ENVIRONMENT AND RURAL DEVELOPMENT COMMITTEE

Wednesday 2 February 2005

Session 2

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ENVIRONMENT AND RURAL DEVELOPMENT COMMITTEE
4th Meeting 2005, Session 2

CONVENER

*Sarah Boyack (Edinburgh Central) (Lab)

DEPUTY CONVENER

*Mr Mark Ruskell (Mid Scotland and Fife) (Green)

COMMITTEE MEMBERS

*Rob Gibson (Highlands and Islands) (SNP)
*Karen Gillon (Clydesdale) (Lab)
*Alex Johnstone (North East Scotland) (Con)
*Richard Lochhead (North East Scotland) (SNP)
*Maureen Macmillan (Highlands and Islands) (Lab)
*Mr Alasdair Morrison (Western Isles) (Lab)
*Nora Radcliffe (Gordon) (LD)

COMMITTEE SUBSTITUTES

Alex Fergusson (Galloway and Upper Nithsdale) (Con)
Janis Hughes (Glasgow Rutherglen) (Lab)
Jim Mather (Highlands and Islands) (SNP)
Jeremy Purvis (Tweeddale, Ettrick and Lauderdale) (LD)
Eleanor Scott (Highlands and Islands) (Green)

*attended

THE FOLLOWING GAVE EVIDENCE:

Mark Akhurst (BP plc)
Professor James Curran (Scottish Environment Protection Agency)
Professor Colin Galbraith (Scottish Natural Heritage)
Dr Stephen Garvin (Building Research Establishment Scotland)
Dave Gowans (Moray Flood Alleviation)
Tom Hart (Scottish Transport Studies Group)
Daniel Kleinberg (Scottish Council for Development and Industry)
Dr Peter Mallaburn (Carbon Trust)
Gregor Murray (Business Environment Partnership)
Janice Pauwels (City of Edinburgh Council)
Mike Thornton (Energy Saving Trust)

CLERK TO THE COMMITTEE

Mark Brough

ASSISTANT CLERKS

Chris Berry
Katherine Wright

LOCATION

Committee Room 1

Scottish Parliament

Environment and Rural Development Committee

Wednesday 2 February 2005

[THE CONVENER *opened the meeting at 10:06*]

Climate Change Inquiry

The Convener (Sarah Boyack): Good morning and welcome to the committee's second meeting on our inquiry into climate change. I welcome all members of the committee, members of the press—although I do not know whether we have any this morning—members of the public and, in particular, our witnesses.

The first panel of witnesses is here to answer our questions on energy and energy efficiency. Mark Akhurst is the climate change manager with BP plc; Dr Stephen Garvin is from the Building Research Establishment Scotland; Dr Peter Mallaburn is head of government and international affairs at the Carbon Trust; and Mike Thornton is head in Scotland of the Energy Saving Trust. I thank those of you who sent us written submissions. We have all been able to read them and they have been extremely helpful.

Nora Radcliffe (Gordon) (LD): I have a question for the BRE. I was at an event yesterday at which we discussed the accrediting of green architects on the basis of proven developments—developments that have shown, over at least one year, that they have achieved the green credentials in their specifications. How much work has been done on that? We get a lot of green procurement, but how much green monitoring do we get to establish that what is promised on the packet is what we get?

Dr Stephen Garvin (Building Research Establishment Scotland): I am not sure that the monitoring aspects are quite as developed as the design aspects. Tools such as the BRE environmental assessment method—BREEAM—have been used on the Parliament building. Those tools set out the degrees of excellence, or otherwise, of the environmental credentials.

On occasion, our clients have wanted to follow assessments through and have some monitoring of the construction process and the finished building. However, monitoring tools are not as yet in on-going use; some monitoring is going on, but it is not very developed. Even the design side still has a long way to go.

Nora Radcliffe: There is huge potential for carbon savings in the building and construction industry.

Dr Garvin: Yes.

The Convener: In your submissions, a couple of you talk about potential savings in domestic and commercial buildings. Has anyone done any work on the cost savings that could be associated with energy savings or carbon reductions if—systematically and across the board—we started hiking up our energy efficiency standards and our renewable energy opportunities?

Dr Garvin: My experience is not quite across the board, but we have done a lot of work into potential—and real—savings in refurbishment projects in existing buildings, such as the older tenements. Significant financial savings and carbon reductions can be made through better insulation and through the installation of more efficient heating systems—or, indeed, proper heating systems—in domestic properties in particular.

Alex Johnstone (North East Scotland) (Con): I will not talk about how we reduce CO_2 emissions, but discuss why we should do so. We all know the general, overall issues and why it is good to reduce CO_2 emissions, but I will take the matter down to the level of the household and the individual, because that is where we need to make progress if we are to achieve a reduction over time. How best do we make an impact on the individual? Is a Government tax regime the right way to go, or is there a place for the free market in encouraging people to use energy in a way that releases less CO_2 into the atmosphere? Can you think of any other way in which the Government can influence individuals' behaviour to reduce CO_2 emissions as a whole?

Mike Thornton (Energy Saving Trust): There is a place for Government action, but consumers can be influenced in a variety of ways, because they use so much energy and the efficient use or otherwise of that energy is the sum of their individual decisions. The Energy Saving Trust advocates the provision of information and tailored advice as probably the most cost-effective method of influencing consumers, but there is also a place for tax incentives and other fiscal measures. At the moment, we run a network of energy advice centres in Scotland. Those centres are focused on providing individual consumers with the information that they need to make informed changes. The network is effective and cost effective; a great deal of additional progress can be made through that route.

Dr Peter Mallaburn (Carbon Trust): I will take the question at a slightly higher level—the Carbon Trust works with businesses and the public sector,

but many of the issues are similar. The answer depends on what you want out of the strategy. If the economic and environmental benefits are to be considered together, the problem needs to be addressed in a certain way. In that case, the answer is much more subtle but much more powerful: action must be taken that is aimed at individuals—as managers of businesses or investors in businesses, if we want to look at the world in that way—and the market must be supported in responding to what the Government does.

You need to pull regulatory and legislative levers to ensure that we have smart regulation. You also need to pull levers that involve Government leadership—public procurement plays into that, whether through the performance of public buildings such as the Parliament building or through the Parliament taking a lead by buying more energy efficient products—and support the market through the activities of organisations such as the Carbon Trust in Scotland or the Energy Saving Trust. You need to decide whether the ultimate policy aim is economic, environmental or social and then deploy everything that is at your disposal. You cannot just aim at individuals. That is what we have been trying to do for 30 years and it is not showing many signs of working.

Alex Johnstone: My concern is that it is possible for a group of individuals to agree that CO_2 emissions are a bad thing but for individuals in that group to believe that what they do does not make a great deal of difference. As a result, individuals behave in a way that is contrary to what they profess to believe. How do we get individuals or individual decision makers in business to take responsibility, not wait for their neighbours to do it?

Dr Mallaburn: We have to appeal to what makes businesses take a more positive view of reducing emissions. Reputation is a big driver, certainly for the larger businesses in Scotland, so if we can appeal to their sense of their position with their consumers, they will respond. For example, the emissions trading scheme has a strong impact in the United Kingdom as a whole in driving business to treat the risk of regulation as an issue. The way in which the consumer views larger organisations such as BP is important. In our work with business, we tend to get a response if we pull those two levers. We make it in businesses' interests to respond. The answer for the domestic consumer is a lot more difficult; we find that things are a little bit easier with businesses.

10:15

Mike Thornton: One of the keys in aiding individual consumers to make what I would call the right choice is that the low-carbon option must be made accessible and easy. We have to lower the barriers to doing the right thing. Much of that is about providing information and advice and facilitating a process of cultural change. If we can make the low-carbon option easy and accessible, we can be effective in driving the consumer towards it.

Mark Akhurst (BP plc): I want to build on the points that Peter Mallaburn raised. I presume that Scotland thinks that reducing emissions and promoting economic growth are important. The answer that the country needs must support the achievement of both those goals. Businesses have a role in providing the lower-carbon products and services that consumers increasingly want. It is important that they do that in a way that is less carbon intensive both in the upstream manufacturing phase and in the end-use phase.

We need to find policies that encourage business growth in that lower-carbon space, because that is appealing to everyone. It is appealing to businesses because they get the opportunity to provide the necessary products and services and it is appealing to consumers because they get the products and services that they want and need. At the same time, the carbon issue is dealt with. The question is what the right policies are to make that happen.

We believe that a suite of policies is needed. It is important to have a policy on a strong currency in carbon emissions, which will be built from some sort of cap and trade system. The important thing about such a system is that it is designed mainly to incentivise business growth in the lower-carbon space rather than to be used as a compliance tool. Other such policies need to be implemented. The transition can be seen as a great opportunity, but we must not make the mistake of thinking that it will be achieved within a few years or even decades. We are talking about a long-term, multidecade challenge and we need to address it as such.

Alex Johnstone: You do not think that simply doubling the tax on carbon emissions would be the right way to go, without leaving opportunities for people to avoid it and still remain active in the economy.

Mark Akhurst: You use the word "tax". That is the issue. We must see the cap and trade system as being a way not of raising revenue or of taxing people, but of incentivising those businesses that want to move into the lower-carbon space. If the caps are set in the right way—perhaps using some sort of benchmarking approach—so that companies that produce product X more efficiently are rewarded and companies that produce the same product less efficiently are not rewarded, we will encourage growth in that lower-carbon space.

It is much more difficult to extend the cap and trade concept beyond businesses into the consumer space. I have not got the answers to that problem, but we will be thinking hard about it over the next five years.

Alex Johnstone: Do you view the emissions trading system as being the next step beyond blunter instruments such as the fuel price escalator that have been used in the past?

Mark Akhurst: Emissions trading needs to be used in a way that encourages lower-carbon activity and lower-carbon business. Higher taxes discourage activity. That is the key difference.

Mr Alasdair Morrison (Western Isles) (Lab): Mr Akhurst, in the second paragraph of the section of your submission entitled "The Debate", you mention the

"necessary objective of global energy policy"

and a

"shift to a significantly lower carbon economy".

In your outline, you cleverly mentioned that we need a mixed energy policy and cleverly concluded that all the many options have their advocates and opponents. How, in a Scottish and UK context, could a company such as BP and an institution such as the Scottish Parliament play their respective roles in securing a mixed energy policy in which we achieve all these worthy objectives while ensuring security of supply, economic growth and the ability to do all the things that you and your colleagues mentioned previously?

Mark Akhurst: That is a good question. Obviously, we are facing a multidecade challenge. We have been working with Princeton University on the issue; I do not know whether members have read Steve Pacala's paper, but he says that we need to plan the way ahead. We buy into that approach. After all, there is a lot of uncertainty about how much emissions will grow in future, the sensitivity of the climate system and so on. If, in the face of all those uncertainties, we simply go on having our conversation about them, we will not be taking any action—and one thing that business is good at is taking action in the face of uncertainty. For example, although we do not know what the oil price will be next week or next month, we have to take a view on what it will be, set it in stone and revisit it in a year or two. We base our planning on the view that we have taken.

With climate change, we need to take a view that a realistic objective is to stabilise greenhouse gas concentrations at around 500 to 550 parts per million. If we do that, the reasonable view is that we should bring global emissions back to current levels by 2050. If we begin by recognising that this is a 50-year challenge, we can begin to find out what actions we need to take over that period to keep emissions at current levels by 2050.

That said, we must first realise that, by 2050, world energy demand will have doubled or tripled. Countries that are part of the Organisation for Economic Co-operation and Development want economic growth. Everyone plans their economy on the basis of 2 or 3 per cent growth every year. In fact, developing countries expect much higher growth; for example, the rate in China is much more than 2 or 3 per cent.

Given that energy demand will double or triple and that we need to keep the level of emissions steady, we can do two things. First, we can use energy much more efficiently than we currently do and, secondly, we can use energy that contains less carbon. Both actions would make important contributions.

We feel that the developed or OECD countries should first introduce policies to encourage people to use energy much more efficiently, because the energy infrastructure is already in place and it will take much longer to change to an inherently lower-carbon energy infrastructure. However, in developing countries, we must concentrate on building new, inherently lower-carbon energy infrastructures, which will be more reliant on natural gas and renewables. Where we cannot avoid using coal, we should consider clean-coal technologies such as gasification and carbon capture and storage. How we fund that is a separate issue, to which we will need to return.

As for the fossil fuel component over the 50-year period, it might be easier if members imagine a graph that shows carbon emissions going into the future. That graph is in two halves; the rectangle at the bottom shows that carbon emissions from fossil fuels will continue at pretty much the same level until 2050, after which they will need to decline, and the triangle at the top shows the energy, including renewable and nuclear energy, that we will get from the new zero-carbon economies.

Over the next 50 years, we will need to lighten the mix in the fossil fuel rectangle at the bottom of the graph. There are three types of fossil fuels: coal, oil and gas. I will talk about oil first, as it is the closest to our business. If we are realistic, we do not think that, over the next 50 years, there will be a significant shift away from the use of oil as the main transportation fuel. Within that time, we expect hydrogen to become part of the mix, but we do not think that it will be dominant within 50 years. Given that energy demand for transportation will double in the next 50 years, we need to use oil twice as efficiently as we are doing today. It is no good carrying on driving around in cars that only do 30 miles per gallon. By 2050, cars will have to do at least 60 miles per gallon,

otherwise we will not be able to allow ourselves to use the oil that is needed to fuel all the driving that needs to be done.

We will also have to shift away gradually from using coal towards using natural gas. At the current rate of use, the world has enough natural gas to last for the next 63 years—if we do not find any more natural gas or if we do not stop using it so much, it will run out in 63 years. However, we are saying that, in future, we need to use a lot more natural gas to generate electricity and to provide the heat that we currently get from using a lot of coal. In the future, we will need to use gas faster than we need to today.

The challenge to companies such as BP is therefore clear. We need to be out there finding a lot more natural gas. Equally important is the need for us to find ways of bringing that natural gas to the consumer and to where it needs to be used. We have come a long way on that journey. Thirty years ago, natural gas was not a global commodity; people relied on coal and oil. Now, because of the technological advances of the past 30 years, gas is a global commodity. We can bring it to wherever we want it, because of the liquefied natural gas technology and better pipelines. We need to build on that and take the technology further. That is a huge challenge.

Renewable energy will also be part of the mix. That will come into the top part of the graph or triangle that I was talking about. If we want solar power to be a significant contributor to world energy and to take away perhaps a billion tonnes of carbon emissions, the global solar energy business has to grow 700-fold from its current level by 2050. That is a huge challenge and I do not know whether it can be done. I think that it would mean something like 25 or 30 per cent compound growth a year to get to that point. That just gives an idea of the challenge of growing those embryonic businesses from a tiny base. It might be too ambitious to say that we will get there in 50 years. However, beyond that, solar power will begin to make a much bigger contribution.

I have given a snapshot of how we see our role in the supply of the energy that the world will need. We need to carry on supplying oil for another 50 years, but we need to play our part in making sure that it is used twice as efficiently. We need to find a lot more natural gas and we need to find ways of bringing it to the market more cheaply. We need to be laying the foundations for renewable energy and other zero-carbon energies so that they can be built into a world-scale business by 2050.

Rob Gibson (Highlands and Islands) (SNP): I would like to get back to the idea of how smart regulation can work. If people are to become involved in the process from the start, they will have to have a sense of ownership of what is going to be done. In business, people will be involved through health and safety checks being done every year into the way in which businesses operate. What do the panel think we could do to reduce emissions from carbon-based energy? Have you any ideas that we could apply in a small country in northern Europe?

10:30

Dr Mallaburn: The issue of smart regulation is important to us. We need to accept that all the markets that we are talking about are regulated. We are all trying to get people to do things that they would not normally do. You can call it what you like, but the issue is shifting investment away from old-style technologies to new ones. From a business perspective, there is a dilemma. Businesses might say, "I don't need to invest in low-carbon technology for five years, because I just replaced my boiler," or, "The lighting system is too expensive to strip out." The trick is to try to show businesses that it is in their interests to do such things now rather than later.

Working with the larger end of the business market in Scotland, we have found that three things need to be done. First, we need to understand what has driven changes. In particular, are there any barriers to change within the organisation? For example, the energy manager of a company might be very keen to make changes, but he might have no champion on the board. One set of policies or measures that might be deployed to sort that out would comprise a change to the company's management. The other approach is to ask how the company sees itself in relation to its peers. If it does not do something, will customers decide to spend their money with a different company? We exploit people's reputational concern—"exploit" is a harsh word, but that is what we do.

We also need to think a lot more broadly about how companies view regulation. My colleague has just made the point that the impending European Union emissions trading scheme is seen as a risk coming down the line, certainly for the larger companies in Scotland. If we can create packages of policies and measures that play to all a company's worries and risks, that immediately raises the issues up from the energy manager level, which is where programmes have been focused for many years, to the level of the board. That is where we get action. At the moment, energy efficiency is an operational issue for most companies. It is handled at middle management level and we will never get traction except in extreme cases, such as that of BP, where energy efficiency is a big issue anyway. As I said, we never get action at a high level unless the issue is raised to the level of the board, which is where all the investment decisions are made.

You asked me how Scotland could make use of such mechanisms. I mentioned leadership. One of the most fundamental missed opportunities throughout the country has been in commercial buildings, which are large energy users—apart from transport, they comprise the only rising emission source. The public sector has massive potential to make some inroads in that area. First, the issue is to set the right example. The Parliament building is an excellent case in point: there are state-of-the-art energy efficiency measures in here. However, we would all agree that other public buildings are not optimal in that respect. A contribution can be made towards strengthening existing targets in public procurement, which is an important area to consider, and businesses will sit up and notice that the Government is putting its money where its mouth is.

Can you use the legislative levers that you have at your disposal to make a difference? There is potential for you to consider the whole area of the EU energy performance of buildings directive. That sounds extremely dry and boring, but it offers you a legislative lever to drive up performance at the higher end of the marketplace. If Scotland decided to implement that directive in a forceful way across the whole economy—at the moment it is heavily focused on public buildings—that would send a strong signal to property companies. Government procures buildings for its own use, so it would have to raise the performance of its stock. There are one or two areas where Scotland could make a real difference, playing on businesses' concern about risk.

Rob Gibson: You will realise that, for example, some swimming pools and sports centres that have been built quite recently, after a hard slog to get there, are among the least energy efficient buildings on the face of the planet. In order to convince people, we will have to educate them. Regulation is one thing, but the educative power of companies to involve their employees in the whole process is probably the best way of getting the relevant information across and the right ideas and mindset into the public domain, short of taking everybody back to school. Would any members of the panel, speaking from their own experience, like to expand on how businesses, including public business and administration, could do that? Could you give some practical examples?

Dr Mallaburn: Employee awareness and action are important, as the people who use the buildings are the ones who will spot opportunities. However, the technical difficulties can be frustrating. For example, the employees might want to recommend to the finance director of a company or a public institution that investing £100,000 in a new lighting system would save energy on a net present value of two years or less—that would be very attractive to most people, because it will pay back the investment in less than two years—but they might find that there are great difficulties in persuading their senior colleagues that they can have an influence. I will give an example from the public sector without naming any names. Certain Government departments would very much like to invest in energy efficiency, but the Treasury guidelines under which they operate do not allow it or are difficult to understand and implement.

There is a large financial barrier preventing such people from using money to invest in things that are not core business for them. The Carbon Trust takes the view that it needs to help them to make the business investment case to senior managers through simple measures, such as helping them to use PowerPoint presentations. Such means can be powerful—we have seen that approach pay off in even the largest companies, in which energy managers tend to be isolated and to find it difficult to influence decisions. I am sure that there are other examples.

Mark Akhurst: Peter Mallaburn referred to BP as a company that wants to take a lead on energy efficiency and said that it has done good work on that. We have done some, but we can do a lot more, even within BP, for exactly the reasons that Peter Mallaburn mentioned. We face a challenge in harvesting the opportunities that exist, because energy efficiency projects compete with many other projects for our capital. Even though many energy efficiency projects have attractive returns, we might choose not to fund them, not only because they might not be as financially attractive as something else, but for many other possible reasons, such as their not being the right strategic fit because our strategy is, for example, to spend money on drilling more oil wells.

We had success when we undertook our first challenge—to reduce our emissions by 10 per cent—because the chief executive officer, Lord Browne himself, had ownership of it. It was clear to everybody in the company that it was really important to him and that he wanted people to cut emissions. He incentivised people through their performance contracts and rewarded in other ways those who took a lead in implementing the emissions cuts in BP. Peter Mallaburn is right to say that energy efficiency being recognised and owned at chief executive officer level is a big step forward in getting people further down the organisation interested and motivated.

Mr Mark Ruskell (Mid Scotland and Fife) (Green): I have a question on energy efficiency for Mike Thornton. In your written submission, you discuss the need for sectoral energy targets—efficiency targets in particular. Do you have a sense of what those targets should be? Do we need to consider introducing targets for energy efficiency in other sectors, such as transport?

Mike Thornton: There is a strong need for setting specific targets in different sectors in order to drive action. If we do not have targets, we often end up with not much action. The EST's suggestion of sectoral targets for energy efficiency comes from our feeling that to set an overall greenhouse gas target would not necessarily be the best way forward for Scotland because the Executive needs to address itself—if it can—to the areas in which it has power to make a difference. With an overall greenhouse gas target, the Executive might hit all the internal targets that it had set itself but still fail to hit the overall target because of actions that are taken at another level or because of changes in world markets. Therefore, we think that a better option would be to set sectoral targets; we urge Scotland to set them at an advanced level compared with the rest of the United Kingdom, as with the renewables target.

Mr Ruskell: There is clearly a role for sectoral targets, perhaps alongside a national target.

I am interested in understanding what your reservations are about a national greenhouse gas target for Scotland. There are factors outwith the UK Government's control, but Gordon Brown is still setting targets for the UK economy, and we are still working towards an end point. Given the fact that there are policies within the United Kingdom climate impacts programme that we know will be enacted over the next 10 to 15 years, surely the Scottish Executive can build an element of prediction into setting a target. The Executive is not exactly operating within a policy vacuum. There seems to have been some progress in recent years in determining and disaggregating a Scottish target—or a Scottish figure, because we do not have a target at the moment—from the UK figures.

Mike Thornton: I accept that it is a finely balanced question, and that a strong case can be made either way. Targets that are achievable and which are fully within the competence of the Government in Scotland are the targets that can be monitored and be more effective. The problem with wider targets—even at UK level, as you have remarked—is that they can be buffeted by larger-scale or world events. It is not always possible to say that a part of Government has met or not met a target, and although a target may be met, the link between that and Government policies is not always watertight. The renewables target is the best current example in terms of sectoral targets for energy efficiency and targets that are proxies for carbon in areas where the Scottish Executive has effective power. Targets are met or not met because of the effectiveness or otherwise of policies, so we get a straight link between policy and accountability.

Mr Ruskell: If sectoral targets are met, the CO_2 reductions that will be achieved will feed into a disaggregated figure for what Scotland is achieving. Surely—even with the sectoral targets that we have—by lumping all the different sectoral targets together we should be able to predict and to set milestones and wider targets.

Mike Thornton: Yes—targets can obviously be set at a level that contributes to an overall carbon target, but that carbon target is summed upwards from the sectoral targets, rather than being set at a particular level and thereafter policies being worked out that can deliver it.

Mr Ruskell: So you aggregate the savings up the way.

Mike Thornton: Yes. The individual components are under strict policy control, so the sum of their parts is, too. Sometimes greenhouse gas targets are set with the best intentions but are somewhat buffeted afterwards.

Mr Ruskell: I can see how that could work in reality, and how it would follow through into policies for specific sectors. I have a quick question for Mark Akhurst. I was slightly concerned to hear that you do not believe that hydrogen will be a significant fuel by 2050. Is that BP's position? I know that other multinational oil companies are considering hydrogen as a significant fuel for transport. Are you concerned that you might be out-competed by the multinationals in a hydrogen fuel economy?

Mark Akhurst: We think that the technological challenges are so great that it is unlikely that, by 2050, hydrogen will have replaced gasoline as the main fuel for transport. I am not saying that hydrogen will not be a contributor in the market by 2050; it will be, but it will be used in applications where the technological challenges present less of a barrier. Captive fleets, such as buses and taxis, would be a great place to start using hydrogen. The problem with hydrogen is that it is not really possible to store enough of it in a vehicle to give it a decent range, so vehicles that return to a depot at the end of every day will fit nicely with the technology.

BP is doing a lot on hydrogen—we are involved in many of the technology demonstration projects that are going on—but our position is that transport fuel will still be dominated by oil in 2050. Hydrogen will have begun to be a mover in the market by then, although it will probably be beyond 2050 before hydrogen overtakes conventional fossil fuels. But who knows? Things are so uncertain that we do not know. We will not leave ourselves in a position where we can be out-competed; we are at the forefront of researching and demonstrating the technology.

10:45

As I said, we need to be realistic about what the possibilities are and about how quickly new technologies can come into play. The main prize on which we need to focus for 2050 is to double the efficiency of existing technology, which is quite feasible. That will mean that people will be driving around in cars that do 60 miles per gallon, rather than cars that do 30 miles per gallon. We can begin to work on that now, and we can realistically achieve it.

We do not know whether it will ever be possible for hydrogen to become the main source of fuel for transport. You should not forget that the hydrogen has to come from somewhere—we have to make it, and the cost of that is high. At the moment, the cheapest way of making hydrogen is from natural gas. It is a matter of taking natural gas, putting it through a reactor and stripping off the carbon, which leaves the hydrogen. Something has to be done with the carbon that is stripped off. It can be vented to the atmosphere in the form of CO_2, but that does not help, even though it is not vented at the point of use, which is the car. The CO_2 could be compressed and pumped into a geological reservoir, which is what we would aim to do. That costs more, however. We think that we will be able to generate hydrogen from renewable sources only in the longer term. The costs of that technology will be higher and there will be a big challenge in bringing them down.

Mr Ruskell: Your predictions might change over the next 45 years; as you said, you do not really know where we will be in 20 years' time, for example. As a company, you have to leave yourself open to possibilities.

Mark Akhurst: Who knows? In 2020, we might be sitting here saying that we do not think that the technology will be available even by 2070. I went to a conference recently, which was attended by a well-respected academic. I cannot remember the guy's name, but he was from a university in the United States. He thinks that 2070 will be the watershed when hydrogen begins to take over from fossil fuels. That is not a BP-specific view; it is based on the available scientific evidence. Other companies are positioning themselves for hydrogen becoming a major part of their business soon; we need to wait and see how that pans out.

The Convener: I return to a point that one of you made about existing technology. This builds on Mike Thornton's point about setting sectoral targets, rather than debating what we are doing at Scottish or UK level. To what extent are we building sectoral targets that can be monitored and through which the range of possible policy levers, which Peter Mallaburn discussed, can be identified? That would seem to be a good starting point.

A few of you mentioned building regulations and upgrading existing stock. The Energy Saving Trust's paper in particular contains a lot of practical and functional suggestions for things that we could start doing now, rather than getting into a debate about where we will be in 2070. If we need several decades to develop some forms of technology, I am attracted by the possibility of addressing what we can do now to achieve quick wins and to do things that are easier than some of the big, high-level measures. It is important that we do not miss the practical stuff in this discussion. What would the quick hits be? What are the obvious things that we should be doing now?

Mike Thornton: That question lies at the core of the matter. We know about this—we do not need rocket science to tell us how to save significant amounts of carbon. Of the 60 per cent carbon savings target in the energy white paper, it is estimated that 30 per cent—or half the target—will come from energy efficiency. Those are the savings that we can start on right now. I agree that one can have one's plans for the future and that it is essential to have them, but there are things that can be invested in and policies that can be changed right now.

Building regulations represent a policy lever that we would suggest as being one way forward, and they could be strengthened fairly quickly. That would be an example of smart regulation, which was referred to by Rob Gibson. A lot could also be done in the private rented sector through smart regulation. It would be possible to say that a landlord's property had to reach a certain level of energy efficiency on one of the national rating standards before it could be let. Such a measure could be integrated fairly well with implementation of the European energy performance of buildings directive which, as has been mentioned, must come into force anyway.

I have mentioned a number of measures that are quite smart, that would promote investment and which would probably have a relatively neutral economic effect. For example, although landlords who wanted to stay in business would be forced to invest in energy efficiency, they would make cost savings over the lifetime of the improvements that they made. The work that needed to be done on their buildings would mean that additional employment would be created in line with the green jobs strategy. That would be quite a smart and economically neutral piece of regulation. We would certainly advocate going that way.

The Convener: Would you advocate such regulation for commercial buildings, too? One of the witnesses talked about the need not just to take action in the domestic sector, but to incentivise private companies to ensure that all

new buildings are energy efficient. Should we use building regulations to do that or should we use other policy levers?

Dr Mallaburn: Building regulations have an important role to play, but to use building regulations alone would be to nibble away at the low end of the market; it would remove only the buildings that were performing most poorly. It is necessary also to incentivise the high end of the market by introducing a labelling scheme akin to that which is used for fridges, which has been highly successful in the UK. If a mandate was issued that all public sector buildings in Scotland had to be labelled by the end of next year, that would be an extremely important step in the right direction. That is our perspective.

Dr Garvin: Building regulations apply to new buildings; their impact on existing buildings is limited, except in the case of major refurbishments. Both in the commercial sector and in the domestic sector, there is a lot of scope to do more with existing buildings. The energy performance directive could give a lead on the commercial side, especially in the public sector, but it also has applications in the private sector.

In the public housing sector, there is a lot of scope for the Scottish Executive to give a lead to local authorities and to major organisations such as the Glasgow Housing Association on improving the performance of their buildings. As was said earlier, we are not talking about rocket science; technologies that can make a significant impact are already available. If we wanted to improve on the performance of the existing building regulations, greater use would need to be made of renewables and low-carbon technologies, but many methods for refurbishing buildings to make them more energy efficient by introducing more efficient lighting and heating, for example, already exist.

Nora Radcliffe: There is a push to use more timber for houses and to source more locally grown timber. I presume that there is a way of working out what saving is made on the overall environmental cost of a building by going down that route. Should we be doing more to encourage the use of local timber?

Dr Garvin: At the moment, more than 50 per cent of the houses that are built in Scotland have timber frames. A substantial amount of timber is used in the frames, floors and roofs of houses. As a renewable material, it has advantages. Given that much of the timber that is used in construction is imported, there is a need and a desire to use greater volumes of locally sourced timber in construction.

That said, a case can be made for applying environmental credentials and sustainability to all the materials that are used in construction. To a certain extent, all of them have an energy embodied in them by the time they get to the building site. Sometimes, there is a trade-off between the materials that are used and the type of building that is being constructed. As a result, using more sustainable materials—and, where possible, local materials—should have benefits. However, any such approach must be taken on the basis of informed choice.

Nora Radcliffe: Is there no practical way of incentivising or even measuring such use?

Dr Garvin: You could certainly measure the life-cycle impact of different materials. However, the matter is very much driven by what public or private sector clients choose. After all, some companies or organisations seek to differentiate themselves or want to be seen to be green. Perhaps we should also think about using as a lever not just a building's initial capital cost but its whole-life cost, including its maintenance requirements.

Nora Radcliffe: Your submission mentions the SAP rating. What is that?

Dr Garvin: SAP stands for standard assessment procedure, which is a means of assessing a building's energy efficiency.

Maureen Macmillan (Highlands and Islands) (Lab): Last week and again this week we heard that one instant solution would be to sequestrate carbon and bury it under the North sea. However, no one has explained whether that is a real possibility or what its environmental impacts would be. I have spoken to people from oil companies who say that using carbon sequestration to bring up the last remaining oil from oil wells will not work. What stage has carbon sequestration reached?

Mark Akhurst: That technology has been well established in the oil industry for many years. For example, in tertiary recovery, we already pump CO_2 into reservoirs because it reduces the oil's surface tension and helps it to flow more easily. Because our business is to understand how such reservoirs work, we know that the CO_2 will stay down there for a long time by dissolving into rock and so on.

Carbon sequestration is not an instant solution to the problem. For a start, it costs money. Every other measure that we have mentioned today is pretty much gross domestic product-neutral or might even provide benefits. After all, saving energy through efficiency measures delivers a positive outcome, in that it saves people money. The difference with carbon capture and geologic storage is that there is no revenue source. Such an approach could happen on a large scale and attract business interests only if carbon was a

global currency. For example, if CO_2 were valued globally at $15 a tonne, it might in certain situations be economically viable for people to compress and geologically inject it. However, the cost of doing that is, at its lowest, about $3, $4 or maybe $5 per tonne stored.

Such an approach presents our best opportunity, and in Algeria we are experimenting with a large-scale project in which we produce natural gas from a reservoir. To get the gas to pipeline specifications, we have to separate it out from the CO_2, which is usually vented into the atmosphere. In some gas fields, 10 or even 15 per cent of the total material that comes up the well might be CO_2, with the rest being natural gas. Each year in the Algerian project, we are separating about a million tonnes of CO_2 out of the gas before the gas is exported into the pipeline.

11:00

In the past, the procedure would simply have been to vent that million tonnes of CO_2 to the atmosphere. We now compress the pure stream of CO_2 that we have had to separate anyway, and we re-inject it back into the rock. There are opportunities to do that where natural gas is produced. Separation of the CO_2 in the flue gas at a power station is much more costly, because it is necessary first to separate the CO_2 from the flue gases. That is an extra thing that we would not be doing otherwise. That would cost another $30 to $50 per tonne to do, depending on the set-up of the power station. Although that is much more costly, it is technically feasible.

We are working on the matter of security in different situations involving pumping the CO_2 back down into the rock. We understand the geology pretty well, so we know where the CO_2 will go and, in many cases, how it will behave. There is more work to do on the technology, but the biggest factor is raising awareness of it as a possibility and gaining public acceptance for using it on a wider scale.

That technology will provide an opportunity for a transition to lower-carbon fuels in the future. If we are going to use hydrogen as a transport fuel in the future, that hydrogen needs to come from somewhere. Most probably, we will manufacture it from natural gas—or maybe even from coal—to start with. That is a good thing. If we can find a way for China, for example, to use its large amount of indigenous coal cleanly, that will be a good thing for the planet.

While we are making hydrogen from coal or natural gas, we can separate the CO_2—which we have to do anyway—and store it more cost-effectively. The technology can be seen as a bridge towards a hydrogen economy in the future, but we should not see it as a replacement for moving to other sources of low-carbon energy, such as solar power and other renewables, which we need to progress as well. I stress again that the technology should be viewed as a bridge to a lower-carbon future.

The Convener: Thank you—that was great. If members are interested in pursuing issues further, we can probably get more written evidence, but that is all we need for today. I thank all four witnesses for their written evidence, which they gave to us in advance, and for being prepared to answer a wide range of questions. We will have a short suspension.

11:02

Meeting suspended.

11:06

On resuming—

The Convener: We can now kick off with our second panel of witnesses, whom we have invited to speak to us about business issues. I thank them for giving us written evidence in advance. We have with us Gregor Murray, who is with the business environment partnership but is also executive director of the Midlothian Chamber of Commerce and Enterprise—we will get double value out of him; Tom Hart, a committee member of the Scottish Transport Studies Group; and Daniel Kleinberg, a policy analyst with the Scottish Council for Development and Industry.

We will not have opening statements from the witnesses, but will go straight to questions from committee members.

Mr Ruskell: My first question is for Tom Hart. In your written submission, you discuss the need for a sectoral greenhouse gas reduction target for transport and mention the need to delay projects such as the urban M74 and the proposed second Forth road bridge in order to hit any such target. You make a distinction between those projects and other road upgrades, such as those on the A8000 and the M8 between Baillieston and Newhouse. How did you make the distinction between those sets of projects and how does—or should—the Executive make the distinction?

Tom Hart (Scottish Transport Studies Group): I based the distinction partly on the scale of the funding that is involved and partly on the assessments that were presented to the inquiry in relation to the M74, which said that such upgrades tend to stimulate growth in traffic, longer trips and a shift away from public transport. In other road schemes, there is a more evident, more distinct need for improvement. Part of the Forth road bridge-related congestion is congestion on the approach road, so that can be eased.

We need to review what is happening on transport, energy and sustainable development, but our economy has been becoming less energy intensive. I checked on some of the evidence in "Review of the Scottish Climate Change Programme: a Consultation"—to which responses are sought later this month—which points out that Scottish CO_2 emissions went down by 3.5 per cent between 1990 and 2002 and that, in the same period, the Scottish economy expanded by 25 per cent. It is sometimes assumed that transport improvements and big investments are essential to keep the economy growing. The evidence does not support that, but selected schemes are important. There is a bigger worry about air travel than there is about road traffic, which is already beginning to stabilise in Scotland.

Mr Ruskell: Transport will be a major contributor to our greenhouse gas emissions in the decades ahead. How important is it that we set a transport sector target?

Tom Hart: Having a target is important, and it is in some ways easier to set a target for that sector than it is in the other sectors that have been mentioned. The other issue is the kind of targets that should be set. My written submission says that some climate change is inevitable and that we need to begin to think about the possible transport costs in diverting routes and higher maintenance, for example. There is increasing evidence that we must avoid an increase in CO_2 emissions, which for the developed world means developing faster cuts to allow some expansion in other parts of the world. There is not necessarily evidence that faster cuts have significant adverse economic effects—they can have benefits and improve quality of life.

Mr Ruskell: I have a question for Daniel Kleinberg. In your submission, you say:

"while it would be useful to make progress on disaggregating Scottish figures, it could be that an increase in overall Scottish emissions contributed to an overall net reduction in UK emissions."

That seems to me to be a bit of a George Bush-ism. Does not business fear that setting high environmental standards and targets for greenhouse gas emissions in Scotland and the UK will somehow scare business away from Scotland? Have any businesses left Scotland because of our high environmental standards in recent decades?

Daniel Kleinberg (Scottish Council for Development and Industry): I cannot talk about businesses leaving, but inward investment is an obvious concern, and figures could be considered in that way. In the submission, I was thinking about the energy sector, which our members have spoken about. That issue is reserved so, first, the setting of an overall emissions target would be outside Scottish control and a target would not necessarily be in the gift of the Executive to deliver. Secondly, the need for international action is paramount, and the setting of local targets might in fact compromise overall net emissions. That is clear.

Mr Ruskell: I cannot see at all how that is clear. If we have control over vast areas of policy and setting sectoral targets in those areas is needed, surely we can contribute to a reduction in emissions. The assumption seems to be that business will somehow be negatively affected by Scotland setting a target and pushing ahead with greenhouse gas reductions. I do not know whether you know that when Digby Jones went to the Environmental Audit Committee at Westminster to give evidence in its climate change inquiry, he said that, to his knowledge, no business had ever left the UK as a result of our high environmental standards.

I am also interested in what the benefits are and have a question for Gregor Murray. I used to work in Midlothian and am very much aware of your successful business programme. However, at the moment it is limited. What is your best estimate of the proportion of businesses in Scotland that could benefit from the delivery of your programme? If your programme were to be scaled up to enable businesses in the whole of Scotland to have access to your services and to benefit from the opportunities that our response to climate change presents, what would be the likely cost implications?

Gregor Murray (Business Environment Partnership): I would have to consider the sum to give an accurate answer, but I think that most businesses would benefit. Some businesses benefit more than others, particularly if they use refrigeration or heat water or steam in their processes, but almost all businesses would benefit from considering waste minimisation and resource efficiency. It would not be hugely expensive to roll out what we do around Scotland and the benefit of doing so would far outweigh the costs. Scottish business would also be made more competitive and successful. In that sense, the challenge can be considered as a win-win situation.

Mr Ruskell: What has been the Executive's response to your programme? Is it looking to expand it?

Gregor Murray: We have had great support from the Executive and there will be considerable financial support until 2007, for which we are grateful.

Richard Lochhead (North East Scotland) (SNP): Since we have a panel member with transport expertise, I will concentrate my questions on transport. The Canadian Government recently

issued a press release that boasted that it was the first Government to convert all its fleet to low-carbon fuels, which is a significant leadership gesture. We want that to happen in Scotland, too.

Businesses run thousands of cars in Scotland. What effort has been made to encourage businesses to promote low-carbon fuels in their fleets? I also ask Tom Hart to address the continuing debate about how we use the road taxation system to encourage the use of low-carbon fuels.

11:15

Tom Hart: Some eye-catching examples have appeared of businesses or public authorities changing to low-carbon fuels or very-low-emission fuels, which can catch press attention. The difficulty is that often only a small percentage of the total fleet is involved. It is far better to concentrate on the harder work of altering fiscal policy to obtain more widespread changes and to make businesses think about how they travel and how their future needs will best be met. Much scope exists to improve energy efficiency and, in some cases, to encourage modal shift.

One big concern of businesses, including freight transporters, is unreliability on the roads system. All business accepts some congestion. Through the ages, prospering cities have had congestion. However, when congestion creates serious difficulty with scheduling reliability, the cost to business escalates. As a whole, business is interested in matters such as road pricing and adjusting parking or lorry regulations to take into account business needs. It does not necessarily say that it needs lots of extra road space to meet its requirements.

Richard Lochhead: Will the other representatives comment on the business community's response to low-carbon fuels?

Daniel Kleinberg: We heard from earlier panellists that business is happy provided that any regulation or action does not put Scottish business at a comparative disadvantage and does not affect the overall need for economic development.

The SCDI is not against the setting of sectoral goals, we just think that an overall emissions target for Scotland would be unrealistic. However, as long as goals take other policy priorities into account, we are happy with them.

Richard Lochhead: Could we learn from other countries on road taxation and road pricing?

Tom Hart: I say in all honesty that most countries are reluctant to push road pricing—Britain has probably pushed more than others. When we touch the pockets of business and people, they begin to want to change their behaviour. Concerns about lead in petrol are a clear example of that. Until the price differential in favour of unleaded petrol was introduced, the shift to that petrol was slow. Pricing is important and the alternative of not having it might be even worse. That is the substance of the argument in Edinburgh now, which applies to other Scottish cities.

Rob Gibson: I will continue on the transport theme by taking us into the future. Scotland has considerable potential to move more freight and people by rail. Moving to electric rail has always been considered an expensive option for smaller lines. Will the panel discuss rail electrification as one means of reducing carbon emissions?

Tom Hart: Scotland has less railway electrification than many countries. That is partly because many Scottish lines are lightly used compared with those in other countries. We have hydro power, but the local resources here are less than those that are available in countries such as Switzerland or Sweden, and without large sources of renewable energy, more electrification will still result in CO_2 emissions. Electrification also results in distribution losses, so there is some waste of energy. On the other hand, at certain levels of traffic, electric locomotives are more efficient and they also require less maintenance, deliver higher speeds and can provide extra power in emergency situations, which some other types of locomotive cannot do. Commercial judgments must be made. On balance, in the recent past, diesel power has improved more rapidly than electric power has. There is a need to consider further how to keep electrical power in advance of diesel power in terms of the amount of emissions and the reduction of waste.

It is important to encourage businesses to consider cases in which it might be advantageous to shift freight to rail or shipping and to use rail rather than business cars for personal travel for business purposes, which can waste a lot of time on long trips. In recent debates on valuing time saving, it has been argued that time spent travelling is a total waste and that if the time can be cut, the economy will benefit. However, the time saved is often used to travel more and thus simply generates even more emissions. There is an academic issue about how to evaluate time savings.

Another issue that has been mentioned is the fact that when people travel by rail, they have long periods in which they do not have to change, unlike when they travel by air, when people might have a fairly quick journey, but problems at the terminals. Increasingly, businesses see rail travel as valuable, because it allows staff to use their time in a way that they cannot do when they travel by car. Those issues are relevant, although they

take us beyond issues related purely to climate change and emissions. There are opportunities to shift to a greater use of rail, but I would not exaggerate the freight prospects in Scotland.

Rob Gibson: I take it that you mean over long distances. I am interested in the issue because we live in a country with far-flung island communities and the like. We need to have a transport network that meets the emissions targets, but which is efficient at the same time. You mentioned the development of shipping. Would either of the other two panel members like to comment on that from a business perspective?

Tom Hart: I will pass over to them shortly. We have the development of the Rosyth ferry terminal for longer-distance shipping. Although the ferry helps to encourage tourists to come to Scotland, the economics hinge on achieving substantial freight use. Increasingly, long-distance freight operators are realising the benefits of using shipping and in some cases rail, instead of long-distance lorries, which have growing problems. Superfast Ferries has said that it is considering the introduction of more routes. Interest has been shown in developing coastal shipping within Britain, possibly for containers, which could link into local road use at either end of the routes. There are shipping opportunities. I am interested to hear what the other panel members say.

Daniel Kleinberg: The further development of the freight terminals at Rosyth and in the south-west would be interesting, but I cannot pretend to have done any work on the carbon emissions savings that would result.

Gregor Murray: I am afraid that I have no particular competence in that regard either.

The Convener: We will have a transport panel next week, so we can repeat some of our questions then, or save them up.

Maureen Macmillan: I have a transport question that follows on from Rob Gibson's, after which I will ask a more general business question.

Tom Hart mentioned that people travel by air because it is perceived as quick, but it is also often perceived as much less expensive than going by train is, for example for people who are travelling from Scotland to London. Another issue that needs to be addressed is that of social inclusion in the Highlands and Islands, where people need air travel to get around. For example, a round trip to the mainland on personal business can take three days if air travel is not used. Do not flights need to continue for social reasons?

Tom Hart: It is important that you mentioned social reasons. Because of the weight that you attach to certain social objectives, you might sometimes want to pursue policies that will tend to increase emissions. Such policies are acceptable, provided that they are kept under strict control and are well justified. However, there is a risk that you might often pursue policies that do not concentrate on the areas in which bigger cuts in emissions might be necessary. I see no problem with some encouragement and provision of concessions in relation to air travel to and from the Highlands and Islands, nor do I see a problem with a review of air fares or some long-distance rail fares. However, I doubt that more than 5 per cent of air travel by Scottish residents is accounted for by travel to and from the Highlands and Islands. Most travel is to places outside Scotland, increasingly over long distances world wide. That is the big issue.

To assist the Scottish economy, there is a case for the expansion of direct flights from Scotland. However, in the opinion of many business commentators as well as that of people who have an interest in the environment, the UK aviation white paper, "The Future of Air Transport", which was published in December 2003, vastly overstated the estimates of growth in air travel. The white paper's high estimates suggested that by 2030, 25 per cent of the UK's carbon emissions would come from air travel alone—the figure did not even include road traffic. The paper hinted that that was not likely to happen, but it did not come up with a solution.

Domestic air travel in the UK from Scottish airports has been rising more rapidly than overseas travel has in recent years. That is partly because of problems in the rail network and the lack of a high-speed rail system like the ones in France and Germany or the system that is being built in Italy. There is an issue in that context about the acceptability to business of better long-distance links between Scotland and various English centres—I do not mean just London; there has been substantial growth in air travel to Birmingham, Bristol and Manchester. There is a real issue about whether the projected growth in air travel can be reconciled with a sustainable economy and improvements to quality of life.

Daniel Kleinberg: The issues that Maureen Macmillan raised in relation to Scotland are being raised at national and international level, as Tom Hart suggested. The SCDI is supportive of the route development fund, but we realise that the approach must be integrated with international action that does not put Scotland at a disadvantage, just as regions in Scotland must not be disadvantaged. There must be action at European level to consider the overall cost of air travel in Europe and the wider world.

Maureen Macmillan: We heard the BP representative talk about businesses moving into the low-carbon space. Are we making the most of the opportunities that are presented to us as we

move into a low-carbon economy, for example in delivering renewable energy to the public, businesses and private individuals, or in the engineering sector in relation to renewables? Do we need policies to help us in that regard? How do we persuade private investors to become involved in the area as soon as possible?

Gregor Murray: There are two points. First, policy must get on the front foot and be positive about the situation. The committee talked about quick hits; there are many quick hits in business, but people must recognise the benefits to their business. The problem is that most people who own and manage businesses—I am talking about small and medium-sized enterprises, because we should not try to treat all businesses in the same way—regard the environment as a cost. At the back of such people's minds is the idea that environmental considerations represent a cost and managers do not want to become too involved with such matters, because there are all sorts of other calls on their time and finances. However, such considerations need not be a cost; much can be done to make them positive for businesses, as well as for the environment, as some of the business environment partnership's work has demonstrated. It is important that we get that message across to people. That can be done actively only by integrating environment support with standard business support such as the business gateway and the other initiatives that reach out to business.

A lot of work has been done on waste minimisation, resource efficiency and so on. However, in policy terms we have been counting the opportunities that have been identified to save waste. That is like trying to stop people smoking by counting the number of people who smoke—it does not change behaviour. We have spent a great deal of money on identifying opportunities, but we have not followed them through. We must get follow-through. We have done that by developing close relationships with businesses and keeping up with them.

Members will see from our submission that for a number of years we have had an initiative with universities in Scotland to put undergraduates into businesses for eight weeks. Those people are trained, selected and mentored through the process. We cannot afford to put advisers into a business for eight weeks, but undergraduates are going in to get to know businesses and to make changes. In 2004, there were 65 or 70 placements around Scotland, from Orkney right down to the Borders. I have been amazed by how effective young people have been in changing behaviour on the shop floor. They have been more effective than some highly qualified professionals, because their enthusiasm spreads. They have done some tremendous work. Our policy should be to integrate education, as well as the standard business support networks, with environment support.

11:30

The Convener: That is quite a radical thought. It reminds me of two projects with which I have been involved recently. One was the upgrade of the University of Edinburgh's renewable energy plant to provide heating, which was the result of a student desktop project. Someone examined the economics of the project and decided that it was feasible. The second was the Castlemilk and Carmunnock wind farm project, representatives of which came to the Parliament last week. Again, that began as a desktop project by a student. We should capture the culture shift that you have described.

The previous panel talked about changing attitudes and mindsets in companies from the top down. How do we do that? You have spoken about the positive business opportunities that exist. How do we incentivise big companies to make saving resources, green travel plans and a range of environmental measures the norm and to see that approach as a sensible way of doing business? What can the Executive do as part of the climate change strategy? Should this be part of a business strategy? How should it be badged?

I would like to hear the views of all the witnesses on the issue, but Daniel Kleinberg from the SCDI can kick off.

Daniel Kleinberg: I echo what Gregor Murray has said. Energy efficiency has been one of the great success stories, both in tackling climate change and in terms of enterprise. I suspect that it is not a coincidence that the sector has cut its emissions by 35 per cent since 1990. The injection of new culture and young ideas into a company is often welcome. It has been shown that attention to quality and process in a company is intrinsically a good thing in business terms; when that leads to a reduction in carbon emissions, it also leads to greater profits. Companies will notice and pay great heed to that.

Businesses are keen to see on-going support for energy efficiency measures. How are such measures taken in large companies? We have heard a bit about what BP does. The issue needs to be addressed at board level. Companies will ensure that that happens if a financial incentive can be demonstrated. That is why organisations such as the BEP, the Energy Saving Trust and the Carbon Trust must be supported.

I was interested to hear talk about SMEs, because in companies in which there are very few people, most of whom spend most of their time trying to keep their heads above water, the issue

is capacity building. We have tried to reach out to our members in that regard. We have worked with envirowise, but any one of a number of companies may be involved. We would welcome on-going support for such work.

Tom Hart: Business is more aware of its energy and travel-related costs than it was 10 years ago, partly because some of those costs have risen. That forces business to pay attention to the issue. Some firms have particular difficulties with parking for employees. That might be an incentive for them to take action to explore car sharing and public transport improvements.

There is a case for having a balance of carrots and sticks. The problem for the Scottish Parliament is that many of the fiscal levers lie with Westminster, although that is not entirely the case—there are opportunities to nudge up costs to make business think more carefully about such matters. Until that happens, companies may just sit back and not be fully aware of what the costs are or what they will be. Greater assistance should be offered to firms to help them to develop awareness—for example, through grants to pilot projects, the results from which can be disseminated as best practice. There is room for more activity on the part of the Executive.

Gregor Murray: Understanding is still an issue for businesses. Those people who think about the environment probably think of recycling and the cleaner technologies. SMEs probably do not yet understand how their businesses influence climate change; they probably feel that the issue does not have a great impact on them.

It is likely that the business advisers who visit such businesses do not have a proper understanding of climate change either. The environment is not their agenda. Until we bring together the agendas of business and the environment, we will never be effective. I am glad to say that Scottish Enterprise is doing a lot of good training work with business advisers; we are involved in that, too. However, that will be a long job. If we want to make progress, there are two fundamental things that we must do: we must integrate the environment and business support networks and we must move from identifying cost savings to realising them.

Richard Lochhead: How do we get to the position in which SMEs carry out internal audits of energy efficiency and environment-conscious behaviour? Should there be an obligation on them to perform such audits?

Gregor Murray: We are talking about carrots and sticks again. I am a great believer in carrots to get people started. Promoting and demonstrating the business benefits through case studies of people in other businesses who have had great success is more effective than using the stick. Once we get people started on that ladder, they become able to move up it and the issues become clearer to them and more relevant to their business.

We have talked a great deal about cost savings. There are also big new sales opportunities in environmental management systems, largely because of supply chains. A member of the first panel mentioned that, for larger businesses, the organisation's reputation was a driver. Big businesses often push that reputation down their supply chains—for example, by asking that the small companies that supply them should have an environmental management system or should meet the ISO 14001 standard. From our experience of dealing with more than 700 businesses, once we get them started on cost savings we move them up the ladder towards new products and new markets. In some cases, they can achieve huge growth from being able to supply the electronics industry or the car manufacturing industry, both of which want ISO 14001 to be met. We should start with a carrot. That way, it is a win-win situation; we get people's hearts as well as improving the profits of their business.

Maureen Macmillan: I want to home in on that area. For example, there are no manufacturers of woodchip central heating boilers in this country; they have to be imported from Finland. Who is thinking to themselves, "I could do that"? What encouragement are people getting, who is giving it to them and how can we make progress on such initiatives?

Gregor Murray: There are many such opportunities. When people get switched on to them, they start to see them. The only way of getting people switched on is to provide them with one-to-one advice from people who offer them carrot rather than stick. There are all sorts of telephone helplines and websites, but there is nothing to beat one-to-one advice if we are to take the job seriously and if we want to get businesses not just to identify but to realise cost savings and new opportunities.

Tom Hart: We need to consider alternative materials and fuels, but I repeat a point that was made earlier: much can be done to improve the effective use of existing energy sources, because a lot of energy is wasted. We should not forget the importance of making business aware of the opportunities. I have heard it said that about a third of energy could be saved or used much more effectively; that could be achieved by a sustained programme of fairly short-term changes within the existing technology. It is important for that to happen as well as the shift to the alternatives.

The Scottish climate change programme has monitored sectoral emissions since 1990 and concludes that transport has one of the highest rates of increase. However, since 1995 transport has performed much better. One reason for that is that we have made more progress in stabilising traffic, which has not increased nearly as rapidly as it did before 1995. The other element is that there has been a significant improvement in fuel efficiency. Despite the talk about gas guzzlers seeming to be more common than ever, the evidence suggests that we have more fuel-efficient vehicles. Incentives to encourage people to use such vehicles could be increased.

The one possible downturn is that part of the gain has come from the shift to diesel vehicles, not just in business but in the car market. Such vehicles are more fuel efficient, but there is an issue about the particulates that come from them. However, substantial energy savings can be achieved through modification of existing fleets as well as by gradually adding in newer technologies.

Daniel Kleinberg: The other thing to say is that business opportunities in what are sometimes seen as green jobs should be mainstreamed with business opportunities in general. It is always difficult to find Scots who are entrepreneurial enough to get involved where there is a financial incentive or an opening—that is true across all sectors. People will make woodchip furnaces if they think that they can make money by doing so. It is not a question of saying to someone, "Shouldn't you be making these?" It is a question of creating the financial incentive down the line to make woodchip a suitable fuel. There are regulatory issues about the use of waste wood. The committee might be aware of that, but it is worth considering.

The Convener: That is a good place to end this session. You talked about positive business opportunities and how we can facilitate them, and about how leadership operates. We have heard some clear messages from both panels this morning, but if I was a business person I would want to look into solar power and the 700-fold increase that we will need during the next couple of decades. That sounds like a huge opportunity, if someone wants to pick it up and run with it.

I thank the witnesses for giving us their written submissions in advance and for being prepared to answer our questions this morning. The session has been helpful.

We will pause for a couple of minutes to let the next panel, which comprises representatives from the public sector, come to the table.

11:43

Meeting suspended.

11:45

On resuming—

The Convener: We now move on to our final panel of witnesses this morning, from whom we will get public sector perspectives.

I welcome Janice Pauwels, who is head of sustainable development at the City of Edinburgh Council; Dave Gowans, who is project director for the Moray flood alleviation project; Professor James Curran, who is head of environmental strategy at the Scottish Environment Protection Agency; and Professor Colin Galbraith, who is director of scientific and advisory services at Scottish Natural Heritage. Before the witnesses came to the table, we observed that they cover a broad range of perspectives. Potentially, we could ask them about a huge range of issues. We will try to work our way through the issues that we have raised with other witnesses and raise some additional ones. The witnesses should feel free to come in on the back of other people's answers.

Richard Lochhead: I will put my first questions to James Curran of SEPA and my second set to the SNH representative.

SEPA has given the committee a very interesting submission. You will have heard the various suggestions that have been made in the previous evidence sessions about how we can tackle emissions in Scotland. I have two quick questions for you. First, where do you think Scotland is on tackling emissions compared to the rest of the world? Secondly, every time that I challenge Ross Finnie on energy efficiency, he claims that the Parliament has a lot of power over energy efficiency measures, but SEPA's submission states that some powers that you think would be very useful in tackling energy efficiency are reserved to Westminster.

Professor James Curran (Scottish Environment Protection Agency): Where is Scotland in relation to the rest of the world? As an opening remark in that context I will say that what has perhaps not come through strongly enough in the evidence that I have heard up to this point—I have listened from the public gallery—is the importance and the urgency of tackling climate change. A major conference is taking place in Exeter at the moment on climate change. What concerns me is that some of the recent findings from global climate change modelling are beginning to show that our forecasts of climate change up to this point probably underestimate the problem, the gravity, the severity, the extent and the rapidity with which climate change may hit us.

I will mention some figures. At the moment, the net contribution of man's emissions of carbon dioxide into the atmosphere is about 3.5 gigatonnes of carbon every year—that is, a net

contribution of 3,500 million tonnes. The latest findings on climate change seem to suggest that by 2050 the world will have warmed up so much that the earth itself—its own ecosystems—will emit carbon into the atmosphere and by 2050 that could amount to 4 gigatonnes of carbon per year. Therefore, by 2050 the earth itself will emit more carbon than we do now. That emphasises the urgency with which we must tackle climate change. Ally that to the fact that because of the way in which the atmosphere works we are already committed to 20 or 30 years of climate change—irrespective of what we do to emissions—and that means that we probably have 20 or 30 years' grace in which to drive our emissions down heavily.

One of the figures that have been cited is the 60 per cent reduction in carbon dioxide emissions by 2050 that the UK has agreed as a target. Sir David King, the Government's own chief scientist, has said that the target should be 80 per cent by 2050 and other commentators have said that it should be 90 per cent. We are looking at drastic reductions over 20 or 30 years. It must be said that the UK has been taking a world lead in addressing climate change. However, the UK is not meeting its targets, and Scotland—I would suggest, after looking at the figures—is perhaps not contributing as much as it could to meeting the UK targets. We should get our position in balance; the UK is taking a world lead, but we must acknowledge the seriousness of climate change and demonstrate a commitment to driving down the level of emissions. We should be doing everything that we can to do that in Scotland.

Sorry, could you remind me of your second question?

Richard Lochhead: It was on energy efficiency.

The Convener: It was on paragraph 2 of your submission, concerning SEPA's powers.

Professor Curran: As far as I understand the situation as it affects SEPA, we do not have the powers to regulate energy efficiency. That is a reserved matter for the Department of Trade and Industry. We cannot insert into licences that we issue to industry on environmental performance clauses specifically addressing energy efficiency.

Richard Lochhead: Is that a power that you want?

Professor Curran: Yes, we have argued for it.

The Convener: I would like to clarify whether companies in England and Wales have that power exercised over them. Is that a power that we need to exercise generally although, because it is a power that you do not have, you cannot start the process?

Professor Curran: As far as I understand, yes.

Richard Lochhead: I have two brief questions for Colin Galbraith. First, according to your submission, the make-up of soil in Scotland is quite carbon rich. How does that factor impact on land use generally, for example in terms of increasing forestry growth, and how should we address it? Secondly, SNH wants to minimise the impact on our natural heritage of measures to reduce carbon emissions. Just before paragraph 17 of your submission, you state:

"They should be pursued in a planned and measured way, to minimise adverse effects."

That takes us into the whole debate, which SNH has commented on, about the location of wind farms. Are you saying that the location of wind farms is not being planned in a measured way?

Professor Colin Galbraith (Scottish Natural Heritage): On your first point, Scotland's soil reservoir is carbon rich. However, if the runaway climate change that we have talked about takes place, the carbon that is present in the soil through microbe action will be released pretty rapidly. We therefore need to take great care of our soil. SNH and SEPA have advocated that we should have a strategy for the conservation of soil throughout Scotland. Some aspects of our soil link from the ecological right through to the social, in terms of peatland management in particular. We are particularly concerned that our peatlands should be looked after, but we think that there should be a wider strategy for soil conservation throughout Scotland.

On your second point about renewables and the reduction of carbon emissions, we are looking for a strategic approach to renewables. The proposals for the siting of renewable energy generators are industry driven, whether they are on land or on sea. On occasions, as you know, that has led to difficulties with local communities or a clash with the natural heritage interest that we pursue. A more strategic approach to the siting of such installations would be beneficial to everybody, not least to the industry. It would avoid conflict situations arising, which would be helpful for both the natural heritage and industry.

Nora Radcliffe: I want to take advantage of the fact that we have a witness who has direct experience of flood alleviation. You say quite a lot in your submission about what might be called the bureaucratic barriers to the work that you do in putting flood protection measures in place. What opportunities are presented by the water framework directive for looking at whole river systems and for much more co-operative work with people who are involved in river systems? Will that be helpful to you, and how difficult will it be to get all the partners working together?

Dave Gowans (Moray Flood Alleviation): As I said in my evidence, I support that approach. I have also pointed out that that approach in itself will not solve flooding in Elgin, Perth and various other places in Scotland that have major flood problems. However, it provides considerable scope to mitigate the effects of climate change and to prevent flooding in places that are not quite so susceptible.

SEPA and SNH might also be able to comment on this matter, but I think that catchment management planning, coastal zone management and a more holistic approach to catchments in general seem to offer considerable scope. Indeed, I would like such an approach to be expanded, and the water framework directive, or the Water Environment and Water Services (Scotland) Act 2003 that implemented it, should help in that respect.

Nora Radcliffe: We implemented the directive quite early on, so there has been quite a long timeframe. Is there any evidence on the ground of discernable movement in that direction?

Dave Gowans: There is certainly evidence of such movement in Moray. Indeed, the evidence of the Society of Chief Officers of Transportation in Scotland flood group, which looks into flooding and coastal defences, shows that there have been moves in that direction throughout Scotland.

For the schemes in Moray, we have taken a whole-catchment approach that brings in land use management, forestry and so on. For example, at the very outset, we carried out an afforestation appraisal to find out the effects of forestry changes on the Moray catchments.

Nora Radcliffe: I suppose that that is all part of the holistic approach to this matter.

Dave Gowans: That is right. That is simply one example of our whole-catchment approach.

Nora Radcliffe: Have any partial answers emerged from that?

Dave Gowans: In that particular case, our work tended to show that afforestation had not made any great impact one way or another. After all, forestry is cyclical in nature and therefore tends to have different effects at different times, depending on the stage that a particular forest has reached. However, by carrying out the study, we were at least able to reach that conclusion. Again, it is one example of how we considered a particular angle.

Nora Radcliffe: And it gave a dose of realism to what might have been seen as an intellectual approach.

Dave Gowans: That is right. We also have to be very careful and ensure that, even with the effects of climate change, today's design standards for Scottish flood defence schemes are not compromised by future changes in land use. I must say that, in that respect, I have better knowledge of the Moray schemes.

Rob Gibson: In his submission, Professor Curran mentions introducing in-house environmental assessments. I asked previous witnesses about smart legislation. Without going into any carrot-and-stick arguments, do you think that the Scottish Executive ought to make such in-house assessments a statutory requirement in the same way that health and safety checks are? Will you expand on that part of your submission?

Professor Curran: I think that the Executive should do that. I listened to some of the earlier evidence, and I think that the voluntary initiatives have been extremely successful. Indeed, I indicate that, time and again, companies that have carried out simple internal environmental audits have made bottom-line profitability improvements of between 5 and 10 per cent. Allying that approach to the existing statutory requirement for health and safety audits to be carried out with staff in businesses through staff committees, union involvement and so on would not only drive those environmental improvements into all businesses in Scotland but allow us to gain the profitability and productivity improvements that would strengthen the Scottish business base; would lead—I hope—to sustained and perhaps increased employment, with all the social benefits that that would bring; and would generate environmental wins and, with regard to climate change more specifically, drive down carbon dioxide emissions. Smart, light-handed legislation will address all those environmental, economic and social sustainable development issues.

A survey that the Environment Agency in England and Wales carried out a couple of years ago reported that 95 per cent of businesses—we must remember that most businesses are small and medium sized—said that they had no environmental impact whatever. That shows that there is a vast gap in the understanding of the impact that any businesses has, let alone of the impact of the staff those businesses employ. The point was made earlier that it is necessary to secure decisions, interest and engagement at board level or owner-manager level, but that will be achieved only by regulation.

12:00

Rob Gibson: That would presumably require some kind of legislation.

Professor Curran: Yes.

Rob Gibson: It is therefore a matter of having the powers to legislate.

Does the City of Edinburgh Council's representative have any thoughts on energy efficiency and in-house environmental assessments from the point of view of a major public sector body? Do any of the council's departments carry out such assessments?

Janice Pauwels (City of Edinburgh Council): Environmental management systems are a tool that local authorities could use to implement that kind of approach. A number of local authorities are already implementing environmental management systems and energy efficiency is one element of that. Perhaps local authorities should be made to implement such systems.

Rob Gibson: That, too, comes back to legislation.

Janice Pauwels: Yes, it does.

Mr Ruskell: One objective of the inquiry is to examine how the Scottish Executive climate proofs policy and spending decisions. Does the City of Edinburgh Council climate proof spending and policy decisions and, if so, how? I am thinking particularly of congestion charging. One of the reasons that have been stated for the introduction of congestion charging is to tackle climate change but, on the other hand, planning decisions for developments such as the one at the Gyle have increased congestion, which increases climate change emissions.

Janice Pauwels: As a rule of thumb, local authorities do not approach many of their policies in that way. They are not yet making the connection between potential impacts and their decisions, but they will have to move towards that approach. There are some moves towards climate proofing policy objectives and considering whether particular policies address climate change objectives, but I do not think that we do that in the way that you mean.

Mr Ruskell: Have you considered adopting a local authority climate change gas reduction target? Aberdeen City Council has adopted one and I wonder whether other local authorities were actively considering adopting such targets.

Janice Pauwels: The City of Edinburgh Council is developing a city-wide climate change strategy and, in parallel with that, considering the council's own approach to climate change and climate change impacts. Those two exercises are going on, and they have a great influence on each other. For the council to achieve any reductions in emissions, it has to work across the whole city and work more in partnership with other agencies to bring about meaningful reductions, rather than pursue reductions on its own. Therefore, we are now developing a city-wide carbon reduction strategy.

Mr Ruskell: How would that strategy fit in with an overall Scottish climate change programme? Do you think of local government as a sector that could have targets that could add up to a national target or are you considering other ways of slotting into a national climate change programme?

Janice Pauwels: From my knowledge of what colleagues in other councils think, I would say that there has been a tendency for local authorities throughout Scotland to view themselves as a sector because they have such an impact and have so many different areas of activity and influence. We have not dissented from that view; we still think of local authorities as constituting a specific sector that should have targets that are specific to their activities.

Mr Ruskell: I have a quick question for James Curran. We have heard a lot about the Blair target of a 60 per cent reduction in emissions by 2050, but that is a long way off. How important is it for us to have a long-term target and what do we need to do to achieve it? What are the milestones? How do we get there? It seems that there are different approaches; there is a free-market approach, which suggests that if we promote good practice, we will get there eventually, but ultimately there is a scientific backstop, is there not? We must reduce CO_2 emissions in the atmosphere to a certain level. How important is the target and how do we monitor progress on the way to achieving it?

Professor Curran: It is important to set targets. Perhaps it is best to set them on a sectoral basis and aggregate them up to a Scottish target, a UK target, an EU target and a global target. It would be a good start to set a target—perhaps a particularly aspirational one—for the public sector. As I said earlier, we probably have 20 to 30 years to make deep and significant cuts—that is the timescale over which we need to set our targets, with an aspirational target beyond that for the critical point at about 2050, when things might go out of control.

The committee has probably reviewed the report "Energy—The Changing Climate", which was published by the Royal Commission on Environmental Pollution in 2000. It is a remarkable work, and appendix E presents some possible scenarios for energy in the UK in 2050. I will not go through them in detail, but it seems to me that it would be particularly useful to take that approach in Scotland and develop a Scottish preferred scenario of development during the next 20 to 30 years. That should be based on the quick wins, given what is cost effective and technically feasible, but should also look ahead 10, 15 or 20 years to see what technology we can expect to become available and economically feasible at those stages.

I hope that we can agree a preferred scenario and a timeline to take developments towards aspirational targets. That would be a valuable piece of work and if it was expressed in a publicly accessible way, it would bring home to people not just the magnitude of the task—the scenarios in the 2000 report make it clear that we need a significant change to the way in which we do things in the UK—but the fact that it is achievable. We must not and cannot give up on it. We can deliver on it.

The Convener: From the panels in our first session, which was held last week, there was quite a lot of talk about leadership. You talked about being given aspirational targets and I know from talking to the Convention Of Scottish Local Authorities that a lot of people would like a proper target for sustainable energy towards which they would have to work. In that way, sustainable energy would become a chief executive issue rather than a departmental issue. How do we push the issue upstairs? That is how the question was put earlier this morning by the witnesses from the business sector. How do we get the issue onto boards' agendas rather than middle-management agendas? Are there ways to do that in the public sector in Scotland? How do we make the shift so that sustainable energy becomes everybody's business rather than the concern of the person who is named in the staff system as the one person who deals with climate change? How do we push the issue up and make it everybody's job? The witnesses from SEPA and the City of Edinburgh Council started to address that.

Janice Pauwels: In the local authority sector, I agree that the matter must be owned by the chief executive. We must have strategic leadership from the Scottish Executive, but that translates down to strategic leadership within organisations, and in the case of local authorities that means strategic leadership from chief executives. That leadership must cascade down to senior managers; the directors of departments must consider the targets and objectives and, in turn, feed them down within departments. In that way, the matter will work its way down.

Hand in hand with that, more work must be done on the monitoring and auditing side and there must be a balance of accountability. Local authorities must be made to account for the activities that they engage in. The approach could link in with public performance reporting, for example, or—somehow—with the role that Audit Scotland might or should have in getting local authorities to report on their progress. In turn, when the reporting had happened the chief executive would consider what was happening across his or her local authority—so the process would go round in a cycle. I do not think that that is happening; there is not yet ownership at strategic level and we are not being asked to account for our activities.

The Convener: Does anyone else want to comment?

Professor Curran: Without being sycophantic, I can say that SEPA is quite lucky in that its leadership—the chairman and the board as well as the chief executive—is very committed to making progress on our internal environmental programme of driving down our impacts as an organisation. As our submission says—the area is my responsibility—we reduced our carbon dioxide emissions by 20 per cent over a period during which our staff numbers grew by 25 per cent, so I guess that in effect the reduction works out at around 30 per cent. We did that over three or four years without doing anything tremendously radical, which shows that it can be done. I do not underestimate the difficulties; the task is not easy, but it can be done. That needs to be borne in mind. The setting of an aspirational target for the entire public sector, from the highest level, would be a good way of driving such work forward.

We also need to raise awareness and understanding and to incentivise the public to take responsibility for their environmental impact. We have a pretty lamentable record on that in this country. I float an idea, which the committee might think is entirely off the wall, but which might help to hit some of the targets. Council tax, which is currently being reviewed, is based more or less on the size of the house. Why should the council tax banding not be based on the amount of energy that people use?

Karen Gillon (Clydesdale) (Lab): May I follow that up?

The Convener: Everyone wants to comment. The members who have already contributed want a second go, but I will bring in members who have not yet commented.

Karen Gillon: There is an argument that Professor Curran's suggestion would skew council tax to the disadvantage of people who were the least able to pay, because such people are the least likely to have energy efficient houses or to be able to adapt their houses. Such people would pay more than people like us, who have bigger incomes and can make changes to their homes. The measure would affect the poor disproportionately.

Professor Curran: I imagine that that would depend on how the bands were set.

Karen Gillon: You suggest that council tax bands should be based on energy efficiency. The poorest, most energy inefficient houses are the dampest ones, which are mainly on council estates. Your approach would therefore affect the poor disproportionately.

Professor Curran: I am not suggesting that it is easy to sit here and come up with a system for setting council tax bands. However, the bands could be set to take account of energy poverty and social issues. The problem would not be insuperable. Such an approach might also put pressure on and incentivise others to ensure that the poorest houses were upgraded as they should be.

The Convener: That point was made during our discussions with the first panel of witnesses. Your suggestion provides a good cautionary example of the importance of thinking through the implications of good, radical ideas. We will leave your radical idea on the table, to provoke thought.

Alex Johnstone: We have talked a lot with this panel and others about the causes of global warming and how we might mitigate and head off climate change over time. The committee's inquiry will acknowledge that climate change is inevitable to some extent and that Scotland will have to learn to cope with some aspects of that change. Flooding and coastal erosion will be at the top of the list of matters that we need to deal with now. Does Dave Gowans think that public bodies are giving the matter high enough priority? Is he getting the co-operation that he needs from organisations such as Scottish Water, from Government and—as he is sitting between their representatives—from SEPA and SNH?

Dave Gowans: At the outset of our project in 2000, when we got going seriously, we set up a partnership with consultants and immediately started to work on a similar, wider partnership that would engage SEPA, SNH and Scottish Water—under its previous banner of the North of Scotland Water Authority—because we recognised that huge projects would impact on a vast range of stakeholders.

We have set out to work with SEPA and SNH in that partnership. We have involved them in our partnering and value management workshops, for example, and we have tried to get the regulator to come on board as an adviser as well. There is a conflict there, and regulatory authorities sometimes find it difficult to jump that barrier. I am not saying this because representatives from SNH and SEPA are on either side of me, but the project has had tremendous support from SNH and SEPA. I would put that down to how we have approached them. There are no problems there.

With Scottish Water, things seem to be a bit more difficult. That may come down to funding. There has been some publicity recently in Glasgow about the city council funding parts of a project that would normally be funded by Scottish Water because it relates to drainage. We are having problems with Scottish Water, in that it seems to have other priorities than flooding. In our projects, Scottish Water is not a huge stakeholder, but we will come to that in the later stages of more detailed design.

We have not had any great problem with other regulatory bodies in relation to flood defence. In my submission I described the main problem as the huge bureaucracy that one must go through to establish schemes and even to make small, very obvious flooding improvements. Councils have no powers to carry out such improvements without a formal order.

12:15

Professor Galbraith: I am delighted to hear that SNH was a full collaborator in the project. On the question of what we can do now and the earlier point about taking action, there are quite a few actions that we could take now on flood management and containment. We still tend to build very hard systems, such as concrete. If we considered using permeable surfaces in our developments, and if we considered river flood plain management and coastal retreat in appropriate places, that would be a contribution.

Another important point is what we do in our uplands. If we think of a catchment, the uplands are where a lot of the rain will fall. That rain then rushes down into the populated areas. We have to consider the holistic management of the catchment overall. I do not know whether that would allow natural regeneration in those areas, but we should consider developing what we would think of as an ecosystem approach. That wider approach could be one way forward. We need to learn from examples such as Moray in that regard.

We also need to learn from international work. Catchment management is very much on the political agenda internationally. There are lessons there, and we certainly advocate that we should learn from them. We also advocate consideration of the holistic costing—not just short-term costing but longer-term costing—of any scheme. Such costing would consider all the benefits that might be brought about by some of the softer ideas, if I can put it that way.

The Convener: Just about every member wants to come in, so I will be brutal and take them all in the order in which they have asked to speak. In addition, because everyone who is on my list has been in once already, I would like them to ask one question rather than three.

Richard Lochhead: Okay; I will try to eliminate one of my two questions. I agree with James Curran that we have to think outside the box if we want to be serious about tackling climate change. SNH's submission includes the idea of a climate change reward card. Where did that idea come from and where is it going?

Professor Galbraith: It is an idea; in the James Curran league it is no more than an idea, if you see what I mean. We have got to be positive. We have got to take this challenge head-on. This country has enormous expertise—in science, in industry, or indeed in public services—in dealing with issues such as this. When we consider the population at large, a reward card—something positive that could reward the conservation of carbon—would be one way forward. The use of cars comes to mind. Lack of use or a reduction in use over time could be rewarded. Regulation has a part to play, but with the general public the positive approach will undoubtedly get rewards. The urgency of the issue is a significant driver. We cannot wait to engage the public more widely on the issue.

Nora Radcliffe: What does the panel think of emissions trading as a way of giving carbon dioxide a value, raising awareness and incentivising people to do something about the issue? How wide and deep do you think carbon trading can go? Could it eventually go right down to the level of individuals?

Professor Curran: Emissions trading across Europe under the directive has only just got under way. The current cap and trade is meant to create an overall 5 per cent reduction in emissions. There is no doubt that in years to come the target for reductions will be set at a lower and lower level. Trading will probably be expanded to greenhouse gases other than carbon dioxide and extended to an increasing number of sectors.

Emissions trading has great merit, as its purpose is to drive down emissions in the most economically efficient way and it can do so. It targets the areas in which emissions can be reduced most cheaply and lets the more expensive areas off the hook, as they can buy permits. However, it is difficult to see how it could be extended to individuals and the social sector. Colin Galbraith has suggested a credit card approach. With some extra work, emissions trading could be extended to the social sector, but it would probably take a cleverer mind than mine to do so.

Nora Radcliffe: A lot of bureaucracy would be involved.

Rob Gibson: My question is addressed to SNH and SEPA, in particular. To what extent are your fleets of vehicles and buildings low carbon fuel proofed? To what extent are your buildings heated by renewables, for example? What lead are you giving to other bodies?

Professor Galbraith: SNH has made enormous progress on that issue in the past few years. Our fleet is increasingly dual fuel—petrol and liquefied petroleum gas—which is good. There was a cultural issue in getting our staff to use and to be acquainted with LPG, but we are moving towards having it used in our cars. We have made major strides in relation to travel. We use videoconferencing, which saves both staff time and a huge amount of carbon from transport. We have a video link to Stornoway, which saves on aeroplane flights to the Western Isles. The same is true of the northern isles.

On buildings, perhaps the best example is our new headquarters building in Inverness, which we want to be a flagship for sustainable design. We hope that it will obtain the Building Research Establishment environmental assessment method excellent rating. Carbon emissions will be less than 8kg/m^2 per year, but I will be able to give the committee an accurate figure later. We see the new headquarters building as something of a test case for SNH's design. Our other buildings are probably less efficient and less good when it comes to the use of renewable energy. We must try to improve that situation over time. We hope that overall we are giving something of a lead. I would be happy to expand on the information that I have provided today.

Professor Curran: In general, we have a fairly poor estate—a ragbag collection of buildings, some of which are rented and some of which we own. We would not hold up any of those buildings as examples of good practice. However, we have made considerable efforts to manage our energy provision within a set of rather poor buildings. We have generated annual savings of about £30,000 just by reviewing our energy usage, optimising it and making it more efficient. We are also examining the amount of waste that we produce and the amount of water that we consume. Improvements in both areas will lead, ultimately, to reductions in greenhouse gas emissions.

We have about 1,000 staff. Our set of pool vehicles is relatively small at the moment, although we want to increase it to provide high-quality, environmentally high-performing cars. We have about 20 pool vehicles that are either high-performing diesel or LPG. More important, we have reviewed our leasing scheme, which applies to more than 200 staff throughout the agency. We have set carbon dioxide standards within the scheme, which we intend to drive down as the years go by, thereby improving the performance of the cars that many of our travelling staff use. We run up a pretty substantial business mileage each year in inspecting sites and taking samples the length and breadth of Scotland, but, rather sadly, we also have a substantial commuting mileage, for which we feel a sense of responsibility.

Janice Pauwels: The local authority sector's situation is similar to that of SEPA and SNH. The City of Edinburgh Council has a successful staff

travel policy and green fleet policy. We also consider building design and standards for sustainable development in Edinburgh. Most of the public sector is active on many of the issues; the key is to share that experience with the business sector and others, which we are trying to do in Edinburgh.

Maureen Macmillan: I would like some information from SNH about biodiversity. In the early hours of this morning, I listened to a programme about the acidification of the oceans. Research that has been done in Israel and, I think, Dundee seems to show that the oceans absorb CO_2 and that climate change will have an effect on coral reefs and shellfish, which will find it more difficult to form shells. Do you have any information on that issue, which could have serious repercussions for the shellfish industry in Scotland? Is that a real and present danger or is it simply a hypothesis?

Professor Galbraith: I am happy to take that away and provide further information on it in correspondence with the committee. My understanding is that the effect is a hypothesis. As the oceans warm up, they may absorb less CO_2 than they do now, which may lead to acidification. I do not know about the impact on shellfish globally, but my instinct is that it would be surprising if that were to be a problem around Scotland in the near future. However, I will provide a fuller answer to the question.

Mr Ruskell: To what extent are national allocation plans an important aspect of the EU emissions trading scheme? Recently, there have been a lot of political machinations with regard to the allocations under the different plans. Are those plans essential or could we take a broader EU perspective on emissions trading?

Professor Curran: I guess that that is the same issue as the one that arises under the Kyoto protocol. EU member states wish to have control in their spheres of influence and therefore want to set their allocation plans. Under the emissions trading scheme, the allocation plans and caps are distinctly different: some countries in Europe are allowed to increase emissions, while others have to cut them. The targets that have been set under the Kyoto protocol are similar. At our current stage of political development, the system is entirely appropriate and seems to be what politicians require. I do not think that the situation undermines the scheme substantially, as long as the allocation and capping give the required net result of dragging down emissions throughout Europe.

Mr Ruskell: That net result will, ultimately, be contraction and convergence—contracting emissions and convergence in the levels of emissions in different countries.

Professor Curran: Absolutely.

The Convener: I suspect that if I allowed it, colleagues would ask a series of further questions, but we have had a two and a half hour meeting and I do not want to exhaust the witnesses. I thank them for answering that range of varied questions. Some of the witnesses wrote in-depth and challenging presentations, for which I thank them. Just because we have not asked about them does not mean that we have not read them.

We have talked about leadership, public and private sector organisations, win-win situations, being positive, trying to advocate opportunities, smart regulation—we might come back to the issue of smart regulation versus heavy regulation—and we had a fascinating discussion on emissions, from the global level right down to the personal level. The three panels have given us a lot of food for thought. I thank all the witnesses. I also thank colleagues for being pretty disciplined—we have managed to discuss a lot of issues.

Next week, we will follow up on the transport and land-use issues, so we will have scope to ask one or two questions that we did not ask today.

Meeting closed at 12:30.

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