TRANSPORT, INFRASTRUCTURE AND CLIMATE CHANGE COMMITTEE

Tuesday 29 September 2009

Session 3

£5.00

Printed and published in Scotland on behalf of the Scottish Parliamentary Corporate Body by RR Donnelley.

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TRANSPORT, INFRASTRUCTURE AND CLIMATE CHANGE COMMITTEE
21st Meeting 2009, Session 3

CONVENER

*Patrick Harvie (Glasgow) (Green)

DEPUTY CONVENER

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*Alison McInnes (North East Scotland) (LD)
*Des McNulty (Clydebank and Milngavie) (Lab)
*Shirley-Anne Somerville (Lothians) (SNP)

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Alasdair Allan (Western Isles) (SNP)
Murdo Fraser (Mid Scotland and Fife) (Con)
David Stewart (Highlands and Islands) (Lab)
Jim Tolson (Dunfermline West) (LD)

*attended

THE FOLLOWING GAVE EVIDENCE:

Professor Jan Bebbington (University of St Andrews)
Professor Stuart MacPherson (Irons Foulner Consulting Engineers)
Professor Sue Roaf (Heriot-Watt University)
Dr Tommy Wiedmann (Centre for Sustainability Accounting Ltd)

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Steve Farrell

SENIOR ASSISTANT CLERK

Alastair Macfie

ASSISTANT CLERK

Clare O'Neill

LOCATION

Committee Room 1

Scottish Parliament

Transport, Infrastructure and Climate Change Committee

Tuesday 29 September 2009

[THE CONVENER *opened the meeting at 15:00*]

Decision on Taking Business in Private

The Convener (Patrick Harvie): Good afternoon everybody. I welcome you to the 21st meeting this year of the Transport, Infrastructure and Climate Change Committee. I record apologies from Cathy Peattie, and I remind members and everyone else present that all mobile devices should be switched off.

There are three items on the agenda. The first is a proposal that we take item 3, which is consideration of our approach to the inquiry into active travel and sustainable transport, in private. Do members agree to take that item in private?

Members *indicated agreement*.

Budget Process 2010-11

15:01

The Convener: Item 2 is the main business of the afternoon. We will hear evidence from a panel of academics with expertise in carbon assessment as part of our scrutiny of the Scottish Government's draft budget. I welcome Professor Jan Bebbington, director of the St Andrews sustainability institute and vice-chair for Scotland of the Sustainable Development Commission; Professor Stuart MacPherson, chair of Irons Foulner Consulting Engineers; Professor Susan Roaf, from the school of the built environment at Heriot-Watt University; and Dr Thomas Wiedmann, director of the Centre for Sustainability Accounting.

Would members of the panel like to make any brief opening remarks before we begin the questioning?

Professor Jan Bebbington (University of St Andrews): I ought to say that I am not an economist—that is how I start most conversations, just to make sure—but an accountant. With my accounting academic hat on and in my role as vice-chair for Scotland of the SDC, I am interested in how carbon assessment is used by an entity to discharge accountability to other parties and to allow it to control its own activities.

On the technicality of the calculations that are involved in carbon assessment, I have to follow input-output tables as a lay person. My focus and expertise—and the Sustainable Development Commission's interests—relate more to the use of such data and what we do with them. I wanted to delineate that for you at the beginning.

The Convener: As no other witnesses want to make any opening remarks, I will move on. What, if any, involvement have any of you had in developing the carbon assessment of the draft budget that has just been published?

Professor Sue Roaf (Heriot-Watt University): I have had none.

Dr Tommy Wiedmann (Centre for Sustainability Accounting Ltd): I had some marginal involvement. I should mention that, apart from working at the Centre for Sustainability Accounting, I am a research associate at the Stockholm Environment Institute at the University of York, where I have worked with environmental input-output analysis and carbon footprint accounting for the past seven years.

My involvement in this particular project was very marginal. I gave a bit of advice to the Scottish input-output team that made the calculations for the high-level assessment, which involved the

exchange of a few e-mails with Stevan Croasdale in relation to some technicalities in how to account for indirect emissions using the input-output model.

Professor Bebbington: My involvement was reasonably marginal too. There was a high-level seminar in the early days to look at developing the particular tool as well as the more specific policy-orientated tool. I attended that seminar, and contributed as a person in the room.

I have been involved mainly through the greener Scotland programme board, on which I sit as a member of the Sustainable Development Commission. We have had updates through the board as the work has progressed, and we have had conversations during its meetings about how the tool is developing and whether there are any issues. I have had very informal conversations in the context of those board meetings with Rebekah Widdowfield from rural and environment analytical services, who has been running the project.

Professor Stuart MacPherson (Irons Foulner Consulting Engineers): I have had no involvement.

The Convener: Already in the first couple of minutes, a couple of you have mentioned other environmental input-output models, carbon footprint models and so on. Have other Governments or national or subnational Administrations taken similar approaches to or formulated similar models for the carbon assessment of budgets?

Dr Wiedmann: Not at the level of detail of the carbon assessment, to my knowledge. Several other national high-level carbon footprint accounts have been put together, mostly by several research groups around the world. They calculate a nation or country's total carbon footprint by allocating emissions to final demand or consumption, part of which is Government spending. As a result, some papers and other literature have a figure for Government spending, but that figure is aggregated and is not broken down into, for example, spending lines. I am pretty sure that this level of detail is a world first—I certainly have not seen anything like it anywhere else.

Professor Roaf: Australia has very high-level accounting and uses a very detailed input-output model, but the figures are broken down by sector rather than by policy line.

Dr Wiedmann: That is right.

Professor Bebbington: I second those comments. There are high-level top-down analyses that set out the carbon impacts of an Administration's activity, but the approach that we are discussing is unusual in that a Government is providing an account on its budget spending. If a Government is providing such an account, either it must have some control over the issue—and the carbon account will give us some clues to that—or it must feel that it might be held accountable for it. It is unusual in that the Government is saying, plausibly, that you might want to hold it accountable over whether the carbon footprint actually decreases, even though at this stage of the game we are not entirely sure how to do that. Of course, until you get the account, there is no way of knowing whether the issue is controllable and, if so, in what way. This is the first time that an Administration has self-consciously applied a carbon measurement to a budget figure, but it should be pointed out that such an approach has downsides as well as upsides.

Professor MacPherson: My knowledge on this matter is not related to the econometric scale; instead, I am interested in project-level carbon accounting and in how you choose between options for specific future projects to reduce the Government's carbon or greenhouse gas emissions footprint. As a result, I am not qualified to answer the question.

The Convener: There may be questions later on how the assessment integrates with other aspects of Government decision making.

As this is probably the first time that a Government has introduced this type of assessment of its budget, others around the world might be watching to see whether we get it right or wrong. Given that a number of different approaches and methodologies could be taken and applied, what are your views on the methodology that has been chosen and how the assessment actually assesses the budget's carbon impacts?

Professor Roaf: The Scottish carbon accounting group, or SCAG, which I represent and which is a loosely convened group of people who are interested in this field, very much welcomed the carbon assessment and its groundbreaking strategy. Obviously, the methodology is only emerging and we need to identify improvements in it. It has been noted that one key need is to identify clearly levels of uncertainty in the method and to clarify the robustness of the different approaches used in it with regard to different data models and relationships. Although there has been clarity on some issues, we had concerns about specific data in a number of areas, as I am sure will emerge in this afternoon's discussion. Do you want me to go into details or just to give a general overview?

The Convener: Could you give one or two examples?

Professor Roaf: One example relates to the quality of data. The assessment includes 2006 data on the carbon intensity of industry and 2004 quantitative relationships between industry spend and consumption. We wondered whether that feature of the method was realistic going forward. It was asked why the Government does not use bottom-up data on fuel consumption, which should be increasingly available and might provide a more precise estimate. Those are examples of some of the questions that were raised.

The Convener: So there is work that needs to be built on to improve the robustness of the tool for future budgets.

Professor Roaf: Why the tool is being developed also needs to be explained. If the purpose is to help the Government to produce policy options, it is perhaps an unwieldy methodology. Fundamentally, the number 1 issue is clarification of how the Government thinks that it can use the assessment and whether, if the intention is to use it to make carbon-based decisions on policy options, it is the right tool for the job.

Dr Wiedmann: The assessment distinguishes between high-level carbon assessment and individual-level assessment, which is a useful and important distinction. On high-level assessment, which I understand is the stage that we are at now, the method chosen is exactly the right one. Environmental input-output analysis is particularly suited to capturing economy-wide impacts, because it is a model of the whole economy, which means that all indirect effects that are triggered by Government spending are identified. It is the right basic methodology for such assessment.

However, we need to think about how the high-level assessment can be interpreted and used. The limitation is that it is a backward-looking account, which means that although we are dealing with a future budget, the model is based on data that, as Susan Roaf said, are a couple of years old. The fact that the technology and the economic structure of the model are a couple of years old is not a problem in itself, but it means that the high-level assessment does not give us guidance on specific policies. It is just an account of the indirect emissions that are triggered by Government spending.

It is certainly useful to keep an eye on that year on year, but if we want to look at specific policies—for example, a housing policy on insulation or a transport policy that involves building a road or a rail line—we need a forward-looking approach that takes into account bottom-up data, which Susan Roaf mentioned, such as fuel use by future trains or future houses. Each policy needs to be assessed on its own, and it is likely that that will be done using a combination of the input-ouput and bottom-up methods. That will make it possible to assess individual policies in a forward-looking manner. Both types of assessment are needed. We need to be clear about what we are looking at now.

15:15

I also have a point about how the results are broken down in the assessment. I notice that the table of contents mentions four types of emissions: direct emissions, indirect emissions, induced emissions and imported emissions. The inclusion of induced emissions is interesting, because I have not encountered such an approach in other national carbon footprint accounts. It tells us about the indirect consequences of Government spending on increased wages, which in turn are spent on things. The inclusion of induced emissions is valuable, but the information needs to be interpreted. We need to think about what it means and how it links to policy. At this stage, we do not have a clear understanding of how policies influence household behaviour and what people do with the money that they get indirectly from the Government. There are certain assumptions, which require further interpretation.

Induced emissions have not normally been included in other greenhouse gas reporting initiatives and standards. For example, the guidance from the Department for Environment, Food and Rural Affairs on how to measure greenhouse gases, which I think will come out this week, does not talk about induced emissions, although it applies at company level and is not directly comparable with what we are doing here. It is worth keeping in mind that the approach is new and innovative, which is good.

I am satisfied with the handling in the assessment and by the consultants of emissions that are embedded in imports to Scotland. However, there is a clear limitation on the data, which can certainly be improved. Multiregional models are being developed that can identify where imports come from. The approach can be built on and improved.

The Convener: Should we expect development of the assessment tool, to enable us to break down information about salaries? For example, could we ascertain whether money is spent on different kinds of goods and services depending on whether public sector pay is increased at the low or the high end of the scale? Do we think of the public salaries bill just as money that goes into the economy, or should we think about where it goes after that?

Dr Wiedmann: That is an interesting question. The issue can certainly be investigated, because

there are tools that enable us to distinguish between expenditure by different socioeconomic groups, for example. We know that there are different consumption patterns. Such an exercise would be valuable and could well link to policies that are aimed at reducing poverty. There is potential to go into the matter further.

Professor Bebbington: Like Thomas Wiedmann, I was surprised that induced emissions were included. As I said, accounts are about accountability and controllability. The induced impacts—that is, what people who are paid by the Scottish Government do with their money—are not controllable by the Government, which cannot say, "Here's your salary and here are the things you are allowed to spend it on." The Government cannot be accountable for how people spend their money; that is the individual's business and not their employer's business.

All accounts can cascade outwards. Induced emissions is a further layer, beyond direct and indirect emissions, which is not usually included in accounts of this sort. However, the inclusion of induced emissions allows us to have a more nuanced conversation about sustainable development as opposed to carbon—the two things are not reducible to each other. We are looking at a carbon account and not a sustainable development account, which might refer to who is employed, opportunities for less well-off people to be employed by the Scottish Government, and so on. The inclusion of induced emissions is the only odd thing about the approach, and in some ways it does not add anything. Its inclusion is interesting, but it is not in the same category as the direct, indirect and imported impacts that we have captured.

I was very pleased by the inclusion of imported material, because it is important that we look at issues on a consumption basis as well as on a production basis. Many of our obligations under the Climate Change (Scotland) Act 2009 are on a production basis, but here consideration is being given to carbon on a consumption basis. That gels well with the Government's national performance framework and its interest in the ecological footprint. Carbon is a big component of the ecological footprint, so it is wise for the Government to include it on a consumption basis. The picture would have been incomplete without that, and it fits in with broader measurement agendas.

I would have taken a bottom-up approach, because I am an accountant and that is how we construct data. However, we already have quite a lot of bottom-up accounts. Information on the Scottish Government's carbon performance in the running of its estate, transportation and so on is already provided in the Government's report on the carbon footprint of its activities. The carbon assessment complements that information with information on the carbon impact of the public money that we spend—for a variety of good reasons, such as to provide health care and local council services. That account is slightly different, both from some of the large-scale accounts that detail where all the carbon in Scotland comes from and from the policy appraisal, which indicates what we should do next. There are interlocking carbon accounts that tell distinctly different stories but help us to understand the whole picture.

Thomas Wiedmann's use of the word "interpretation" was important. We may want to reduce our carbon footprint, broadly speaking, but we would not want to do so by providing less health care, if people need it. Judging whether a measure is good or bad is much more complicated than looking at the carbon accounts; we must also consider what the spending is for and the outcomes from it. The carbon assessment is part of an interlinked set of different types of accounts, each of which will allow us to do different things.

Professor MacPherson: I am not an economist, I am a bottom-up person who is interested in appraising specific projects and courses of action. When assessing my comments on this issue, you must bear in mind that I am speaking as a lay person and am much less qualified than my colleagues.

Two things struck me about the input-output analysis. First, the figure of approximately 11 megatonnes for induced emissions was smaller than I had expected. I have no technical background in the area, but the size of the figure surprised me, given the scale of the public sector and the public sector economy in Scotland. Secondly, like other witnesses, I find it hard to understand how someone would use the data to decide which of a number of alternative courses of action they should take to minimise the life-cycle greenhouse gas emissions of a policy. A bottom-up structure is needed to do that.

The Convener: Other members will ask about the methodology behind the emissions that have been included. Do you have anything to say about the emissions that have not been included in the current assessment, such as emissions that will arise from the use of infrastructure that is built by government spending?

I also want to pick up on Professor Bebbington's comment about imported emissions. The matter may be one of presentation, but does it make sense to include those emissions under "Manufacturing"—a heading that includes goods that are manufactured domestically and those that are imported? Those do not seem to be the same sector to me. Could that give rise to confusion?

Professor Bebbington: I will start with what is not included and the use of infrastructure, which comes in on page 14. There is a wee bit of a fudge. I think that the Government is right to quarantine some emissions out of the assessment, otherwise there would be several layers of analysis together and it would be hard to understand exactly what you were looking at.

Some emissions ought to be out, but the Government fudged the issue a bit, because it said that some decisions drive carbon but others reduce it. My answer is that the greenhouse gas inventory can tell the Government how good it has been at determining that. That is the base from which other information can be imputed. A different type of assessment tool—which has just been spoken about—guides whether you do or do not do things.

Roads infrastructure and the use of it and built infrastructure such as housing and the use of it are picked up somewhere else in a different form of account. The rules that you apply to decide whether to build this or that road, or a rail or road link, or whatever, will be picked up elsewhere in the system. The outcome of such decisions will tell you what your greenhouse gases are, which are the input to the assessment calculation, so eventually they will flow through.

There are lots of carbon accounts. Recently, the Government produced a carbon balance of its transport policies. Because I am sad, I have had a really good read of it, but I will not give evidence on it, because you are not asking about it today. However, that document answers the question, given the policy, what happens next? So the Government has produced a transport account, but it is a different sort of account from that which we are discussing. I do not agree entirely with the Government's view that we cannot know, because we do know, it just comes out elsewhere.

I imagine that the bulk of imported emissions are manufactured, but—as you said, convener—that is not the only factor, so I would rather call them imported, then we can layer out the other things. A bit more clarity would certainly help.

Dr Wiedmann: Calling imported emissions manufactured is too narrow a description, because other emissions are included, such as upstream emissions, including from service provision and capital goods. I would stick with imported emissions.

In thinking about which emissions might be included or excluded, it might be helpful to think of past and future emissions, which links to what I said earlier about being backward and forward looking. From my understanding, the current high-level assessment includes all past emissions that are required to produce the goods and services on which the Government spends money. In that respect, the account is comprehensive.

I think that certain types of emissions, for example to do with land use changes, are not included in this high-level assessment, for example afforestation and carbon sequestration, which can take carbon out of the atmosphere. There are also future emissions that will result from activities, spending and policy decisions, for example emissions from cars that are driven on new roads or from housing that has not been insulated.

Professor Roaf: I expect that committee members will have asked what use is the assessment if we cannot use it to inform our policy-making decisions? We asked that question as we went through it. Obvious uses can be made of the information. For example, the outputs of the assessment capture the role played by the rural affairs directorate very clearly, because of the high carbon intensity of its activity. As a result, we could say that it should be a clarion call for focusing emissions reductions opportunities in the area of land use. Some policy decisions therefore can arise from the assessment, but not the day-to-day policy decisions that the committee probably makes.

There is another area. Because we now live and operate in a traded world, the methodology does not capture the net carbon position that results from, for example, our European Union trading. It is an issue that the assessment does not deal with that aspect of the Scottish Government's activities.

15:30

The Convener: Are you suggesting that a future version of the assessment applied to next year's budget should examine the aspects of the Government's spending that give rise to emissions in the traded sector and the non-traded sector?

Professor Roaf: You should ask an expert such as Tommy Wiedmann to deal with that; it was just something that we noted.

There is another issue, in that different carbon accounting activities are going on, so how do we make the bottom-up accounting methodologies compatible with the top-down ones? The assessment does not deal with that.

Professor Bebbington: I cannot find the paragraph but, to be fair, the assessment does note the traded and non-traded issue. That issue does create problems, because traded sector emissions occur elsewhere. I suspect that most people would be caught under the carbon reduction commitment through which spending is focused. There will be an element of traded emissions, but you cannot tell how much.

Alison McInnes (North East Scotland) (LD): I think that many of my questions about methodology have already been covered. If the witnesses have nothing more to say about the choice of methodology, I will move on.

Do you agree with the Scottish Government's calculation that direct emissions account for 21 per cent of the total, indirect emissions account for 51 per cent and induced emissions account for 28 per cent? Does that seem to be a reasonable conclusion?

Professor Bebbington: To pick up on a point that has been made before, I also thought that 11 megatonnes, or 13.5 per cent, was quite a small amount. However, when we break into the figures a bit more and look at the spending categories that flow out from them, such as electricity and moving people around, we see that there is some intensity in those activities but not as much as might have been thought. For the amount of spending in the economy, that is a relatively low percentage of the carbon, which is quite interesting.

With the exception of agriculture and rural affairs and NO_x, which have already been noted, the figures tell me that there are no obvious easy wins. You would not be able to look at the assessment and say, "Ah, if I whipped in there and sorted that out, I'd be done." The things that we need to do to sort out our carbon emissions are the things that we need to do across the board anyway. There is good synergy.

We know that it is essential to decarbonise our energy production system, and we have policy pointing in that direction. If we do that, we will pull carbon out of that account. Likewise, dealing with transportation will help enormously.

I am not sure that I know what the real picture is, but with the exception of agriculture and rural affairs, we are talking about working through our policies and ambitions in the climate change delivery plan. That will help our account as well as everyone else's.

Dr Wiedmann: One issue to bear in mind when examining the results is that they take a consumption perspective, which asks what emissions occur as a result of one's consumption or activity. In this case, we are asking what indirect emissions occur as a result of Government spending? That does not mean that the Government is directly responsible for all those emissions, because they include much more than only emissions from the Parliament building, for example. In a way, there is a shared-responsibility perspective, in that the assessment shows the emissions that an activity generates, but the actors who produce those emissions are throughout the economy—they are industry and consumers.

One must bear in mind what that means for responsibility, especially as the induced emissions are, as Jan Bebbington put it, an added layer of consequential emissions. That might also help to put the size of the emissions into perspective. As you know, it is possible to report greenhouse gas emissions territorially, as is done under the Kyoto protocol. They can also be considered from a consumption perspective. On a national scale, the difference is imports and exports. They are simply different perspectives and one needs to bear in mind what they say.

The Convener: Professor MacPherson, you commented on the level of emissions that are attributed to one sector or another. Do you want to expand on those comments in relation to induced emissions?

Professor MacPherson: No, because I am a lay person in that respect, as I said in preface to my remarks. The public sector in Scotland is a large economic entity, and I was simply surprised that only 13.5 per cent of Scotland's 85 megatonnes of greenhouse gas footprint was attributed to it. That is a surprising number to a lay person, especially if we include induced emissions, but I accept it if others have examined it thoroughly, say that it is correct and are able to back it up.

Shirley-Anne Somerville (Lothians) (SNP): Some of the witnesses have commented that it is strange that induced emissions were included and have discussed the impact of that. The assessment is supposed to be a carbon budget for every pound of Government expenditure and, given the sheer size of the public sector in Scotland, a large proportion of that Government expenditure is made up of wages. Is it better for the induced emissions to be included, even if they are an additional complex layer, or should they be taken out because they do not sit comfortably within the assessment? What is the better approach in making a rounded budget?

Dr Wiedmann: Induced emissions should be in the assessment. It is interesting to see their magnitude and effect. To get a complete picture of every pound that the Government spends, it is interesting to see direct, indirect and induced emissions. Induced emissions inform policy and might even help to tailor certain policies. If we want to compare Scotland's carbon footprint with those of other nations, we might have to put induced emissions aside, simply because other national carbon footprint accounts do not include them and we have to compare like with like. We must keep that in mind, but it is good to include them.

Professor Bebbington: I am slightly less cheerful about including induced emissions. I would tend to leave them out, but that does not

make their inclusion right or wrong—there is a point of distinction. I would leave them out because you have some control over the other emissions. If you decided to spend your money differently or invest in infrastructure differently or whatever, your direct, indirect and imported emissions would change. However, your induced emissions would change only if you directed people to spend their money in particular ways, which I cannot see any employer doing, or if the overall shape of your economy changed, as that would change your employees' spend as well. Induced emissions are not controllable in terms of following the wage line. You could include those emissions for the sake of conducting a trend analysis, if you like, but the fact is that those emissions will reduce as you restructure your economy—that is fine, but you cannot claim direct responsibility for that. Induced emissions are in a different category of information from the other three types of emissions, which is why I tend to want them to be quarantined in some way.

Another thing to remember is that what is in the public sector might be different from what is in the budget. My university is in the public sector, so our spend on the provision of education will have an impact on the carbon intensity of Scotland, but only some of our income is Government-based income. We might have to be slightly more exact with our language and stress that we are talking about a carbon account of the Scottish budget, not the Scottish public sector, because the public sector is larger than what is in the account. That might also account for our initial surprise at the figure of 13.5 per cent of emissions, given that the public sector spends X amount of money. I have never worked out what the difference is between the public sector and what goes through the Scottish budget, but if it were the same pro rata, we might not be surprised. Only when you asked the question did I realise that I do not know what that looks like.

Shirley-Anne Somerville: We can all look into that.

Professor Bebbington: Only if you have trouble sleeping.

Shirley-Anne Somerville: Earlier, we discussed income averages and the possibility of analysing them in a different way so that we can pick up how people spend their income. We also have industry carbon-intensity averages. The budget therefore very much uses averages. Does anyone have any comments on that usage and its positive or negative implications?

Dr Wiedmann: Using industry sector averages in the input-output model has certain limitations. It is perfectly reasonable to use them for the high-level assessment, which considers aggregated spending and the total amount, because spending in one industry sector can affect a range of subsectors, and there will be some averaging out at a higher level.

When we come to specific policies and activities, the situation might well be different. For example, with regard to investment in renewable energy, such as expenditure on more energy-efficient methods of electricity production, it is important that more specific factors are used in order to assist the assessment of the carbon impact of the policy, which I understand will be done at some point in the individual-level assessment in the carbon appraisals. Emissions that are associated with that technology will have to be assessed, because it would not be appropriate to use the average emissions from electricity production. That is something to keep in mind in relation to the specific analyses. That is also where bottom-up and top-down approaches can work together to create a complete yet specific account of emissions.

Professor Roaf: I do not think that you can use this assessment as a policy-informing tool. However, it is a useful tool in showing areas in which we are not well equipped. For instance, it tells you that if you spend £1, you will create a certain amount of carbon, and if you spend less, you will create less carbon. Does that mean that the Scottish Government will say that it will spend less money because it must meet the targets? Possibly not, but the Government might consider how it could decarbonise spending, which takes us on to the question of energy and the tricky issue of how we count the energy subsectors. The tool is a fantastic stimulus to upping the game. We will have to solve such problems. However, I cannot see how it can usefully be used to make anything other than the highest-level budget decisions on policy.

15:45

Shirley-Anne Somerville: Does the tool claim to do more than that? The Cabinet Secretary for Finance and Sustainable Growth says pretty much what you said in his foreword to the assessment, so perhaps we should not be surprised that it is not a policy-informing tool.

Professor Bebbington: I agree. The tool does not set out to inform policy. Another tool will be developed that will try to do that.

I have a sustainable development focus, not purely a carbon focus, so I think that we definitely should not expect to say, "Let's spend less money." We should be making choices about spending to support the health care and livelihoods of people in Scotland. The knowledge that spending has a carbon impact might lead us to think differently about spending. That is where

an assessment such as we have could couple with a much more bottom-up account.

We do not have a carbon footprint of the national health service in Scotland, although we might do in future, but there is a carbon footprint for the NHS in England and Wales, which considers the total carbon in the NHS and where it comes from. An interesting and quite surprising finding is the amount of carbon footprint that is tied up in prescription, because pharmaceuticals are drawn from fossil fuels and are energy intensive to produce. If we can direct our health spend towards prevention, so that people do not have to take pills, not only will people be healthier and we will probably spend less money on the NHS but our carbon footprint will be lower. That level of analysis identifies action that we know is right, such as encouraging wellbeing rather than responding to sickness, which also has a carbon impact.

If we simply use the tool that we have to conclude that spending on the NHS accounts for a big amount of carbon and therefore should be reduced, we will not get the right outcome. However, it would be good to couple the approach with an attempt to promote a preventive health strategy, because that will mean not just that people will be less unwell but that the NHS will be less carbon intensive.

The carbon footprint assessment made the NHS think about its prescribing practices and waste. The NHS traditionally overprescribes, to ensure that patients take the whole course of pills and do not re-present because the problem is only half solved. The NHS always builds wastage into its prescribing practices. Such an approach has health impacts, carbon impacts and cost impacts. A sustainable development mindset would consider all three sets of impacts and would not focus purely on carbon.

The Government wisely does not claim that the assessment is a policy tool. However, the assessment might direct us to consider areas of spend more closely and to identify opportunities to improve things in a way that would also have a carbon impact. Carbon drives the process but does not control it.

Des McNulty (Clydebank and Milngavie) (Lab): I am sorry that I have not been here throughout the meeting—I had something else to do, which is linked with the work that we are considering.

It has been argued that the assessment provides a tool, but having listened to the witnesses I am beginning to question whether it has obvious utility. I can see that it generates interesting PhD questions, but if the purpose is to manage down the carbon in the budget, the tool seems to be singularly inappropriate. The spanners—if you like—are relatively straightforward to identify.

We can see that energy efficiency will deliver significant carbon benefits, and that driving in the direction of using more public transport, particularly active travel as opposed to car use, and a different way of looking at our agriculture use will deliver clear benefits. It seems to me that the obvious tools are spanners rather than such a computer model. That seems to be the burden of what you are saying, but perhaps you are not saying it quite as explicitly as that.

Professor Bebbington: I would not say that explicitly, because the assessment is not a spanner. However, it is still useful. It is a discharge of accountability. We are talking about the carbon impact of spending money. In that respect, we are talking about an accountability mechanism, not a tool as such. You might ask whether something is too carbon intensive or less carbon intensive and how things will change. That sparks a conversation about responsibility. However, the assessment does not say that it is a spanner. We have other things that are spanners.

Des McNulty: I used to be an academic before I became an MSP, and I do not want to be anti-academic, but it strikes me that the assessment is an academic tool. A policy maker will want something different; they will want to know what the consequences will be if one thing is done as opposed to another thing. Aspects of the assessment might drive in that direction, but although pursuing a high-level approach is perhaps academically interesting, it does not necessarily drive us in the direction in which we want to go. Would it not be better to have quick and dirty models that say we will deliver certain reductions if we do certain things?

Professor Bebbington: I disagree with that on two bases. First, carbon assessment is not the only tool. If it was the only thing that we were using, I would agree with you. If we had only one amount of effort to spend, carbon assessment would not be the first thing that I would spend it on.

Secondly, it is not academic to talk about a Government's accountability for its expenditure. The big thing that the assessment offers us is the ability to discharge accountability, and the committee is a key part of the process. The issue is not academic to me; it is to do with the parliamentary discharge of accountability.

Professor Roaf: A few of us from SCAG got together and discussed the matter. Obviously, trends are shown. There is concern about the level of risk in the data, but there is also the fundamental question, what is the tool for? I

presume that that is for the Scottish Government to decide.

Dr Wiedmann: It might make sense to distinguish between high-level and individual-level assessments. I would not call a high-level assessment a tool; rather, it is an accounting method. I agree with Jan Bebbington that it is important to have that method, because it proves retrospectively that something has changed. If there are high-level assessments year after year, it is to be hoped that improvements will eventually be shown. Such accounting is important for democracy, so the issue is not just academic. Carbon assessment is not suited to being a tool with which policy makers can explore the effects of different policies, which is the forward-looking method that is being looked for. We need individual-level assessments for that and more data and adapted methodologies to estimate future emissions benefits. High-level assessments will prove and record things, and, I hope, ensure that benefits are captured in the accounts.

Professor MacPherson: I want to pick up on Mr McNulty's point. Bottom-up assessments are my area. A bottom-up assessment is needed if a client asks what course of action they should follow that will result in the lowest life-cycle greenhouse gas emissions. Anyone who has ever tried to provide a bottom-up assessment will know that such assessments are horrendously complicated. Therefore, one issue that needs to be dealt with is the availability and reliability of data, so that a realistic bottom-up assessment can be made of different courses of action, such as whether buildings should be constructed by one method or another. However, such assessments are difficult to do, given the information that we have on the embodied greenhouse gas emissions in materials and so on.

Looking at national-level information, I accept the carbon assessment as an accountability methodology. I am not an economist but, for what it is worth, I accept the carbon assessment as a tracking tool that enables people to review whether the carbon intensity of Scottish Government spend is being reduced. From that point of view, the carbon assessment is legitimate. However, we also need useful tools for assessing—in realistic timescales and with realistic effort—different courses of action in, for example, construction projects.

The Convener: Other members will ask about the development of an individual-level assessment later. We will return to Shirley-Anne Somerville for her next question. I remind members that supplementary questions should be supplementary to the question that was asked.

Shirley-Anne Somerville: As was mentioned earlier, the carbon intensity of spend is broadly similar across portfolios, with the exception of the rural affairs and the environment portfolio. Do the witnesses have any comments on that similarity between the budgets? Further to Professor Roaf's point, what lessons can be learned from the situation with the rural affairs and the environment budget?

Professor Roaf: As was said before, the carbon assessment demonstrates that there is a need for a clarion call to decarbonise the rural affairs and the environment portfolio. Such a demonstration is another useful function of the assessment, so we should perhaps see the assessment as being part of a process rather than as a tool. It must be a systematic process that includes action planning, target setting and so on, as well as the carbon assessment. The assessment has been useful in identifying the high carbon intensity in the rural affairs and the environment portfolio. How we then develop a process that will begin to answer the questions that the carbon assessment raises is another important question.

Dr Wiedmann: It is not so surprising to see that there are not tremendous differences between the different spending budgets. That is probably due to the fact that the assessment still provides a relatively aggregated or high-level report. I understand that, underlying each budget line, the model attributes expenditure to 126 different sectors, so there is more detail. The differences in those lower-level data will be more significant.

The carbon intensity of spend can inform us about the impact of individual expenditure lines, but it is difficult to derive policies from it directly. For example, an approach that shifted expenditure from relatively high carbon-intensive expenditure to lower carbon-intensive expenditure would not necessarily mean more energy-efficient technology, because the expenditure could be shifted from one sector to a completely different sector. The more interesting question is what we can do within one sector. For example, how can we decrease the carbon intensity of electricity production? Again, that leads us to the questions about specific technologies and bottom-up data.

16:00

Professor Bebbington: I would dovetail the agricultural carbon intensity that is identified in the assessment with the NO_x emissions, which I understand are related to how farming is done. That opens up that debate enormously. If we put that together with the policy and programmes work resulting from the climate change delivery plan—which I believe will be published next year—we could start to see a tie-up between the figures in the carbon assessment and where action is taken to deliver the aims of the act. At that point, we would have a cross-check, or another

accountability check, of whether spending leverage was also being used to try to address the broader areas.

Why do we have spending in the agricultural sector? We have it because the prices for produce that we want our farmers to produce are not sufficient for them to have livelihoods. In that respect, there is a distinction between a carbon impact and a sustainable development impact. I would not use the carbon assessment to switch expenditure, because we spend money not only for carbon reasons but for social support and an array of other reasons. I would like to see the issue being dovetailed with the other policy documents and approaches so that we know what will happen next. Do we have a way in which to address our agricultural emissions, for example?

Professor MacPherson: I can only offer my perspective against a layperson's perspective on the econometrics of the matter. With the exception of the figures for agriculture, I was struck by how similar the profiles of greenhouse gas emissions per £1 spent seem to be, but I wonder whether that is partly, or largely, a function of the fact that average data were used and applied across the different areas. Perhaps there is a fairly heavy factor that tends to pull the figures towards the mean.

Shirley-Anne Somerville: Carbon sequestration is not included in the figures—we touched briefly on that earlier. Do you have any more detailed comments on how it could be included, or on whether it should be?

Professor Bebbington: If there was sequestration as a direct result of Government spend, it ought to be included so that we have net figures. If someone takes responsibility for what they emit, they should also be able to take the credit for what they draw in. However, the spending lines in the draft budget do not go down to that level of detail. The Government does not spend money on planting trees, unless there are direct subsidies to particular programmes for tree planting. If there are such subsidies, we get into the secondary effects of Government policy and spending leading to certain outcomes.

In that respect, I am not wholly surprised that the figures do not identify a big sequestration element, because I doubt that that is in the Government spend, unless the Government spend is not actually on that activity.

Professor Roaf: If we think about carbon capture and storage as an example, figures for the sequestration of carbon from the atmosphere would immediately go into the energy budget, so they would be masked by the average figures for the sector. Is that right, Tommy?

Dr Wiedmann: Yes, I think so. The UK national environmental accounts have a specific line for land use changes, including afforestation, and sequestration through such changes. I am not sure about the Scottish environmental accounts. As a matter of consistency, it would be good for those factors, and carbon sequestration supply technology such as carbon capture and storage, to be included. Ultimately, over time, they would show up as reduced emissions.

There is still a lot of research to be done on the exact amount of carbon that can be stored in trees, for example. It depends on where they are planted, how the soil underneath them is treated, the type of trees and so on, so we should bear in mind that there is considerable uncertainty about the figures.

The Convener: The assessment throws up some results that could appear to be anomalous. For example, the emissions that are associated with the motorways and trunk roads budget appear to be a great deal lower than the emissions that are associated with the Scottish Public Pensions Agency. Are such anomalous results a cause for concern? Can members of this and other committees use the carbon assessment to judge potential budget amendments that might come up during the parliamentary scrutiny process?

Professor Bebbington: I would not use the document to do that. On issues such as motorways and trunk roads, I would use the "Carbon Account for Transport", as it sets out the baseline and the proposed activity and gives the carbon account of that. That is outside the boundaries that have been drawn for the carbon assessment. This is where the interpretation element becomes important: we must be clear about what the assessment is and is not, and it might be easier to be clear about what it is not, rather than what it is. There are other carbon accounts that allow members to interrogate the use of transport infrastructure. The figures exist and are available.

The Convener: So, until the assessment or tool, or whatever we call it, is linked with a host of other approaches, it is hard to use it to judge the worthiness of spending in a particular area.

Professor Bebbington: Yes, but it might direct you as to where to look—it is a useful directional device. For example, from our reading of the document and our conversations, we have found that there is a need for a further look at the rural portfolio and that our actions in that area are important. The delivery plan that is associated with the Climate Change (Scotland) Act 2009 provides the same sort of story—it shows where we should look to take carbon out of the system. Transportation is another big part of that story.

Once we have dealt with energy production, transportation and agriculture, we will have done some of the big jobs, but those are also the intractable issues. Another big item is the built infrastructure, including housing.

The Convener: Is there a danger in having a document that the Scottish ministers have trumpeted—I am not sure that that is a fair term, but the document is presented with some pride—but which throws up apparent anomalies that could give rise to serious misinterpretation?

Dr Wiedmann: There might be a danger of people not seeing the fuller picture, for example, if they look only at the graphs. If people read the report, they will understand that the assessment for roads includes emissions from spending on road construction, but not emissions from the cars that will use the roads. If somebody just flicks through the results in the report quickly or sees only the pictures, they might not know that. That is a danger, which is why it would be good to include such points in the captions to make it really clear what we are looking at and to avoid misinterpretation.

Professor MacPherson: It is important to make the distinction between the carbon assessment, which is a greenhouse gas emissions budget for the Scottish Government's direct and indirect expenditure, and emissions that follow on from that, or the public consequences of that expenditure, for which the Scottish Government is not directly accountable. The assessment is not a cost benefit analysis tool to consider whether we should build a road; it is simply an account of the greenhouse gas emissions consequences of the Government's expenditure of which it is directly in control. Whether someone drives a gas-guzzling car or, like Sue Roaf, a Polo Match, that is their choice and the Government is not directly in control of that.

Professor Roaf: The carbon assessment is a good first step, but it would be good for Parliament to develop it into a much fuller and more rounded process. There should be a clear route map. The carbon assessment should be done, with the functions of that particular methodology; then, other accounting procedures with different functions, such as target setting, action planning and budgeting, can be carried out. People could see that that was much more rounded and we could start to develop much more certainty about the way in which the individual-level approaches are compatible with, used with and relate to the higher-level ones. The carbon assessment is a fantastic first step, but the process must be filled out so that people have a much clearer idea of how the assessment fits into the whole ambitious strategy of the Government to carbon account for its policies.

The Convener: Your answer is much fairer than my question.

Rob Gibson (Highlands and Islands) (SNP): Absolutely.

Professor Bebbington: The one possible big advantage of the carbon assessment is that it may also help the conversation and negotiation about who is responsible for doing what. If a road is provided and I drive on it, there is a shared responsibility. Once you get a sense of the carbon impact of driving on the road and compare it with the information that you can get out of the carbon assessment about the direct impact of building the road, you know which matters more—whether the driving matters more than the construction of the road. However, the construction of the road induces the traffic. The carbon assessment gives us a much greater ability to have a conversation about shared responsibility and where responsibility lies. That kind of conversation, which develops citizens and communities that will be responsive to being responsible for their carbon, becomes important.

It could be said that this is the first time that carbon assessment has been done anywhere in the world, but just because it is the first time that anyone has tried it does not mean that it will solve all the problems. In that respect, it could help to flick open a much broader debate—one that is not restricted to rooms such as this committee room but which is held in people's living rooms as they decide how they move around. That cannot be done directly from the carbon assessment, because it is quite techie, but in combination with other things the carbon assessment provides us with a citizenship approach to thinking about what we do.

Charlie Gordon (Glasgow Cathcart) (Lab): Given that this tool—I will call it a tool at this stage—is in the very early stages of its development, do you think that it is applicable to individual local authorities?

Professor Bebbington: Local authorities would be able to work out their carbon footprint from the carbon assessment. However, my understanding of what they are doing through their own carbon footprinting projects is that they already have some of the data, but they are probably more likely to be slightly more bottom-up than top-down.

Partly because of the amount of spending that passes through local government, individual local authorities are working quite hard not only on their direct carbon footprint but on the carbon footprint that is induced by how they conduct themselves and the activities that they take part in. Those two things dovetail together, but it is not a matter of taking the figures and shaking them out a wee bit further, because the level of detail to which local

authorities are working in their carbon accounting is much more detailed than can be got from the carbon assessment. Nevertheless, there is a link.

Charlie Gordon: My understanding is that the authors of the carbon assessment approach have assigned local authority spending to different industry categories, but if, as you say, a great deal of bottom-up data are available in local authorities, that is perhaps an obvious area in which the assessment could be strengthened.

Professor Bebbington: Yes, although those data come from common bases because the tool that local authorities use to understand their carbon footprint is based on input-output tables, which are exactly what the carbon assessment is based on. The big databases that we use to understand where the carbon is and how we assign it to activities usually run through tools that are in the public domain, but I will not say anything about those because Dr Wiedmann knows everything about them, as that is the Stockholm Environment Institute's main business. They should be compatible with one another, although if all the figures from the local authorities were combined, they might not add up to the total national figure. That is an empirical question; I do not know whether the figures would add up, because we have never had carbon accounting before, so we cannot figure that out.

Dr Wiedmann: Technically, it is possible to break down national Government spending to the local authority level. In the national monetary accounts of the United Kingdom—the situation is similar for Scotland, but I am more familiar with the UK accounts—Government spending is broken down into several columns, including central Government spending, local government spending and then different types of spending, such as education, health and so on. It is possible to break down the figures, and we have used those data to undertake specific carbon footprint analysis for local authorities. They have found it interesting to see not only their direct emissions from the energy that they use in houses, schools and their estate—electricity and street lighting, for example—but their indirect impacts through spending on goods and services.

Although it is at a different level, the carbon assessment approach is very much in line with that; it can certainly be made compatible to ensure that, when everything is put together, local authority spending adds up to national spending. Indeed, it will be similarly useful for policy making by indicating hot spots or the magnitude of indirect emissions. However, even with accounting, we will still not know how specific policies will affect the level of such emissions.

To some extent, that is what we try to do at the SEI in York. We might, for example, examine how a housing or transport policy affects indirect emissions through changes in behaviour. How might providing more public transport result in a modal shift from cars to buses? Such issues can be explored, but doing so is a step further than the mere accounting of expenditure.

16:15

Charlie Gordon: The assessment document says:

> "carbon costs need to be weighed against other objectives that spending programmes are intended to deliver."

At the start of the meeting, each of you recounted to the committee your personal involvement in getting the work to this stage. Without repeating any of those comments, how do you think the carbon assessment process has integrated with the development of the draft 2010-11 budget?

Professor Bebbington: I do not know. I suspect that that work went on in closed rooms that I certainly had no access to.

Charlie Gordon: That is pretty much the answer that I expected.

Rob Gibson: Much has been said this afternoon but, in summary, the feeling is that we need to develop both high-level and individual-level assessments. In any case, Professor Roaf has said that the assessment will provide a fantastic stimulus to upping our game. What is the panel's view on the direction for high-level assessment, and does this year's exercise provide a robust baseline for reporting in future years?

Professor Roaf: It provides a very solid basis. It uses probably the best methodology; in fact, when I discussed the issue with a number of people, we all decided that the methodology had been well chosen and was good and robust. Of course, it will be refined throughout the process and, at some point, we will be able to draw a line in the sand and base future trends on it.

Dr Wiedmann: I agree. The usefulness of the exercise will emerge only if it is required to be carried out year after year. There are certain methodological quirks that can be improved and I hope that, over time, the data gathered can be more up to date and that the time lag will not be as long as it is at the moment. There might well be further developments. As the work is very much about accountability and looking retrospectively at what has changed as a result of implementing policies, I certainly recommend monitoring year after year.

Professor Bebbington: Likewise, I want to see the trends. However, what I would like even more is for you to ask the cabinet secretary Mr Gordon's question about whether the calculations made any

difference whatever to the decision-making process. Of course, that question will be quite hard to answer, given that this is the first year that the Government has had the figures.

Rob Gibson: I will come back to that in my next question.

Professor MacPherson: I am not an expert in that area, so I will merely make an observation. As the methodology and the data that are used improve over time, we must keep an eye out for the effect that that approach produces, as opposed to a genuine effect that results from a reduction in greenhouse gas emissions. If we refine our methods and get more up-to-date data, we might see an apparent downward trend in emissions. It would not be a real trend, however, but simply a function of the fact that the data were compiled in a slightly different way. We would need to be careful to separate an apparent trend that was induced by changing the way in which the data were captured and used from a real downward trend in greenhouse gas emissions.

Rob Gibson: Indeed. My next question is on individual-level assessments. I know a bit about the rural economy. Scotland's geography and its soil conditions mean that there is little room to move away from livestock-based agriculture in much of the country. We therefore have a very limited ability to alter the carbon balance that is created by livestock production.

With regard to individual-level assessments, the Scottish Government has stated:

"carbon appraisal of individual policy measures and specific spending lines will be needed to better understand the carbon implications of individual strands of Government activity".

The Government admits that, so the point that Jan Bebbington made in response to Charlie Gordon's question is integral in taking the issue forward.

How much do you know about the development of individual-level assessments by the Scottish Government, apart from the one on transport that has been mentioned? What are the advantages and disadvantages of individual-level assessments?

Professor Bebbington: That brings us back to the theme of sustainable development versus carbon. It becomes very important in the rural economy, as we will make choices at various stages to live with carbon because we believe that it is good to have it, despite the other things that are involved. My main concern, as a commissioner with the Sustainable Development Commission, is that carbon will take such a centre-stage position that those other things will be lost, including equities and a whole bunch of other stuff, such as different types of biodiversity.

As you said, we have seen only one individual-level assessment, on transport. It did not contain exactly what I would have wanted from it, but it gives us some idea. The individual-level assessment tools will be developed over time; people throughout the world are trying to develop them, because they can be used to drive whole reduction trajectories. However, they need to be scrutinised carefully to ensure that we do not do dysfunctional things with them.

ILAs are perhaps useful, if they work, in examining things holistically. I will not repeat the NHS story that I mentioned previously, but that is an example of people thinking holistically and leapfrogging over to something that was much more sensible. We do not know whether there will be many opportunities to do that, but if there are, we will have a better hope of sorting out our climate change impacts.

If the individual-level assessment is too narrowly focused only on carbon, it might result in quite dysfunctional choices that do not take a holistic approach. That relates to Professor MacPherson's point about apparent reductions. From a production point of view, moving all our manufacturing offshore makes us look good, but we might move it somewhere where it produces more carbon than it might have done otherwise. The avoidance of that type of cross-boundary, stupid outcome needs to be built into individual-level assessments.

Professor Wiedmann: I cannot comment on any specific Scottish policies, as I do not have knowledge of them. In general, with regard to advantages and disadvantages, the individual-level assessments are essential to explore the effect of policies. They will involve individual scenarios, and they will always be only estimates of future emissions. They involve uncertainty, but they are essential in order for us to make informed decisions. They will be helpful in the end, whatever estimates we get from them.

As Jan Bebbington said, ILAs make the link between consumption and production. Production is on one side, but consumption can affect it—if people shift their diet from meat to non-meat, for example, there is a link to livestock production. It is important to capture that.

On disadvantages, ILAs will require much more resource because people will have to work through specific examples and get the bottom-up data, so they will be more expensive and will take up more time to do. We could prioritise and see which policies should be explored first in order to minimise costs.

Professor Roaf: I beg to differ on the agriculture issue. I am particularly looking forward to 2030 when, I believe, Glasgow will be the

champagne producing centre of Europe because of climate change.

Many things will change rapidly with the rate of climate change. The question that Rob Gibson raised reinforces the need for structure in the process, so that we know which sectors will have bottom-up individual-level assessments, and when. Do we know how compatible the accounting will be between the sectorial studies, and between the ILAs and the higher-level assessments? We need to get all that framed out so that we know exactly what the larger process will be like. The bottom-up ILAs will be incredibly important.

The other factor that has been raised is the importance of awareness raising. We are sitting around this table discussing carbon; we could not have done that a year ago. A lot of things are going to be shaken out just from the discussion. Educating people in the use of carbon language and awareness raising are incredibly important.

Rob Gibson: The bubbles in the champagne might have an added effect on the atmosphere as well.

Professor MacPherson: Yes—if they are carbon dioxide.

As someone who will be carrying out ILAs on projects, I point out that they are difficult and expensive to do. We will just have to suck it and see—we will have to do some ILAs to see how difficult the process is. We can get into extraordinary detail if we try to take them to the n^{th} degree in looking back over the chain of delivery of projects. The trouble will come when we have to decide when to truncate the process. I do not know the answer to that yet, although I have an intuition that we will have to come to some judgment about when enough is enough—that is, when we have done a certain amount of work to establish that we understand enough about the greenhouse gas emission life-cycle impact of a course of action. As I say, I do not know the answer yet but I have worked on projects so I know that we can go round and round in ever-decreasing circles. Management will have to decide when the data are good enough for us to make a decision. That might not be the same thing as understanding all the greenhouse gas emission impacts of a course of action; they might be two different things. Having enough information to make a robust decision and knowing that one course of action is better than another is not the same as knowing all the outcomes of a course of action, if you understand me. We need to have enough information to choose between options, but that does not mean that we have the n^{th} degree of information.

Rob Gibson: I am sure that we could look into that in greater depth in the future. Thank you.

The Convener: I wonder which parliamentary committee will have the nerve to propose a fact-finding visit to areas that produce sparkling wine after today's discussion.

Rob Gibson: Are you making that proposal?

The Convener: Not just yet. I ask Des McNulty to wind up the formal questioning.

Des McNulty: How useful will the carbon assessment be in allowing subject committees to scrutinise the carbon impact of spending in individual subject portfolios?

16:30

Professor Bebbington: At the current level of resolution, it will not be particularly helpful until we see some of the individual-level assessments, which might be more helpful. The carbon assessment gets things started but it does not necessarily go all the way.

It bears repeating that no one has ever done carbon assessment before, and it is probably good to have a look at it. We now know a little more about the limitations and what it does not do, as well as what it does. I would not abandon it just yet, by any stretch of the imagination; I would keep a watching brief on it to ensure that it does the job that we want it to do. Happily, it is not the only carbon account. If it were the only carbon account, we ought to panic; however, there are others that might be more useful in doing that particular job.

Des McNulty: I would like to pursue what might be seen as an inconsistency in what Stuart MacPherson said about the individual-level assessments and what is being said about the overall budget carbon assessment. Stuart MacPherson seemed to say that individual-level carbon assessments were complicated, with lots of factors to be taken into account, and that we are not sure whether we can conduct them in specific areas for specific purposes, yet there seems to be a greater degree of confidence in assessment at the aggregated level, where one would intuitively think that the degrees of uncertainty would be exponentially greater. I am interested in that apparent contradiction in your degrees of confidence.

Professor Bebbington: The overall picture is just that—an overall picture—and looks back at what has happened, whereas the individual-level assessments suggest what we should do next, given an array of different options. Because the high-level assessment is high level—it is accurate in terms of its high level and the way it has built itself—it would not allow us to create individual-level assessments.

I will give you a good example. There is evidence—although it is now quite old—from

research that the New Zealand Government funded that shows the full life-cycle carbon impacts of building materials. It shows how much energy is tied up in the equipment that is used to make the building material, how much energy is put into making the thing, how much energy is put into shifting it to the site and all those sorts of things. It was a three or four-year study—it was somebody's PhD—and it produced evidence on about 30 building materials, showing with reasonable confidence which material produced the lowest amount of carbon.

That level of detail is what would be needed to plug into the sort of decision that Stuart MacPherson talked about, for example on which materials I would use if I was going to build some flats—whether to build them entirely out of wood, using concrete, using steel or using stone from wherever. The high-level assessment does not give such options; it addresses the question, "This is what we're going to spend our money on; what does the pattern of impact look like?" That is quite different from asking, "Which of these eight or nine different options should we take?" In each option, it depends on where the boundary is drawn.

I completely agree that the position seems odd, but it is because the assessments are different creatures. We can be certain that the high-level assessment is more or less right, but we could not make a decision on the basis of it. If we wanted to make a detailed decision and get it right, we would get into a more complicated process because that would be a "What if?" decision.

Des McNulty: That is true up to a point, but we must question the assumption that individual-level assessments are forward looking whereas high-level assessments are inevitably backward looking. It could be argued that individual-level assessments could also be backward looking—that is an element of their being forward looking—and that, in fact, every good individual-level assessment should be backward looking as well as forward looking. It is the use to which the assessment is put, rather than the methodological aspect, that is critical.

I am a bit anxious about the idea that individual-level assessments cannot be done because they are too complicated and that high-level budgeting can be done because it is backward looking and somehow safe. That is a convenient answer for the Government, but I am not sure that the science backs it up.

Professor Bebbington: I would certainly not want you to go away with that impression from anything that I have said. The description that Stuart MacPherson just gave is a really good one. There is a trajectory—we know that some things are better and some things are worse. An individual-level assessment without many data might give us a sense that we need to go to one place rather than another, but if we wanted to know exactly where, that would take more data. I am an "and" person: we need high-level and individual-level assessments because otherwise we have no way of moving forward. I want to be really clear that we around the table are saying "Both, please"—for different purposes.

Professor MacPherson: I did not intend to create the impression that ILAs are so difficult that we should not be trying to do them, but I was emphasising that they will be difficult.

I really want to emphasise the fact that we need more research and attempts at it, to get a handle on how difficult it is and to understand when enough is enough. I also want to challenge my colleagues with the idea that a bottom-up assessment can be used to construct a complete greenhouse gas emissions life-cycle picture of a project that will then match a retrospective top-down assessment. We might not get there, and we do not necessarily need to do so. If we are faced with a choice between a number of options and we can carry out an individual-level assessment that is good enough for the purpose of making that choice, that means that we do not have to get down to the last kilogram of greenhouse gas emissions associated with each option.

We might never get the options to add up completely because the 80:20 rule is likely to kick in—that 80 per cent of the greenhouse gas emissions are bottomed out from 20 per cent of the analysis, or something like that. In such a situation, there would be no need to proceed beyond the 20 per cent of analysis, as the conclusion would be that the results have given a robust enough basis for making a decision. We might not know that one particular option will result in X thousand kilograms of greenhouse gas emissions compared with Y thousand kilograms from another, but we will be confident enough that one will result in fewer emissions than the other.

Professor Roaf: There are huge areas of uncertainty in the methodology as it stands. For example, we have to use UK data as proxy for imported emissions, and there are some questions about the extent to which it is a reasonable assumption to do so. It might therefore be sensible to request a description of the uncertainty around the data, where it exists in the current method, because I do not think that such uncertainty is exclusive to the carbon assessment.

Dr Wiedmann: I agree with Professor Bebbington that both high-level and individual-level assessments are needed. There is a trade-off in terms of the required effort. It is no coincidence that the high-level assessment is a top-down approach that is quicker and simpler to do, and that individual-level assessments will take

a bit longer because more data have to be gathered and so on. Both types of assessment are essential, especially when informed decisions about specific policies need to be made. Individual-level assessments are needed, even if there is some uncertainty around them. I agree that such uncertainty should be documented, but having an ILA is better than having no estimate at all.

Des McNulty: If the Government has to choose between, for example, increasing investment in cycling and dualling the A9, and it chooses to dual the A9 and reduce the money for cycling and, at the same time, produces a high-level carbon assessment to show its interest in carbon, as a politician I am interested to know how those two things can be juxtaposed. My problem is that it is hard being sucked into a debate about the technicalities when some individual-level assessments are being made that I might want to home in on.

I have one final complication to add. I used to be the convener of the Finance Committee, which took it as axiomatic that, by and large, the Government has scope for changing no more than 2 per cent of its expenditure in any given year, because it is hard to turn the tanker around and most of the money has to be spent on people's salaries and big projects or services that do not require a policy position.

Given the fact that budget decisions do not come from a first-principles approach but make marginal changes on a year-by-year basis, how does the high-level carbon impact assessment fit in with the reality of the budget process and the scrutiny that we face in concrete terms?

Professor Bebbington: I would argue that we need to move beyond marginal changes. The trajectory to which we have committed ourselves through the Climate Change (Scotland) Act 2009 is a non-marginal trajectory. Given the urgency of the situation and the fact that the current science shows that we are close to a 2°C tipping point, fiddling at the edges is not a viable or sensible option. The decision almost sits outside whatever data we might put around it; it is a choice about how we look at the budget as a whole. If the situation is as serious as we believe, and given what the science tells us and the fact that Parliament has passed the 2009 act, it may be decided that it is time for non-marginal, zero carbon-based budgeting and to start again. The process will carry on, but it might be done in parallel.

The Scottish Government and the Scottish Parliament have every reason to try that—the experimental scrapping of departmental approaches to see how work can be undertaken on a team basis, even though that is working well in some places but not in others. There is certainly an appetite and an ability to say that, if we are looking for a bigger, non-marginal change, we must start all over again and look at the whole budget rather than fiddle around with changes of 2 per cent. The Government would still have to work its traditional budgets at the same time, however, so that would be a parallel task, not a substitute task—at least, not yet.

The Convener: In the first couple of years of the current session, there was a great deal of focus on getting the climate change legislation in place and making it as good as it can be. Now that we are moving into the implementation phase, do you get the feeling that people in Government are saying, "We've never done this before. We're going to get some things wrong; we're going to get some things right"? Humankind has never faced this challenge before, so it is understandable if people feel that way. We have the climate change delivery plan, the carbon assessment of the budget and, later, individual-level assessments and option appraisal. Do you get the feeling that we are moving in the direction of a coherent approach, or is the approach a bit fragmented at the moment?

Professor Roaf: This is probably the first Parliament in which this discussion is being heard—I think that it is a phenomenal step forward. Patrick Corbett, at Heriot-Watt University, has said that Scotland will lead the carbon enlightenment. That is great; we can do it together.

We have an extraordinary opportunity because we have the academics, industry and the Government sitting down together to discuss and develop a language. That has been an incredibly important step not only in raising awareness of the issues, where we spend our carbon and so on, but in increasing the competency of the Scottish Government in carbon accounting. Two years ago, everybody was saying, "Whoops! How do we do this?" Now, they are beginning to say that they are developing this, that and the other. We, in academia, are now developing agent-based complexity models that allow us to include all the factors, put people into the model, ask it a question and get a bottom-up answer out of it. That is terrific, and we are doing that together.

In terms of importance and where we are, this is an incredibly positive first step. Given the fact that we are doing it together as a community and the fact that Scotland is at the forefront, it is a fantastic step forward.

Professor Bebbington: I am going to be slightly grumpy. The key is scrutinised delivery, and the difficulty in scrutinising the delivery is identifying early on when something is slipping and what needs to be done about it. My main fear

is not that the approach is fragmented rather than coherent but about how we will deal with failure in the system. All the elements are in place to enable us to go towards a glorious future, but as I understand it, when we get to the end of the Kyoto protocol period, the world collectively will not have met the targets that we set ourselves. How will we deal with that political failure and get back on track? That is the big issue for the future: we will need to identify quickly when the system is failing and then get it back on track.

16:45

Dr Wiedmann: The crucial point is integration. I can see the carbon assessment being integrated more and more into political decision making. By accounting on a higher level year after year, a picture will emerge that will show progress in that area. I would encourage the Government to continue on that path.

Professor MacPherson: The implementation of the carbon assessment will involve it becoming part of the decision-making process for all projects. The life cycle of the greenhouse gas emissions that are associated with those projects has to be a key part of the approach. Therefore, the Government must ensure that that happens, but not to the extent that the focus swings too far and we end up with dysfunctional decisions being made because social and other impacts are not taken into account.

The Convener: I thank all our witnesses for their time. I know that we have overrun slightly, but this is an important policy area.

Before we move to item 3, which we have already agreed to take in private, I inform members that we have received a letter from Stewart Stevenson on the request for advice from the UK Committee on Climate Change on the highest achievable interim target and other matters. The Scottish Government received a response from Lord Turner that indicates that the formal advice will be provided by the committee in February 2010. In his letter, Stewart Stevenson tell us that that is

"fully consistent with the requirement of the Act that the advice be published by December 2009 or as soon as reasonably practicable thereafter."

Copies of the letter will be provided to members, but we might wish to discuss the matter at a future meeting.

16:47

Meeting continued in private until 17:10.

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