie:** It is currently very low. Do you know?

[72] **Mr McElroy:** Around 4 per cent.

[73] **Mr Lambie:** Yes, or even less. It is definitely very small.

[74] The other issue with renewable energy is that it largely comprises wind energy at the moment, but wind is intermittent. That is why we have a concern. There is no black-and-white answer to this. Everything has a place and there is a place for wind, but, if you drive wind as being the key, you are increasing the problems on the grid because wind is intermittent and, when it stops, it stops instantly. You need either to have a spinning reserve or to ramp it up to make up for the shortfall. So, wind can be less green than it is at first perceived to be if we are not careful about how we manage it. There is a proper place for it, but it needs to be managed as part of the mix. You cannot just say that it is the answer.

[75] **Mr Porter:** On an integrated power system, you need technologies that you can command so that when demand goes up and down, you can adjust the input into the system. Wind does not fit with that requirement, so you have to have other technologies somewhere to provide that facility.

[76] **Michael German:** Shall we move on?

[77] **Alun Davies:** Could I ask a follow-up question? My reading of your written submission is that you would like to see a largely European regulatory environment with the UK fitting into that. You certainly do not want to see a specific Welsh regulatory environment that is very different from that in Europe or the UK. I assume that you say that because you see emissions rising over the coming years.

[78] **Mr McElroy:** I do not think that at all. We are saying that we need the European overview and regulation, which is what provides the cap and the price signal for carbon. In many respects, the barriers to the delivery of a target have to be addressed at a more local level, which is all about community engagement, the planning process, transmission and connections and so on. So, it would certainly be preferable for the overarching framework and the economics to be driven at the European level, but we also need local engagement and intervention.

9.50 a.m.

[79] **Mr Lambie:** I agree with John. The main driver is to achieve the levels of investment that we are talking about, but you need some certainty about how the pieces will work, and if there are constant changes to those or if many different levels are changing the rules, you will have a real difficulty obtaining the cash for that. You have to remember that much of this money comes from banks, so, when you ask to borrow the money for a biomass plant, for example, the first thing a bank asks is whether you have a long-term, reliable supply of fuel and how secure you are that you will have these renewables obligation certificate for x number of years, and you will say that you do not know. So, you have a very great difficulty in putting the investment case together. So, we are saying that some sort of continuity or stability is needed. As David said, the EU sets the scene at the top level, but that does not mean that local implementation or management of that cannot work. Depending on where you go in Europe, you will see different results and different delivery; it is about how you implement it. What we are saying is that if you implement it well, it will work. It is very difficult to deal with lots of different levels of regulation.

[80] **Brynle Williams:** On the more immediate problem, my concern is that you were saying that there is a potential for a cutback in Russian coal—did you say a cutback of 30 per cent?

[81] **Mr Lambie:** I do not think that I mentioned a number.

[82] **Brynle Williams:** Do we have sufficient indigenous supplies of coal here to feed the power stations? We are looking at a terrific fuel bill increase this winter—the predicted

increase is 30 to 40 per cent. A shortage of Russian coal will contribute to that. Can that be replaced by indigenous coal supplies in the UK?

[83] **Mr Lambie:** Certainly in terms of obtaining those supplies, the answer for the short term is ‘no’. The mines are not operating and there are planning issues. In the longer term, the answer is ‘potentially’. At the moment, coal is at the highest price that it has ever been. I do not know what it is today, but when we first set the contract for Uskmouth, it was \$63 or \$64 dollars a tonne, but it is now \$214 and rising. There have been shortages and there have been issues about supplies out of Australia because of problems in Newcastle and the flooding there. There are also problems in South Africa, and it looks like there may be some problems in Russia. So, the core price is rising.

[84] **Mr Porter:** May I ask my colleagues—

[85] **Darren Millar:** Do you want to sit over here? [*Laughter.*]

[86] **Mr Porter:** I ask the committee whether it is fair to say that this could help indigenous coal, as the world price rises, as some of the coal in the UK that was not competitive will become competitive. In Westminster, there is something called the UK Coal Forum, which is headed by the Minister of State for Energy, and I sit on that forum. Representatives from the Assembly also attend it. There is a keen interest in making sure that coal continues to play a proper part in electricity production and that some of that part should be played by indigenous coal.

[87] **Alun Davies:** I will just come back on Mr McElroy’s answer to my previous question. In your paper you say that

[88] ‘Investment in fossil-fired electricity generation in Wales is likely to increase emissions in the short to medium term’.

[89] You then go on to quote examples from Aberthaw and examples that relate to potential investment in Pembroke. Is it fair to say that you will live with increased emissions because, essentially, you are looking at the short and medium-term profit, rather than the long-term environmental issues?

[90] **Mr McElroy:** Overall, even at company level, our emissions will reduce. I have already said that our target, as a company, is to have our carbon intensity at 50 per cent of its level in 1990 by 2015. Overall, we will achieve that goal. There are issues about our size in terms of the competitive market and what share of that market we have. However, as I said, we will close our coal stations at Didcot and Tilbury and we are in the process of building a combined cycle gas turbine at Staythorpe, and we also hope to build a CCGT at Pembroke. In net terms, the carbon intensity of Tilbury and Didcot is twice that of Pembroke and Staythorpe. So, overall, we will reduce emissions, but there will be an increase in emissions in Wales in the short term.

[91] **Alun Davies:** When you say ‘short term’, what length of time do you mean? How do you define ‘short term’?

[92] **Mr McElroy:** That depends on what happens to the energy mix within Wales and what happens to industrial emissions.

[93] **Alun Davies:** However, you are saying that, as a business, you will increase emissions in Wales.

[94] **Mr McElroy:** Yes.

[95] **Alun Davies:** That is within your control, and I understand the business reasons for that. However, when you say ‘the short to medium term’, it implies that you have—

[96] **Mr McElroy:** It comes back to the point that David made. If we end up with a situation where the climate change committee recommends an 80 per cent reduction target by 2050 to the Government, we are on a continuing trajectory, and, ultimately, any gas plant that is built and operates over the next 20 or 30 years will have to be replaced by something that emits less. A lot of this ultimately depends on what the emission reduction pathway for the UK is, the price signals in the market, and the EU-level ambition. As David said, if you look at ambitions in the EU and the UK at the moment, you will see that the electricity sector will have to be largely carbon neutral by 2050.

[97] **Alun Davies:** So, 80 per cent is achievable.

[98] **Mr McElroy:** That is a difficult one. I cannot claim to be an expert on all aspects of the economy. One of the questions that I ask myself is, ‘What is the minimum level of reduction that we can achieve?’. Certain types of industries, such as agriculture, will always emit. The issue is what an achievable level is, ultimately, and hopefully the climate change committee will put some flesh on that. I am looking forward to hearing what it has to say about it.

[99] **Alun Davies:** Yes. [*Laughter.*]

[100] **Alun Ffred Jones:** You mentioned that 4 to 5 per cent of your electricity production comes from renewables. Is that the figure for your companies?

[101] **Mr McElroy:** That is a national figure.

[102] **Alun Ffred Jones:** What about your companies?

[103] **Mr McElroy:** Last year, we produced more wind energy than anyone else in the UK.

[104] **Alun Ffred Jones:** What is the percentage?

[105] **Mr McElroy:** As a percentage, it is relatively small. I do not have the number to hand, I would need to go back and look it up, but it is certainly of the order of 5 to 7 per cent. It is in single digits.

[106] **Mr Lambie:** For us, it is a very small percentage. It comes from the co-firing power station at Uskmouth. Having said that, we are building three biomass plants of 50 MW each, one in Newport and two on the east coast.

[107] **Alun Ffred Jones:** Do you have targets for the coming years in terms of electricity from renewables?

[108] **Mr McElroy:** It is hard to have targets for renewables at a company level in the UK at the moment. To give you an example, we have about 1,400 MW of renewable projects in the planning system, but the year before last we had less than 10 MW of consent. Last year, we did better, but it was of the order of 100 MW of projects. It is hard to set a company target for renewables, not because of a lack of willingness to invest, but because of the problems associated with getting planning consent and getting grid access.

[109] **Mr Lambie:** In many ways, it is the infrastructure that drives whether a renewable project will go ahead or not. Without there being renewables obligation certificates or

support, windfarms would not be built. The same is true of biomass. With waste energy projects, we have problems with the quality of the fuel and, as the local authorities turn more and more to recycling, there is less waste to burn, so, when someone comes and asks us whether we would like to do a waste energy project, they cannot guarantee the fuel supply. There is a whole raft of issues—

[110] **Alun Ffred Jones:** The two main issues in terms of wind energy are planning and access to the grid.

[111] **Mr McElroy:** Yes.

[112] **Alun Ffred Jones:** It is often touted that tidal stream power is viable, and RWE is proposing to develop plants off the coast of Anglesey, so when is this coming on-stream?

[113] **Mr McElroy:** That project will be built by RWE Innogy—the structure of our company is complex. We have signed an agreement with a potential technology developer and supplier. I assume that we are looking at a timescale of three to five years or something like that, but we must go through all the usual procedures before we can deploy the technology.

10.00 a.m.

[114] **Mr Lambie:** There are a substantial number of issues to do with tidal and current technology, because it is not fully proven in a commercial sense. There are a number of studies and some operating is going on but, as a fully commercialised technology, it is not quite there. You have connection and planning issues, which we have talked about. Most of the tidal technology, in the case of Wales will be connected to or will cross sites of special scientific interest—we have difficult connections.

[115] **Alun Ffred Jones:** In terms of the technology, you do not expect anything to be commercially viable for at least five years?

[116] **Mr Lambie:** Like John, I am not an expert. I suspect that it is of that order, but we can certainly try to find some more information for you, if it would help.

[117] **Brynle Williams:** Briefly, you have the three biomass plants. When are they likely to come online?

[118] **Mr Lambie:** The Newport one goes into planning Q3 with Newport City Council. Both the two east coast plants will come on stream in 2011.

[119] **Brynle Williams:** What would be your energy source?

[120] **Mr Lambie:** At the moment, sadly, we are looking at imported woodchip from Russia or Canada.

[121] **Brynle Williams:** For all three plants?

[122] **Mr Lambie:** Yes. If we could find energy crops, we would happily use them.

[123] **Michael German:** Yesterday, we touched on the G8 view on biofuels, which is not dissimilar in terms of the food versus crops for energy argument. Biomass would be in the same field of operation. You have noted the extent of the expansion of biomass in terms of the acreage here, or the hectares, or whatever it is. Do you think that we are reaching the maximum in terms of the amount of crop required to feed what is in the planning stages for

biomass in the UK?

[124] **Mr Lambie:** You have to differentiate between biofuel and biomass. In the case of biomass, there can be an annual cropping process for energy crops. Those crops tend not to be planted in good-quality land that is for food. Biofuel, be it wheat or whatever, tends to supplant food crops. Biomass does not have quite the same problems that biofuel has.

[125] I sit on the board of a company that looks at the biofuel side, and that company is looking at moving in the same direction, so it would not convert—other than something like the waste from sugar cane processing, which is very good—wheat and other materials that could be used for food; it would use—I will use a bad word here—*jatropha*, which is a weed that can grow on very poor-quality soil. With many of these technologies, as we have all been saying, when you decide on the process, or when you try to motivate people to do a specific thing, there needs to be a period of proper assessment to decide all the implications before you press the green button. The issue is probably that a lot of people are starting to build biofuel refineries or plants, for which they have to obtain the raw materials, and they are paying more, for obvious reasons. It is like many things, in that the idea is not a bad one, but the implementation needs to be managed properly.

[126] **Michael German:** Turning now to carbon capture and storage for a moment, which are distinct areas of conversation, but that is the issue for coal-powered generation for the future, is it not? You have to find some way of capturing the carbon and storing it. What should the regulatory framework, which will emerge over the coming years, contain to guarantee that, when these technologies become available, all coal-fired power stations will be retrofitted, or do we need new carbon capture and storage and therefore completely new plant? Will retrofitting be possible in most coal-fired power stations? What do you think the regulatory framework should be saying at this point? Should it be directing and setting out that certain things must be done in the next five, 10, 15 or 20 years? If it included an indication, as a company, you would probably be clear as to what you need in investment terms.

[127] **Mr McElroy:** I was hoping to have handed over to Hans at this point, but we are back on regulations again. [*Laughter.*] The CCS directive that is going through the European institutions at the moment is a pretty good document in terms of how it deals with the issue of the regulation of storage. There are issues regarding transport, but they will largely be taken care of by national regimes. On the capture side, we already have the integrated pollution prevention and control directive, and that is expected to be the major vehicle for regulating capture. The issue at the moment is that there is quite a lot of debate about mandatory capture. We cannot simply go out and buy the technology—we cannot get the performance guarantees, we do not know the price, and it is premature to be talking about mandatory CCS. We have the EU ETS, and we will have quite a tight cap, so the pricing will determine whether coal-fired power stations are built—it will depend upon the price of carbon, and whether capture is available.

[128] So, the key issue at present is how we fund demonstration. There is a lot of good work going on in the regulatory framework, both at an EU level and a UK level. There is a UK consultation on capture-readiness at the moment, and it is a requirement of the directive. We have to be quite careful about how prescriptive that is, because we do not quite know how the technology will develop, or exactly what we might put on a specific site. However, we are relatively grown-up in this industry—if we decide to invest in coal, we will take that decision based on the regulatory risk that we see out there, and what we expect the carbon price to be. I must say that, if you were to build a coal-fired plant at the moment without meeting certain basic requirements for CCS down the line, that would be a fairly brave way to go.

[129] **Mr Lambie:** You would not be allowed to do that.

[130] **Michael German:** Is this mainly about retrofitting, or will these be new plants?

[131] **Mr McElroy:** Hans can probably give us some detail on that, but the big issue is the efficiency penalty on CCS. Quite honestly, I do not see retrofitting existing coal-fired plants as an economic option in the short term, or even the longer term. Then there are the many engineering problems around existing coal-fired plants. If you are going to deploy CCS, you want to ensure that the energy efficiency of the plant in question is at the leading edge, so that you minimise the effect of the efficiency penalty. So, it is very much technology for new plant than for retrofits.

[132] **Michael German:** Do you want to say something about the leading-edge technology that might be available?

[133] **Mr Jensen:** Just going back to regulation issues, I agree with John—the UK Government has made great strides in encouraging the necessary changes to the OSPAR convention and the London convention, to try to enable carbon capture and storage to be encouraged, at least. The key factor is the current legislation on storage. We never really envisaged carbon capture and storage—it was very much about removing hydrocarbons from beneath the sea bed—so, we are in a very different situation. However, I certainly feel, in terms of the regulatory regime, that there is a will to make the necessary changes, and I am sure that that can be done in the timescale that we are talking about.

10.10 a.m.

[134] As far as existing capture technologies are concerned, there are essentially three that look promising. The first is oxy-fuel combustion, where fuel is burned in pure oxygen rather than air. The carbon dioxide can then be quite easily removed using a chemical process. I can go into it in detail if you would like, but maybe you would not. *[Laughter.]* It is, theoretically, a reasonably straightforward technology. The problem is that the boiler has to be constructed to a particular design that ensures that it is leak-tight. That causes tremendous problems in terms of making plant flexible, and so on, and it precludes a retrofit option.

[135] The second option is integrated gasification combined cycle, which is being developed by our sister company in Germany and one or two other companies. That is where the fuel is gasified before combustion, and the carbon dioxide can be removed. Again, there are issues with plant flexibility and the technical guarantees that can be achieved. The cost is also an issue, as IGCC is an expensive option.

[136] The third option is the option that we would promulgate in the UK, which is post-combustion capture, where the normal combustion process takes place and the flue gas is then treated using an amine solution to remove the carbon dioxide. This does allow for retrofitting, but, as John quite rightly says, there is a large energy-efficiency penalty, because, if we are looking at oxy-fuel combustion, we need a large quantity of power and steam from the existing thermodynamic cycle. So, it makes it a complicated and difficult process. Retrofitting existing power plant is a possibility, but, because of the efficiency penalty, you would want to make your investment in the newer, more efficient plant, rather than older plant where the efficiency penalty makes the plant uneconomic.

[137] **Michael German:** You say in your submission that you are thinking of investing in a pilot capture project in Aberthaw. Which of the technologies are you looking at for that?

[138] **Mr Jensen:** To put that in context, we have a three-phase programme. The first phase is to look at oxy-fuel combustion and post-combustion capture at our combustion test facility at Didcot in Oxfordshire. This is a very small-scale combustion rig, where we look at the

fundamentals of the process to try to understand how it works and understand the maintainability of the equipment, the costs, the environmental issues associated with it, and so on. That is happening now; the rigs are being constructed and the commissioning is taking place this month. So, we have made quite a lot of progress on that. Some of our competitor organisations have also made investments in that area. Therefore, it is small scale rig design and operation to try to understand the fundamentals of the capture process.

[139] What we intend to do at Aberthaw is the second phase, which is a 1 MW electrical equivalent plant using post-combustion capture. This will use amine solvents to remove carbon dioxide from the emissions stack of Aberthaw power station. We are talking about roughly 20 tonnes of carbon dioxide being removed per day. So, it is on a very small scale, but it is the next phase. Once we understand the fundamentals of the removal process, we can then start to understand how it works on a slightly larger scale. The aim is to improve our understanding of the process. So that is what we intend to do at Aberthaw.

[140] **Michael German:** The Environment Agency Wales said in evidence to us that it thinks that if you retrofitted carbon capture and storage at Aberthaw your efficiency of production would drop from 35 per cent to 25 per cent. Do you agree with its assessment?

[141] **Mr Jensen:** I do not necessarily agree with those numbers, simply because we do not know. We have to build this thing, get it running, and then understand what the electrical or steam requirements are. The published data talk about a reduction in efficiency of 10 percentage points overall using existing technology in certain circumstances. I would be reluctant to give specific numbers at this stage. It could be of that order, but it could be less.

[142] **Michael German:** Either way, it would lead to an increase in costs and, therefore, an increase in the cost to the consumer.

[143] **Mr Jensen:** Yes; costs would go up. However, there will be an efficiency penalty. The size of that depends on the technology, how well it works, and all of the other issues that I mentioned before.

[144] **Michael German:** Is there any form of incentive for having reduced the carbon by storage and capture? Is there any proposal that you know of in the regulatory framework to make that available? There are the ROCs for renewables, but is there anything for carbon capture?

[145] **Mr McElroy:** There are no incentives at the moment, although there is a significant debate in the European Parliament as to what form of incentive might be appropriate. The European Commission is pushing member states hard to think about the issue and come up with something. However, there is nothing on the table at present.

[146] **Michael German:** Do you have a suggestion?

[147] **Mr McElroy:** We are looking at two things; we are looking at the demonstration of the technology versus the long term. In the long term, we are saying that carbon price should be what decides whether we go down this route or not. In the short term, what we are looking at is a form of either capital support, or capital and revenue support, which matches the cash flows within the demonstration project. That could either come from member state capital grants, which is one area that the UK is potentially looking at, or from some ring fence within the new entrant reserve of the emissions trading scheme, which is what the European Parliament is looking at—there are various ways of doing it.

[148] The one thing that we do not want to see is a mechanism that distorts the carbon market. However, the danger is that some of our competitors—not within the electricity

sector, but certainly outside the electricity sector—are advocating revenue support. In terms of risk and reward, I do not see that as providing any incentive for a power company to go ahead with a demonstration project. Therefore, I think that we have to make the move towards either capital or capital plus revenue support.

[149] **Darren Millar:** I wanted to ask about carbon capture and storage, not just in terms of coal-fired or fossil-fuel power stations, but also in terms of biomass power stations. What are you doing to future-proof your technology, so that you have a carbon-negative account, if you like, for the biomass plants that you are going to operate, Alex?

[150] **Mr Lambie:** There is nothing currently under review for the biomass plants. The differential at present is between releasing carbon from coal and, from biomass, recently created carbon. Therefore, the theory is that you are not actually increasing its cycling, so, from a biomass plant at present, you are not putting additional carbon dioxide into the atmosphere.

[151] **Darren Millar:** There are some additional carbon dioxide emissions in emissions from transport and processing, in order to get your biomass and woodchip, and so on, however, so why are you not looking at introducing carbon capture and storage into your sort of plant?

[152] **Mr Lambie:** At present, on a 50 MW biomass plant—and perhaps Hans can answer this better—the capital cost is already high; it is only sustainable through the ROCs, and it would not be sustainable in its own right. If you then had to add on carbon capture and storage at the end, the cost would become prohibitive. The primary aim for everyone is to reduce carbon, but we all have to be equally mindful that the only people who are going to pay for this are the customers, either through tax, or through paying their bills—there is nowhere else that the money can come from. Therefore, someone has to pay for it, and we have to try to deliver the end result, but we have to try to do it in as cost-effective a way as we can.

[153] **Darren Millar:** We are paying the price at the moment for not investing in renewables earlier, are we not?

[154] **Leanne Wood:** Regarding the carbon capture and storage pilot project in Aberthaw, where are you going to store the carbon dioxide?

[155] **Mr Jensen:** At the moment, we are not envisaging storing the carbon dioxide. What we intend to do is to develop the capture part of the process first so that we understand that. As I said, it is about 20 tonnes a day, so it is a small quantity of the carbon dioxide, and we intend to reintroduce it into the flue gas. We have looked at transport and storage options in the area, but they are not particularly favourable, compared with north Wales and Morecambe bay, for example, where there are hydrocarbon reserves, where carbon dioxide could be stored safely. The North sea is another more sensible option. However, it is less easy to find a storage site around south Wales.

[156] **Leanne Wood:** Would you dispute the evidence that was given to us by the Environment Agency, which said that no suitable sites were identified in Wales at the moment?

[157] **Mr Jensen:** Again, we do not know until we start storing the carbon dioxide whether it is a safe and suitable facility. As far as I understand it, there are no suitable storage facilities around south Wales—I believe that Morecambe bay would be the nearest possible storage site. Again, we would need to look at the characterisation of the storage facility, to ensure that we are happy that the carbon dioxide could be stored there safely.

10.20 a.m.

[158] **Mr Lambie:** No-one is 100 per cent sure on the storage element yet. BP, Shell and others in the North sea have commented on the suitability of ex-gas fields for storage, but no-one is currently 100 per cent sure.

[159] **Leanne Wood:** Are you relying on carbon capture and storage to reduce your emissions?

[160] **Mr Lambie:** No. On the coal plant and on the emissions that we reduce, we try to improve efficiency. We have increased efficiency in the last two years to the extent that we have taken out one entire ship of coal, which is 30,000 tonnes, which is a reasonable improvement. You try to do whatever you can to reduce the carbon output, but we are limited as to what we can physically do. You can only do your best.

[161] **Alun Davies:** I would have thought, Mr Lambie, that, essentially, carbon capture is the only way that these means of generating energy will be carbon efficient and meet Mr McElroy's target of 80 per cent reduction in the next few years. Is that not the case?

[162] **Mr Lambie:** I do not disagree with you. All that I am saying is that the technology is not yet proven, although people are trying to prove it, and the storage issue is not yet solved. It is usually liquefied, so it is quite an expensive process to take that amount of liquid. There are many unanswered questions and, for example, if the statement was, 'You must do that', you can be sure that the first few would be extremely costly and inefficient and probably not in the interest of the consumer.

[163] **Michael German:** Thank you for those final comments and for your evidence this morning, which has been helpful and interesting. I will suggest to the clerks that we have a note on the European directives, to which John referred, and something on the current debate that is going on in the European Parliament and the European Commission about incentives to assist carbon capture and storage, which might be useful to us as background information.

[164] If there is anything else that you gentlemen feel that we ought to know, which you have not had a chance to say this morning, please feel free to drop a note to the clerk and we will ensure that it is circulated. I thank you, on behalf of the committee, for your submissions and for the evidence that you have given us. It has been a useful session. Thank you.

[165] We will now have a short pause in order for the next witness to take his seat.

[166] **Alun Davies:** [*Inaudible.*—]—chairing a committee of the European Parliament, which has just produced a report on this subject. Would it be possible for that report to be circulated to the committee?

[167] **Michael German:** The question is whether you want to take evidence on the report or not?

[168] **Alun Davies:** It might be interesting to listen to what Eluned has to say.

[169] **Michael German:** It would also be useful to look at the evidence that Eluned gave to the Committee on European and External Affairs of the previous Assembly on this issue, and at the dialogue between her and the First Minister, where she had a different position to the First Minister on this matter. Are colleagues happy to do that? I see that you are.

[170] **Alun Davies:** Before we move onto the next item, would it also be possible for us to

invite Cris Thomas to committee, after the recess, to give us evidence on the project that he is running in Pembrokeshire that we visited last week?

[171] **Michael German:** Yes, of course.

10.24 a.m.

**Ymchwiliad i Leihau Allyriadau Carbon yng Nghymru—Sesiwn Dystiolaeth am
Gynhyrchu Ynni
Inquiry into Carbon Reduction in Wales—Evidence Session on Energy
Production**

[172] **Michael German:** I welcome Keith Allott, who is the head of climate change at WWF. It is appropriate that you heard the end of the previous evidence session, because your perspective might be broader or have a different sense of direction.

[173] We will start with carbon capture and storage, but, before we do that, can you introduce your submission with some opening remarks, and tell us a little about the work of WWF in this area? Members will then have questions for you.

[174] **Mr Allott:** Thank you for inviting WWF to give evidence today. WWF cares about this issue because climate change is one of the, if not the, single biggest overarching threat to our core mission. The key message for us is one of urgency, although it also feels very abstract in terms of the impacts that we are going to see in 10, 20 and 30 years' time. We are alarmed at the pace of change. This year could well be the year when we cross the first great tipping point in the world's climate system, in terms of the arctic summer sea ice. It is essentially breaking up irreversibly and this is the year when we will probably witness that. Once that happens, it will trigger all sorts of feedback mechanisms, so there is an urgency for action to ensure that we do not cross any more of those tipping points. The further we go down this road, the harder it will be to keep the climate under control.

[175] Therefore, we welcome leadership in the form of the 3 per cent year-on-year reduction that the Welsh Assembly Government has supported. Recognition of the science shows that, in the UK Climate Change Bill context, the targeting, at 80 per cent at least, needs to be much more ambitious than the Government is mooting. Just this week, David Miliband issued a joint communiqué with the South African Government, recognising the need for developed countries to reduce emissions by 80 to 95 per cent. So we are now in a completely different ballpark. The science has moved on; the progressive voices in Government are recognising this and we need to raise our game.

[176] So, what are the solutions to that? Renewable energy and energy efficiency must be the core. We have done work at a global level and in many of the key economies, including the UK, showing the technical feasibility and affordability of achieving this scale of emissions reductions. We worked with the modellers who did work for the Stern review and for the UK Government, showing that we could reduce the UK's emissions by well over 80 per cent, including aviation emissions, which essentially means 95 per cent reduction from land-based sources, at a cost of around 2 per cent of GDP in 2050. That can be achieved, but it requires a new approach and a new level of ambition in policy making.

[177] Within that context, carbon capture and storage may well play a significant role, but we need to be phasing this correctly. Our concern is that, at the UK level—I am not aware of any active proposals in Wales at the moment, but they may well follow shortly—proposals for new unabated coal power stations in the UK, and across the EU, are a huge problem. Coal is the major source of the problem to date in terms of the carbon that has already accumulated in

the atmosphere, and if you look at the business-as-usual projections, the rush back to coal globally and in industrialised countries is the main problem that we face—we must head that off. We often hear a lot about coal-fired power stations in China, but Organisation for Economic Co-operation and Development countries are planning to build as much new coal-fired capacity as China, but it is just replacement capacity, so it appears below the radar.

[178] So, our view of this is that CCS has a role to play. We need to accelerate the learning and the development of CCS technology, but we need to separate that clearly from pressure to build new coal-fired power stations on the promise that carbon capture will come along one day. Carbon capture readiness is a dangerous distraction from that debate. The Government is conflating the two things as it looks at things like the Kingsnorth power station and the other proposals that are in the pipeline for new capture-ready coal stations. There are no guarantees that CCS technology would ever be available without the cost being prohibitive. Without those guarantees, we should not take a dangerous gamble with the climate or with the taxpayer, who may be expected to pick up a liability at a future date.

[179] **Michael German:** Alun Ffred, do you want to kick off?

[180] **Alun Ffred Jones:** You state in your publication, 'Evading Capture', that the WWF believes that there could be a role for CCS. We have just heard this morning that retrofitting is not feasible. Do you agree with that?

[181] **Mr Allott:** I think that that needs to be tested. There is an assertion or an assumption in the Government's framing of the whole discussion on CCS that we need to be developing post-combustion capture technology because we can then sell it to China—in other words, to retrofit Chinese power stations. So, the Government's whole position on CCS is one of having its cake and eating it. Retrofitting in China is okay, but it is too difficult to do here.

[182] Our view is that, ultimately, we need to achieve a green energy revolution. If we invest in new unabated coal stations or prolong the life of existing unabated coal stations, that would be holding back the progress on the green energy revolution. Retrofitting will have huge impacts on the energy efficiency of power stations.

10.30 a.m.

[183] However, that is not our current problem. You will have heard about the Kingsnorth power station, which produces 1.6 GW; up to a quarter of that capacity may be, if it is successful in the Government's competition, subject to a CCS demonstration plant, but at least three-quarters of the station will carry on in an unabated way. The Government is mixing up its objectives. There may be an argument for having a demonstration carbon capture project on a stream of an existing power station, to demonstrate the technology.

[184] **Alun Ffred Jones:** Do you think that carbon capture is practical and has it been demonstrated to work?

[185] **Mr Allott:** We think that it is a promising technology. It has not been demonstrated on an integrated power plant at any significant scale.

[186] **Alun Ffred Jones:** Can you repeat that? Has it been demonstrated anywhere in the world?

[187] **Mr Allott:** Not on an integrated power station. The various components of CCS technology have been demonstrated in different contexts, such as the oil industry and the chemical industry in terms of the various different elements of it. However, in terms of integrating those different parts in one place and on a much greater scale, such as what you

would need for a large coal-fired power station, it has not happened yet. That is a problem. Many of the companies and organisations that are championing CCS technology as a way of continuing the fossil-fuel-based business model, such as the oil industry and the power industry, are not stepping up to the plate to make it happen. So, there is an element of having their cake and eating it in this regard—they are holding out this ‘jam tomorrow’ promise that CCS technology will come along and save us all, but without investing the money to demonstrate it. We need to avoid the risk of lock-in to new coal and fossil-fuel stations, and, at the same time, accelerate the learning on CCS technology to see if it can play a role. However, we need to do it the right way round, rather than building lots of new coal-fired power stations now and regretting it later.

[188] **Lorraine Barrett:** It is interesting that you suggested that the carbon capture option could be seen an excuse for continuing with fossil-fuel energy production. What I am trying to get is what this carbon storage would look like. The previous witnesses said that it would be liquefied, so are we talking about huge tanks somewhere, holding liquid carbon? How big would they be? Could anything happen to that? Is it stored forever? Do we just keep filling up these tanks? That is the big picture that I have in my mind, but I have not looked at the practicalities of what that might mean.

[189] **Mr Allott:** It is a very good question, because too much focus has been placed upon the capture end of the carbon capture and storage pipeline, and not enough on what you do with the carbon once you have captured it. Various ideas have been floated over the years, including pumping liquid carbon dioxide into the deep oceans. We regard that as totally untenable, because it would cause ecological devastation of the ecosystem in the oceans. It would cause local acidification and kill much of the biodiversity in the oceans.

[190] The options that we regard as being potentially feasible and potentially environmentally acceptable would be storage in deep geological formations. Broadly speaking, there are two options for this. The first would be to re-inject carbon dioxide into depleted oil and gas reservoirs. It has been done at some scale—it has been done in the North sea by a Norwegian company called Statoil, and it has also been done by BP in a depleted gas field in Algeria. In the North sea, in particular, there are many potential sites where that could happen. There is a significant amount of capacity, globally, for that type of storage, and there is some confidence that it should be, under the right conditions and if done well, a fairly secure way of storing it, although it needs to be proven properly.

[191] The other, potentially bigger, storage option would be to inject it into deep saline aquifers. This could be an option, but a lot of work needs to be done to ensure that that is a safe option, particularly in terms of what happens. Once you inject the carbon dioxide, the idea is that it would form carbonate salts, but the danger is that that could mobilise some toxic chemicals that could find their way into the water table. You must be very careful in doing that, so we need more work to find out whether or not that is a truly environmentally benign option.

[192] **Alun Ffred Jones:** Much of this work seems to be at an experimental stage, and we do not seem to have the renewable energy or carbon capture technology to hand. Is that a fair assessment?

[193] **Mr Allott:** I think that we do have the technology to hand, and we have a lot of technology that is close to hand. I think that that means that we need to have a technology policy to accelerate the development of green technologies. A lot of work has been going on in this area, but general research-and-development spend on green technologies and energy technology is starting to bump up from a pretty low baseline. The spend collapsed about 10 years ago, not just in the UK, but in other industrialised countries, and yet we are now facing a climate and energy crisis. The idea that we can get our way out of this without having an

effective research-and-development policy on clean technologies—particularly renewables, energy storage and energy efficiency, but also carbon capture and storage, potentially—is fanciful. We need to be investing in these technologies and accelerating the pace. However, there are still plenty of technologies available now that are cost effective, that are demonstrated at scale and that can be deployed at the same time as we invest in those technologies that are near to market. It is not that we are standing here without any technology that we can use, as there are plenty of technologies; the danger is that we see that argument being used to justify building new coal-fired power stations, for instance, by saying that we cannot meet the demand for energy through cleaner technologies. All our evidence shows that we can, using technologies that are available today, and that investing in developing cleaner technologies would mean that we could continue to meet a growing share of our energy needs through clean technologies.

[194] **Darren Millar:** Thank you very much for your opening remarks and the evidence that you sent in. Do you not think that carbon capture and storage is a promising way of taking carbon dioxide out of the atmosphere to supply to biomass plants, for example, and that that is not being pursued enough by the Government? Do you not think that there ought to be a greater incentive in some way, shape or form to allow for the necessary adaptations to future-proof biomass plants, for example, that are being given permissions at the moment?

[195] **Mr Allot:** I think that your diagnosis of the scale of the challenge is right. On some of your earlier comments about the need to go carbon negative, the science is telling us that we need to be thinking about as that a real possibility—probably more than that—by the second half of this century. I have a certain amount of sympathy with the comments made by the previous witnesses that, for biomass technology, there are concerns about getting the sustainability of the supply chains right and improving the efficiency of the biomass conversion. Some planned biomass plants have a very low efficiency of only 23 per cent, and I believe that the proposed plant in Wales has a very low thermal efficiency. Frankly, I think that it would be a better first step to invest in getting it up to 90 per cent efficiency through a biomass-fired combined heat and power system while a parallel process would make sure that we had carbon capture and storage technology reaching a critical mass. The next phase might well be to move towards a carbon-negative approach some decades in the future, when we can have biomass plants with carbon capture and storage. However, I think that adding two emerging technologies together at the same time may be a difficult step.

[196] **Darren Millar:** You touched on retrofitting earlier. Do you think that the retrofitting of existing coal-fired plants, for example, to install carbon capture and storage technology ought to be mandatory at some point in the future? If so, how do you think that that should be enforced?

[197] **Mr Allott:** I think that that is a very good question. There are some instructive parallels to be drawn here with sulphur dioxide emissions from coal-fired power stations. At the time of privatisation, it was promised—indeed, the privatisation prospectuses for Powergen and Npower, which is now RWE, showed this—that a lot of flue gas desulphurisation equipment would be fitted to clean up the sulphur. Only about two thirds of that equipment ever got fitted. The companies did not spend the money that they had, essentially, been given by the taxpayer at the time of privatisation. There is a real lesson here for carbon capture readiness, vague promises, and the absence of clear regulatory rules at the outset.

10.40 a.m.

[198] We have only just begun to see FGD equipment being fitted on any significant scale, including at Aberthaw, because it has been driven by a fixed regulatory deadline that was set by the European large combustion plant directive. That stated that, after the start of this year,

you could not run a station as a base-load power station without sulphur abatement. The power sector needs that clarity and the same sort of signals for new investment and for retrofitting existing plants for carbon capture. Given the scale of the climate challenge, which is even more significant than the scale of the acid rain challenge, it is an appropriate route to take, and that is why we are calling for a legislative model in the UK and in the European Parliament. Proposals for a greenhouse gas standard are before the European Parliament and are being debated as we speak. That standard would set a maximum performance level for new power stations, coming in straight away, and, subject to the progress of the demonstration plant, it would set a deadline for the retrofitting of existing plants that wanted to run at base-load. That is exactly the same model that applied to the sulphur regulation, which finally managed to bring the acid rain problem under control. We need to apply the same model to the carbon problem.

[199] **Darren Millar:** Do you think that the legislative arrangements in Wales now give us an opportunity to go further than the rest of the United Kingdom? Would that be a good thing or would it simply move the problem across the border into England?

[200] **Mr Allott:** That is an interesting question on the status of reserved powers to do with energy policy. I do not profess to be an expert on the details of this, but I am aware that there are limits to what the Welsh Government can do directly and formally on energy policy. However, positive and strong political signals can be sent from the Welsh point of view that an unabated coal-fired power station has no place in a country that is aspiring to achieve a 3 per cent year on year carbon reduction—quite rightly, as that is what we need to be achieving. So, a strong political signal from the Welsh Assembly Government would be powerful. The Scottish Government offers a model for that, as I understand that it has no formal powers to refuse to build new nuclear power stations in Scotland, but it has given an absolutely clear political signal that new nuclear power plants will not be considered in Scotland. That has completely redrawn the map for the UK's consultation on nuclear power. It was not done formally through legislation, and there may be issues about your formal powers, but you can still drive forward the debate at a UK level by sending strong signals.

[201] **Brynle Williams:** Would you agree that we are not taking this issue seriously enough? The bottom line is that energy costs money, and we all want energy on the cheap, so we are looking at coal as an easy way out. How can we get the message across? I found it alarming that you said that we had reached a tipping point. We do not have 20 years, if we are to believe what people say. How can we push on to look at sensible ways of producing power? Are we not putting enough emphasis on saving as opposed to using? Are we looking for the easy fix all the time? I would like to hear from you which direction we should take, because I have sat and listened to the always-up argument, but I have always said that power costs money whether you want something that is super duper and turbocharged or just electricity. Which way should we go with this?

[202] **Mr Allott:** That is a good question. This does cost money, and the whole logic of the Stern review is that it will cost money but it will cost a hell of a lot more if we carry on as we are—and Stern now admits that he underestimated just how much. That is an uncomfortable position to be in, when conveying that message to consumers, but the reality is that business as usual is costing us more money than anyone expected. The reason we are feeling the pinch on energy bills and in the economy generally is because of our exposure to fossil fuel prices. Everything is being driven through the roof because of our reliance on fossil fuel reserves, which are insecure, are running out, and are in the hands of some regimes that we do not trust politically. So, investing in renewables and energy efficiency, and reducing the amount that we use is the smart, strategic thing to do even without the climate imperative.

[203] You are right that the sensible thing to do is reduce our consumption. That should be our mantra, and we should do that before we do anything else. The UK Government consulted

recently on its renewable energy strategy, and it is beginning to dawn on it that the cost of meeting its EU renewables targets will be less if our overall energy consumption is less, because we will need less of an infrastructure for our renewable energy. It is quite alarming that it took this ambitious EU target to force that revelation of the apparently blindingly obvious in the corridors of the Department for Business, Enterprise and Regulatory Reform; nevertheless, a few scales have fallen from the eyes. We have yet to see that implemented, however. The Government's consultation is still assuming very little in the way of demand reduction, compared with what we believe is achievable and necessary, and so we could do an awful lot more on that front.

[204] On the cost, quite a few headlines have been dedicated to the consultation on renewable energy and to the estimated cost of £100 billion. If you read the small print, you will see that that estimate is based on an assumption that oil prices will go back down to \$70 a barrel. If anyone here believes that oil prices will go down to \$70 a barrel, that is great, but the chances of their going up to \$200 a barrel are just as high. So, the reality is that the goalposts are shifting the whole time, and hearing scare stories about the cost of achieving a transition does not help. There will be costs involved in the transition, but there will also be huge savings, because our exposure to fuel costs will be reduced completely if we move to renewables.

[205] **Michael German:** I want to move to carbon pricing, and Alun will ask you some questions about that to start off with.

[206] **Alun Davies:** We are hearing two very different sessions this morning in many ways. In the earlier session with the generating companies, they were quite clear about many different issues, such as the cost of maintaining energy generation at current levels without necessarily investing in new technologies, and also the implications of creating a different regulatory environment in which to operate. One issue that we heard is that, essentially, the price of carbon is simply not high enough to justify investing in carbon capture and storage technology and infrastructure. You seem to be saying that the challenges facing the industry relate more to technology than to investment. Is that your point of view?

[207] **Mr Allott:** I think that the two are intimately linked. I believe that there is a challenge in getting investment and in getting it to flow to the right things, and I think that the system that we have under carbon pricing makes it clear that the carbon price is not enough to support investment in carbon capture and storage. I would throw this back at the Government: the Government's logic is that we build carbon capture and storage technology in new power stations now and, when the carbon price reaches an appropriate level, we then think about retrofitting old power stations with carbon capture and storage technology. For me, that is circular logic. We need to use the carbon price to support investment, where appropriate.

[208] The analogy that I would draw would be with appliances, as no-one seems to have a problem with the concept for, say, fridges. Given what we know about climate change and energy efficiency, it is not a controversial statement to say that we should have a policy of banning the most inefficient fridges from the market. You could have a market instrument to incentivise the best fridges that are still on the market. I think that the same logic should apply in the realm of power generation. You could say that the most inefficient and polluting power generators, namely unabated coal stations, particularly new ones, should be removed from the market, and you then have a market instrument with a carbon price to incentivise the best. That is exactly the model that we are proposing with the greenhouse gas standard. Amendments have been tabled to the current Energy Bill at Westminster, and they are before the European Parliament, and the model has been supported by the Conservative Party and the Liberal Democrats. The greenhouse gas standard would not replace the carbon price of the emissions trading scheme; it would work alongside it and as a backstop to prevent lock-in and wrong decisions being taken. The carbon price is not yet mature and therefore is not high

enough to stop the wrong decisions from being made.

[209] **Alun Davies:** I put it to you that your comparison with fridges is a bit naive. The consequences of taking these power stations out of the market are not that people would suddenly build another one; they are simply that prices will increase for the most vulnerable in society and the lights will go out for others.

[210] **Mr Allott:** We are talking about the standard for new power stations, first and foremost, and there are other ways of keeping the lights on. We are currently in the middle of some very good work, which will be available in a month or two and I would be happy to share it with the committee, which looks at the implications of delivering a modest but achievable improvement in electrical energy efficiency. If we achieve our renewable energy targets, what do we need to invest in to ensure that we keep the lights on? We keep hearing these scare stories about the lights going out because of coal-fired power stations being retired and nuclear power stations being shut down and therefore, we need to build new coal stations, nuclear stations, and gas stations to keep the lights on. However, the Government has just committed to a binding renewable energy target. If we meet that target, what else do we need to keep the lights on?

10.50 a.m.

[211] The initial results from our study, which uses the same expert model as the Department for Business, Enterprise and Regulatory Reform, suggests that, if we need any new conventional capacity, the scale of it is much lower than the power companies claim. In addition, the fundamental characteristic of the technology needed is very different from what they are planning to build. You do not need large-scale, monolithic, coal-fired power stations, which are designed to provide base-load power, or large-scale, monolithic nuclear stations. There may be a case for much more flexible, smaller scale, and perhaps gas-fired stations at the margins to cope with occasional problems of intermittency. The issue has been overstated to justify business-as-usual investment from the power sector, as far as we can see. That is inappropriate, given what is going on.

[212] **Alun Davies:** I am not sure that I agree with you on that. Global experience tells us that the lights do go out and that there are issues regarding security of supply. I think that enough countries in the world have experienced difficulties for us to be aware of the reality of those issues. It would be irresponsible for any Government to say that it would follow this political road whatever the consequences may be—if the lights go out, so be it. Are you convinced that the UK can reduce its emissions without using nuclear power?

[213] **Mr Allott:** Our view is that we can, once carbon capture and storage is demonstrated and proven. We think that carbon capture and storage has an important role.

[214] On the security of supply argument, the biggest security of supply problem that we have seen in the UK in recent years happened earlier this year, and it was not caused by renewables or green energy; it was caused by outages from a conventional power plant. Renewables and clean energy tend to get the blame for any energy security problems that we have. There are problems with intermittency and lack of predictability with all forms of power generation. Clearly, it is in no-one's interest for the lights to go out. That is not what I am advocating; I am not suggesting that we play a high-risk game with this. I am suggesting that that argument has been greatly overplayed by various different interest groups trying to promote their own technology. For example, it is such interest groups that say that there is a need for a huge investment in Kingsnorth and a potential need for 10 new coal-fired power stations and new nuclear. We have yet to see the big picture. The Government's documents and analysis have not assessed that question. The Government is happy to use the rhetoric around it, but it has not given a clear analysis of the energy security issues around new

investment if we meet the renewable energy targets.

[215] **Alun Davies:** There are very real energy security issues. WWF-UK is an interest group. I used to work for you, so I know that. There are very real issues facing us with the loss of 30 per cent of our generating capacity through the retirement of nuclear stations. I accept that improvements in energy efficiency might mean that we do not need to replace all of that capacity, but we need to replace that 30 per cent, and we will not do that solely through the use of renewables.

[216] **Mr Allott:** In the current consultation on renewable energy, the Government is talking about 32 per cent of electricity being supplied by renewable electricity sources by 2020. We think that the figure could and should be slightly higher to ease some of the pressure on the transport sector and to ease pressure in terms of the lack of clarity on the biofuels target. We think that it is more like 35 per cent that will have to be supplied from renewables. We think that it is achievable if we go about it with the right political will, and if we start now.

[217] **Lesley Griffiths:** There is concern that new coal-fired power stations will be approved before CCS is proven. In your view, should a deadline for full-scale CCS be set? If so, what would that deadline be?

[218] **Mr Allott:** That is a very good question. Our preferred approach, as I have said, would be to have a greenhouse gas standard in place along the lines of the model in place in California. That is currently being debated in Westminster and Brussels. It would avoid this entrapment problem. The concern is that a build-now-capture-later mindset is being legitimised in the UK power industry. The focus on post-combustion capture is encouraging companies to think that it is okay to build new, large coal-fired power stations now and to say, 'One day in the future we will retrofit'. Our preferred approach is to try to ensure that that does not happen, because any future Government—in 10 years' time, or whatever—will not necessarily feel bound by a political commitment or an agreement now. In 10 years' time, people will be saying 'Oh, it is a bit more difficult than we thought', or, 'The costs are a bit higher', or, 'This is something that Gordon Brown agreed—who is he? We cannot remember that Prime Minister', and there will be arguments about keeping the lights on; it is just creating a hostage to fortune. The likelihood is that the future taxpayer will end up having to pick up the bill for any retrofit. It is a gamble with the climate, and it is a gamble with the taxpayer, and you can head that off now.

[219] It would only be remotely tenable to go for a carbon-capture-ready approach, building coal-fired power stations now, if you had an absolute, binding deadline for retrofit and a binding commitment that you will close the station. If you are not prepared to fit the carbon capture technology by a certain deadline—and the deadline that has been talked about by the Royal Society and others would be 2020—and if you build a new coal-fired power station now, you will need to accept that you will have to stump up the costs for carbon capture and fit it, or else face closure. If you were to take that line, then I believe that 2020 would be the appropriate timescale. If you set a later timescale, you will be taking your foot off the gas in terms of driving Government and industry to accelerate its technological development of CCS; it will always be something that is done in two years' time, and it will be a case of 'Let's spend the money then'.

[220] **Brynle Williams:** On that point, has any work been done on the cost of disposing of nuclear waste, in relation to carbon capture over the lifespan of a power station?

[221] **Mr Allott:** A lot of work has been done. I would not claim to be an expert on it on it, but I know that the cost estimates for that are also subject to huge uncertainty.

[222] **Lesley Griffiths:** Our previous witnesses said that they were not relying on CCS to reduce emissions. If an emissions ceiling for new power generation were to be established, at what level should it be set, and is there a level of emissions below which CCS is not worth using?

[223] **Mr Allott:** The level at which we believe it is appropriate to set an emissions performance standard for a new plant would be 350g per kWh of useful energy. The advantage of a greenhouse gas performance standard, by the way, is that it is technology-blind, so it can be met by renewables, high-efficiency gas, with some heat recovery, or nuclear, although that is not a course that we would advocate. We believe that that level is appropriate because it can be met by investments in gas-fired power stations, and it would rule out the problem of unabated coal. It could also be met by coal with a significant, although not complete, level of carbon capture and storage, so we believe that it is an appropriate level to set it at.

[224] The level that has been proposed by the Conservative Party at UK level is 500g per kWh; we believe that that is higher than necessary. We very much welcome the recognition of the need for the policy, but we believe that it could be tightened somewhat. However, I believe that that level is also being proposed this week in Brussels, by the UK Conservatives and the Swedish Conservatives. Chris Davies, the Liberal Democrat MEP, has also been proposing a figure of 350g, which is the figure that we support.

[225] **Michael German:** We will now turn to what we can do in Wales.

[226] **Darren Millar:** We heard earlier about the possibility of a pilot CCS programme at Aberthaw. What are your views on using Aberthaw as a pilot site, given the fact that we have also been told that, in terms of storing the carbon that might be taken out of the process, there is no easy place to access in the immediate south Wales area?

11.00 a.m.

[227] **Mr Allott:** That was the first that I had heard about the lack of storage sites near Aberthaw—it is very interesting, and I would like to find out more about it. The pilot work that RWE is doing is useful to demonstrate the technology—I would not knock that at all. However, we need to ramp this up urgently to a large scale, and the part of the chain that needs particular focus is the storage and transport part of the equation. Therefore, I am concerned if that is not likely to form part of the storyline at Aberthaw. If it is demonstrating the capture side of things here and then transferring it to other sites, and other learning across the company, that is great. There is perhaps a role for the Welsh Government, preferably in collaboration with the UK Government and other stakeholders, in undertaking a serious, independent analysis of storage sites in order to guide investment, particularly in the carbon dioxide transport infrastructure. The obvious site would be somewhere on the east coast. If this is to be a runner—and a lot of the storage sites are located along the east coast, along with fossil fuel power stations or large combustion plants—it would make sense to have an integrated carbon dioxide motorway, basically, connecting the point sources with the potential disposal sites. However, I am not aware of a serious attempt to map the geology of the United Kingdom in order to identify whether that is appropriate for Wales—south or north Wales—or for other parts of the country. I would like to see that—it would make sense strategically, and it is something that the Welsh Government should be pushing for, because if the geology of south Wales is inappropriate, then that needs to be tested and shared at a public level, and not just at a company level.

[228] **Darren Millar:** Is there not a danger that, if it is constantly discouraged, it will not go ahead with the pilot project at all? It says that it will try the technology out and remove carbon dioxide from the process, regardless of the fact that there is nowhere to store it at the

moment, just to get the technology up and running. You have already suggested that the technology has not been developing at the pace that it should. Would you agree that there is more that can be done on the Welsh Assembly Government side, as well as the UK Government side, to help to develop this technology more quickly? I take on board your point about the need for more geological surveys on where carbon can be stored in the future. Do you think that the Government should fund that?

[229] **Mr Allott:** There is a case for the geological surveys to be funded by Government. I am slightly concerned that the whole debate on demonstration plants has been framed around the assumption that this should all be paid for by the taxpayer. I would like to remind members of the committee that the sectors that are planning, rhetorically, to make maximum use of carbon capture and storage are the power sector and the oil industry. The oil industry, as we know, is making record profits at the moment, while the rest of us are suffering because of high oil prices, but we do not see any large-scale investment from that industry in the business model that it is holding out for the future, which is based on carbon capture and storage. Where are those profits going? Is the industry investing in its own vision of the future? I do not see that happening at the scale or the pace that is necessary.

[230] Likewise, the power companies clearly have a lot of investment to make, particularly around renewables, and I do not want to distract from that. However, they are making windfall profits at the moment under the EU emissions trading scheme: £15 billion over the current phase of the scheme. We do not see that money being fully invested in the necessary solutions. So, it is a question of finding some contract between the private and public sector in terms of paying for this, rather than relying on the public purse to do it all.

[231] **Michael German:** You have made a powerful final contribution to the meeting. Thank you for coming today and for the evidence that you have given. If you feel that you have not had an opportunity to say everything that you wanted to say, there is always a route for feeding it back into the system via correspondence. Thank you very much indeed.

[232] I remind committee members that we will shortly go across to meeting room 13, which is just across the way, where we will meet with the president of the Foundation for Environmental Education, Mr Jan Eriksen, and members of Keep Wales Tidy. Tea and coffee will be provided. We will then return here for the meeting of the Rural Development Sub-committee at 11.20 a.m.. The Chair of the sub-committee informs me that he can do all his pre-meeting business in 10 minutes.

[233] The next meeting of this committee is on 16 July. I would like members of the committee to consider whether they want that meeting to be held in private session, especially in relation to the future structure of our committee and other committees. Perhaps we can discuss that informally. I also remind you that, at that next meeting, you will all receive a gift from Friends of the Earth, which will be a book for your light summer reading.

[234] We now adjourn to room 13.

*Daeth y cyfarfod i ben am 11.04 a.m.
The meeting ended at 11.04 a.m.*