OFFICIAL REPORT
AITHISG OIFIGEIL

Economy, Jobs and Fair Work Committee

Tuesday 31 January 2017

Session 5

The Scottish Parliament
Pàrlamaid na h-Alba

Tuesday 31 January 2017

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ECONOMY, JOBS AND FAIR WORK COMMITTEE
4th Meeting 2017, Session 5

CONVENER

*Gordon Lindhurst (Lothian) (Con)

DEPUTY CONVENER

*John Mason (Glasgow Shettleston) (SNP)

COMMITTEE MEMBERS

Jackie Baillie (Dumbarton) (Lab)
*Bill Bowman (North East Scotland) (Con)
*Ash Denham (Edinburgh Eastern) (SNP)
*Richard Leonard (Central Scotland) (Lab)
*Dean Lockhart (Mid Scotland and Fife) (Con)
*Gordon MacDonald (Edinburgh Pentlands) (SNP)
*Gillian Martin (Aberdeenshire East) (SNP)
*Gil Paterson (Clydebank and Milngavie) (SNP)
*Andy Wightman (Lothian) (Green)

*attended

THE FOLLOWING ALSO PARTICIPATED:

Professor Keith Bell (University of Strathclyde)
Gina Hanrahan (WWF-UK)
Gillian Hurding (Community Energy Scotland)
Elizabeth Leighton (Existing Homes Alliance Scotland)
Andrew Mouat (Glasgow City Council)
Professor Sean Smith (Edinburgh Napier University)
Elaine Waterson (Energy Saving Trust)
Dr Mark Winskel (University of Edinburgh)

CLERK TO THE COMMITTEE

Alison Walker

LOCATION

The Mary Fairfax Somerville Room (CR2)

Scottish Parliament

Economy, Jobs and Fair Work Committee

Tuesday 31 January 2017

[The Convener opened the meeting at 09:30]

Decision on Taking Business in Private

The Convener (Gordon Lindhurst): Good morning and welcome to the fourth meeting of the Economy, Jobs and Fair Work Committee in 2017. I remind all present to turn their electronic devices to silent or switch them off if they are liable to interfere with the sound system. I welcome our witnesses, who we will introduce in a minute.

The first agenda item is a decision on whether to take items 3 and 4 in private. Is that agreed?

Members *indicated agreement.*

Draft Climate Change Plan and Energy Strategy

09:31

The Convener: The committee is considering the climate change plan and energy strategy. The witnesses with us today are Professor Sean Smith, director of the institute for sustainable construction and professor of construction innovation at Edinburgh Napier University; Elizabeth Leighton, policy adviser for the existing homes alliance Scotland; Elaine Waterson, strategy manager of the Energy Saving Trust; and Andrew Mouat, principal officer, carbon management, for Glasgow City Council.

I ask the witnesses to keep their answers succinct, and committee members will no doubt seek to do the same. You do not need to answer every question, and if you want to come in on a particular issue, please indicate by raising a hand. There is no need to do anything with the buttons in front of you; the sound desk takes care of that.

I start with a general question. I know that some witnesses have submitted written evidence to the committee. I ask each of you to take a moment to outline briefly what you consider to be key points—positive or of concern—in the climate change plan and the energy strategy.

Andrew Mouat (Glasgow City Council): In general terms, I think that both documents are very good. They are pretty all-encompassing, providing a good background and then laying out exactly how the Scottish Government intends to deliver on those points. My one point of concern is how heavily reliant it seems to be on carbon capture and storage. Although that is a technology that should be considered, there is a whole half-page dedicated to it. I urge ministers to consider that and how it affects the overall on-going ambitions and targets.

Elaine Waterson (Energy Saving Trust): We were pleased to see the ambition of the target reductions for the residential sector—a 76 per cent reduction is really positive—and pleased to see the vision of having 80 per cent of households connected to low-carbon heating by 2032. Our concerns are about whether more should be done to do the energy efficiency stuff more quickly and about that 80 per cent target—it is a great vision to have, but the detail on how we will get there is not there yet. To some extent that is understandable, but it would be good to have more detail about what it means in practice.

Elizabeth Leighton (Existing Homes Alliance Scotland): For the benefit of those who do not already know, I should say that the existing homes

alliance is a coalition of bodies representing the housing, anti-poverty and environmental sectors.

I, too, support the EST's comment about the ambitious vision for the housing and residential sector of highly efficient homes that are mostly heated by low-carbon heat. That is the right vision and where we need to be in terms of climate change and fuel poverty. The most important thing that we can do for those people who are fuel poor is to reduce their need to heat in the first place. That is the best way to ensure that they have money in their pockets, rather than paying the high cost of heating.

However, as we outlined in our evidence, we are very concerned that there is a significant credibility gap. It is right to have such ambition, but it cannot be wishful thinking—it must be backed up by credible policies and resources to give us the confidence that the target will be met. The marketplace and householders must also have confidence that that is definitely the direction in which we are heading. Therefore, we need to focus on filling the credibility gap with new policies and proposals, with firm interim targets, in the final climate change plan.

Professor Sean Smith (Edinburgh Napier University): In general, we are very supportive of the targeting measures, particularly for the key groups of the fuel poor and those on low incomes, as has been mentioned. The previous efforts in respect of renewables and other reduction measures in industry, such as the closure of coal-fired power stations, have all helped to reduce carbon emissions.

We may not go into the issue of forestry today, but I will touch on it. We are very supportive of accelerating more home-grown timber into our construction and timber products for housing. We have enough timber in Scottish forests to build 3 million homes and the forestry sector supports 16,000 jobs. The efforts in that sector, such as planting more trees and the timber development programme, which is undertaken by the Government, the Forestry Commission and industry, are very supportive of that direction.

Transport interlinks with all the issues. It would be useful to come back to that in the discussion, taking a holistic approach and talking about the influence on building standards and section 7 sustainability. We support the plans that are afoot for electric vehicles, but we need to think about how we incorporate those into some of the legislation and regulations so that everything links together.

The Convener: I will open up the discussion to questions from committee members.

Gillian Martin (Aberdeenshire East) (SNP): Andrew Mouat picked on something that jumped out at me. I come from near the Peterhead carbon capture and storage pilot project from which the funding was removed. How do you see the research on that getting to a point where such storage is achievable, given that the funding was taken away from that project by the United Kingdom Government?

Andrew Mouat: I do not know. Given the resource for renewable energy that we have in Scotland, I am not convinced that we even need to consider carbon capture and storage. Although the funding was taken away, I suggest that, given that there has been so much funding for carbon capture technology over the past 10 years, had there been a viable option, it would have progressed further by now. That is unlike renewable energy, which has increased exponentially over the same period.

I do not know the specific details of the Peterhead pilot.

Gillian Martin: Are you concerned that carbon capture will not be the answer to the problem of reducing our carbon emissions? Should we scrap it altogether and look for alternative means?

Andrew Mouat: In essence, yes. Carbon capture is used as an excuse to burn fossil fuels when that is not necessary, particularly in this country.

Gillian Martin: That is interesting.

Bill Bowman (North East Scotland) (Con): I have a question for Elizabeth Leighton, who spoke about gaining the confidence of the marketplace and householders. Can you tell us more about what you mean by that?

Elizabeth Leighton: The ambition that is set out in the plan provides a signal to industry that the Government is serious about taking a low-carbon pathway for housing and that it makes sense to invest in capacity and skills in the manufacturing of low-carbon technologies for homes. However, if the policies and programmes are not there to back that up so that home owners believe that that is the direction of travel—either through support for regulation or through signals such as nudges and tax incentives—they will not take up those measures. After all, not all the issues will be dealt with through grants and programmes for the fuel poor, so we have to talk about the whole marketplace of owner occupiers.

That is why I want to highlight this graph that I am holding up, which is in the climate change plan and which shows the planned trajectory. Our concern is that it is expected that, in future, there will suddenly be a huge drop in emissions as we introduce low-carbon heat. However, we feel that much more can be done during the current period. The measures are available. For example, there

are 600,000 lofts and 600,000 cavity walls yet to be insulated, and hundreds of thousands of homes need solid-wall insulation. All those measures would make a huge difference for the fuel poor as well as helping to reduce emissions and setting us up for when the low-carbon technologies come into play. After all, things such as heat pumps work most effectively if the house has been insulated.

We think that, through several steps, about 30 per cent of our housing stock could be brought on to low-carbon heat during the first few years of the programme, so we do not need to wait.

The Convener: Sorry, but could you give us the reference or page of the chart that you held up, just for the record and for future reference?

Elizabeth Leighton: Sorry. It is figure 7 in the climate change plan. I am sorry, but I do not have the page number.

Andrew Mouat: It is in section 8.2.

Professor Smith: On page 48.

Elizabeth Leighton: Thanks.

The Convener: Thank you very much.

Bill Bowman: So we need to take people with us and not just tell them what to do.

Elizabeth Leighton: Absolutely.

Gil Paterson (Clydebank and Milngavie) (SNP): Can I come in on that, convener?

The Convener: Certainly.

Gil Paterson: We know that, in relative terms, local authorities and housing associations are pretty proactive and that we are doing reasonably well in that sector. However, when it comes to the private sector—including the housing, industrial and commercial sectors—and individuals privately spending their money, there is a reluctance. To follow that through, the business that I own has a number of buildings, some of which are very old and difficult but, when we got a new one, that was in my control, so everything possible was done. Regulation might take care of that. How do we make that step change? In the public sector, we are doing reasonably well, but when it comes to the private sector we are failing. Does it take regulation to do that, or should we just leave things the way they are?

Elizabeth Leighton: I welcome that question. One good thing in the climate change plan is that it says that the Government is going to consult on regulation for the private rented sector on minimum standards of energy performance. That consultation is expected later next month. Regulation is necessary to work on the bottom of the heap—the worst-performing properties that are flatlining and not picking up. The proposals will give a push to get those properties up to a minimum standard of energy performance. At the same time, we need to use incentives, advice and support to pull others higher up the energy performance certificate scale.

The plan acknowledges that the Government will look at a phased approach to regulation for the rest of the private sector. We think that there should also be regulation of the owner-occupied sector. After all, if we deal only with the rented sector, that will be about a third of the properties, which will leave us with the bulk of properties not really having been addressed. Therefore, we urge the Government to bring forward that measure quickly so that we have a level playing field for all private housing stock. Regulation has worked well in the social housing sector, and private tenants and owners should benefit from the same good energy performance that gives us all the benefits of health and wellbeing as well as saving us money.

09:45

Professor Smith: I very much support that. What has happened in the public sector, which has rallied to meet some of the challenges by retrofitting and so on, has been very positive. One might say that we have tackled the private sector a bit late—maybe we should have done it a few years ago. England is considering the same thing.

Although we have legislation for new builds, they represent only 10 to 15 per cent of all home transactions in Scotland, and let us say that 200,000 new-build and existing properties are sold across the piece in any one year. With that in mind, we need to give the industry enough time to scale up for this. If people know that they have to sell a house in a few years' time and it has to have a band C energy rating, or if they are letting in the private rented sector, there must be time for the industry and the private rented sector to gear up for this. It is one thing to introduce legislation as a stick that helps to drive change, but you have to give people enough time to be ready for it and to have the solutions available or have the small and medium-sized enterprises ready to react to it.

Elaine Waterson: I will just emphasise that there are various ways of softening the blow of regulation such as providing zero interest loans for people and providing grants for the fuel poor so that they are able to bring their homes up to a new regulated standard.

It is important to remember that, for householders, regulation is already in place for things such as boilers. When someone replaces their boiler, they need to install a new boiler that meets a certain energy efficiency standard.

Regulation already exists; it is not completely new for the home-owning sector.

John Mason (Glasgow Shettleston) (SNP): Some of the previous questions have sparked questions in my mind, especially—to follow on from Gillian Martin—about carbon capture and storage. I do not know whether anyone else wants to come in on that. I have always been puzzled by carbon capture and storage, because if we produce something bad and then we just stick it in the ground or keep it somewhere, that strikes me as unsustainable. On the other hand, there is the suggestion that carbon can be reused—in the chemical industry, for example. Can any of you guide me on this, because I am not an expert in the field—is carbon capture and storage as good as using hydro or are we not comparing like with like?

Andrew Mouat: I would argue that we are not comparing like with like when we compare carbon capture and storage with any renewable source. Also, capturing carbon from a manufacturing process and reusing that carbon is very different from carbon capture and storage which, as you allude to, is an almost indefinite storage of the emissions in an underground well or facility of some description. I think that the amount of energy, money and resource that would go into establishing the industry could be better directed elsewhere. Renewables are an area that is already delivering results—we are generating 57 per cent of electricity from renewables already, and it almost feels as though we have not tried that hard. I feel that carbon capture is a distraction.

John Mason: The convener has advised me that we are getting more information on this next week—we may have a witness who is expert on it—so I will not ask any more questions on it.

The private sector is mentioned in relation to retrofitting and all the rest of it, which is interesting. Immediately, I think about the cost that is involved in that. Can we do that kind of thing by regulation? Can we just tell owner-occupiers that they have to retrofit their houses—as we can tell the builders, presumably, that they have to build decent houses to start with—or is it inevitable that a pretty hefty grants scheme will have to be tied into any retrofitting for owner-occupiers?

Elizabeth Leighton: You should introduce regulation in a way that means that you never really have to enforce it. It should be easy for people to comply. The standard should be set at a level that is relatively affordable and easy to do. It basically means setting a standard for what people have to put in place. That includes commonsense measures such as jackets for hot water tanks, loft insulation and draught proofing—basic measures that it would be reasonable to expect as a minimum standard. Those measures could be implemented at the change of lease, because it is easier for a landlord to do it when the property is vacant, or, as Sean Smith suggested, it could be done when the property turns over, at point of sale. If the seller did not want to incur that cost, they could transfer that obligation to the buyer. In that case, it could be picked up through the sale of the property.

John Mason: Are you saying that, if I sold my flat, before the new owner moved in they would have to upgrade?

Elizabeth Leighton: There might be a period of time—a certain number of months—in which to upgrade the flat and present an energy performance certificate to say that the standard had been met. There are ways to do it to make it easy for people, and to show them the benefits that they would gain and the fact that it is not a huge financial burden. At the same time, though, I agree with Elaine Waterson. Regulation would need to be supported by extensive advice and support from the home energy Scotland network. Zero-interest loans are already available. There should also be grants for people who are unable to pay, because we must ensure that any regulation does not disadvantage those who are fuel poor. On the contrary, they should benefit from regulation.

John Mason: How do you feel that it has been going so far? There have been various schemes to replace boilers and improve insulation and that kind of thing. Do we just need to do more of that?

Elizabeth Leighton: We need to up our level of ambition. It goes back to the graph that I showed you earlier. The tables in the climate change plan suggest that the number of measures that would be installed right the way through to 2032 stays static at 90,000, while the Scottish Parliament information centre report that just came out on the climate change plan notes that, in 2014-15, 87,000 measures were being installed. That seems a bit like business as usual rather than a national infrastructure priority on energy efficiency that is transformational and moving us towards a housing stock that is truly low carbon. We need to up the number of measures that are going into homes, which will have to be done through a package of measures, including but not wholly reliant on regulation, because it will have to rely on people voluntarily uptaking measures, too.

John Mason: That ties into my final question. How does the new climate change plan relate to RPP1 and RPP2? Do you see it as a continuation, or is it a change of direction or just a change of speed?

Professor Smith: I have brought a graph that might explain that, if that is of any help. It is not digital, but I have brought copies.

The Convener: If you want to provide those to us, yes. Perhaps it could be emailed to the clerks after the meeting so that we have a digital copy.

Professor Smith: Mr Mason asked how the documents relate to each other. Although in other sectors, such as transport or energy, various things change—for example the means by which we move or our energy supplier—the residential sector is generally fairly static. It does not change because most of the properties already exist. Over the coming years, to 2050, we will probably add 15 to 20 per cent to the stock.

In the graph in front of you, we have brought together RPP1, RPP2 and the draft climate change plan. I do not think that we are allowed to call it RPP3 now, although I will do so for these purposes, if I may. The graph shows residential targets and planned reductions in million tonnes of CO_2 emissions. The blue dotted line at the top represents business as usual, as forecast in RPP1 back in about 2008. The light blue line represents what RPP1 forecast and planned from the policies that were laid out for the direction of travel. As you can see, it reduces from about 7 in 2010 to about 5 in 2021-22. The orange line is the planned and forecast reduction in emissions for the policies and outcomes in RPP2. The black line is the expected and planned reduction from using the policies in the latest document—the climate change plan.

Let me explain. The difference between the lines on the chart in 2017 suggests that under the current plan of policies on carbon reduction for the residential sector the level is significantly higher than was previously planned, in the sense that there will be more leakage of carbon emissions because the black line is above the orange and red lines.

John Mason: It is also above the blue dotted line, as if we had done nothing.

Professor Smith: It is—as if we had done nothing.

The black line slopes down quite steeply and then plateaus. The key issue is what happens after 2025. At this point, I will defend the Scottish Government because, no matter which political party is in power, there are many things happening at UK level that affect decisions about what we do here in Scotland and what we can enforce as policy, whether on feed-in tariffs, energy company obligations—ECO systems—and various other things that are going on. If we do not hit the preset targets in RPP1 and RPP2, what will happen as we get to the current climate change plan—RPP3—is that we will squeeze into the last seven years between 2025 and 2032 the push to hit the target that is set for 2032.

To give an idea of the scale of what will be required, I will touch on work that has been produced by the existing homes alliance. We still have another 900,000 homes to retrofit, which is quite a significant task. Some great work has been done already. I have seen, for example, the changes that have been made to people's lives in my village, where people have talked about how warm their homes are now and the difference that retrofitting has made. The majority—not all—talk about the benefits that they see.

It is quite difficult to say to the public, "I'm sorry, but you're going to have to wait 15 years until 2032 for us to retrofit your house, or put measures in place", but if we were to go for 2025 rather than 2032, and we target band C for energy performance for those 900,000 homes, we would need to retrofit one home every minute in the available time that we have until 2025, whether it is done through grant, legislation, or the carrot of reducing land and buildings transaction tax for people who move to a band C home. In the course of the first hour of the meeting this morning, we would have had to retrofit 60 homes for us to be on target. I hope that explains why we say that we need to up the pace on RPP1.

John Mason: That is very helpful. Thank you.

Andy Wightman (Lothian) (Green): I will get my head round the figures in due course. I have a couple of questions. The climate change plan's policy outcome 1 for the residential sector is that

"Improvements to the fabric of Scotland's domestic buildings results in a 6% reduction in their heat demand by 2032."

We have been advised that that 6 per cent reduction is not from a baseline of today, 1990 or whenever, but is in fact a reduction on projected heat demand in 2032. Do witnesses have views on what the accepted baseline for measuring reduction in heat demand should be?

The Convener: Who would like to respond?

Elizabeth Leighton: I am not sure that I can respond directly to the question, but I know that EHAS's analysis of the UK Committee on Climate Change's pathway to 2032 suggests that there should be an 8 per cent reduction in heat demand. Policy outcome 1 is not as strong as that. I am not an expert, however—there may be people on the next panel who will be able to answer the question.

Professor Smith: Part of the demand will no doubt be influenced by occupants' behaviour. We have data from a number of studies across Scotland in which people have had access to real-time displays. We need to differentiate between a

smart meter that sits under the stair or in a cupboard, and someone seeing on a display what is actually happening. Most of the smart meters that are coming out now have an in-home display so that users can see and identify how much energy they are using, in terms of heat demand, around their homes.

We did a study in which we used real-time displays with good colour graphics to explain easily to people how they use electricity, gas and water, through which we clearly saw a 7 per cent reduction in electricity use. We used the direct comparator of exactly the same income groups in exactly the same sizes of homes, but without the displays. People who used gas for heating reduced their gas consumption by 20 per cent.

We have gone back to those properties over the past three years. People are looking less at their in-home displays because they have already started to change their behaviour: they know what they want to change in their houses in terms of radiators, thermometers and so on. People slip back occasionally, but they find it extremely useful to have a display that flashes and tells them that they have used more than a certain amount. If a red light comes on that tells them that they are using much more heat, that allows them to re-benchmark and reset.

The reduction of 6 per cent is about improvements to buildings' fabric. That is different from insulation, which is more likely to result in an 8 per cent or 9 per cent reduction.

10:00

Andy Wightman: The question is: what is the baseline for that 6 per cent reduction?

Professor Smith: That is a good question. The Government does not state what its baseline is.

Andy Wightman: We need to do some work on that.

Professor Smith: Yes. We have a number of questions about statistics and other things that we want to bring to the committee's attention.

Andy Wightman: Will you raise those questions?

Professor Smith: We will. I will probably mention a couple today, but we will also write in.

Andy Wightman: That would be helpful.

My second question relates to Elizabeth Leighton's reference to wishful thinking. All witnesses have said that the targets and ambition are good, but the existing homes alliance says that the

"targets .. are not backed up by credible policies or proposals".

Will you say a bit more about that? What would "credible policies and proposals" look like? Would they be specific numbers, actions, timetables and costs?

Elizabeth Leighton: In the briefing that we submitted—we will also submit more detailed evidence—we suggested improvements that could be made to the plan that would help to fill that credibility gap. There needs to be an interim milestone on energy efficiency to show the trajectory—the increase in the pace and scale—of improving the fabric of our homes up to energy performance certificate band C by 2025. That would involve work on lofts, cavities and walls. What we suggest is similar to the target in the UKCCC pathway, so we are pretty much in agreement on that. It is also similar to a number of measures that the Scottish Government proposes for the period to 2032. The analysis is similar but the timescale is different. The number 1 improvement would be to quicken the pace and implement the measures on fabric.

We should not wait till 2025 on low-carbon heat. Only a slight increase is planned for between now and 2020 but much more could be done. As I mentioned earlier, about 30 per cent could be done by getting properties that are off the gas grid on to heat pumps or getting those that are already on electric heat on to heat pumps, or other more efficient electric heating. There are also all the district heating urban networks that are waiting to be developed. They are, or should be, on the shelf ready to go and there is no reason why they should not be taken forward from now through to 2025. About 30 per cent of properties could already be on low-carbon heat by then. That is much quicker than the plan suggests. The two items on which improvements could be made in timescales and targets are interim targets on fabric and low-carbon heat.

How could we do that? We need to move much more quickly on regulation. We have already discussed the benefits of introducing regulation and the incentives that would go alongside it. That is being consulted on, but the consultations could make much firmer proposals on how soon regulation could be introduced.

I have to mention the budget—I know that it will be under consideration in Parliament. The budget is, basically, standing still, and the plan suggests that it will stay the same over the next four years. You need an increase in resources that is consistent with a national infrastructure priority. The plan is supposed to be a different and transformational way of doing energy efficiency, but the numbers that are in front of you and the trajectory suggest that it will do much the same. Resources, targets and policies should be represented in the final plan.

Professor Smith: We also raised the issue in relation to RPP2, which contained a wonder graph with the additional technical measures, but they were not explained. Although we and others supported the targets, we challenged the lack of information in RPP2. In the final version of RPP2, in section 5.4.21, the Government stated its intention

"to produce a detailed proposal in RPP3 on how we may realise this potential"

of the higher technologies happening further on in the timescale, but that is not in the energy strategy.

I will go back to the question about what sort of information is required. The issue is what proportion of the target will be arrived at through district or community low-carbon heat and what proportion will be arrived at through other measures. The reduction will require a seismic shift after 2025 not only for this country but for many other countries that are in the same boat with their existing housing stock. A series of technologies need to be developed and tested.

Retrofitting community heating or other district heating is not so straightforward: there are all sorts of issues with curtilage, access, costs and delays. However, potential exists in some new-build developments and in areas where there are plans for new housing. Suggestions that are being put forward in the proposed city region deal for Edinburgh and south-east Scotland include plans to consider and embed use of, and widening of, community and district heating, with the new housing linking to other hubs and infrastructure including schools, leisure centres and so on.

A perfect example of community district heating being put in is the Commonwealth games athletes village. We were involved in part of that with the Commonwealth legacy team, and it is a tremendous achievement. The excess heat is helping to support the cycle track, which needs a constant temperature of 26°C, so there is an outflow for the excess heat. However, we had to import from Russia the special insulated pipework that was required in some of the projects. If we are to go down this particular stretch of road, we need to work with the enterprise bodies, innovation hubs and innovation support centres to ensure that we have the products and supports in manufacturing. District heating would be a successful way to achieve low-carbon heat, but we do not want to import all the solutions.

Andy Wightman: To what extent does local government part-own the plan? It will have a lot of responsibility for delivering it. Do you think that it has the resources and the powers to deliver it?

Andrew Mouat: We could always use more resources. I will bounce your question back, if I may, and suggest—in the politest possible way—that the Scottish Government could do slightly more to facilitate meeting some of the plan's requirements. The athletes village provides an example. The way in which district heating pipework is treated, in terms of non-domestic rates, is an example of one Scottish Government department dealing with another Scottish Government department. The rates price that is applied to district heating is the same as the price that is applied to the gas network, although the two are clearly very different. That suggests how a small thing can make the difference between a project's being viable in business-case terms and unviable.

Local authorities have a huge role to play in facilitating district heat networks, for example, and we are making strides on that, but we need national support on that front, as well.

Ash Denham (Edinburgh Eastern) (SNP): Professor Smith made the point very well about the importance of retrofitting existing homes in an earlier answer. You mentioned the possible incentive of reducing LBTT for people who get their energy performance certificate to level C. I have heard of eco homes that do not have central heating, have high levels of insulation and are heated by wood, but when those things are fed into the computer program, it does not accept the parameters: they do not fit in with how the programme is set up, so the EPC rating that comes out is not high. Is that a widespread problem?

Professor Smith: Yes. I experienced that with my home when a surveyor came round—the poor thing did not know what he was in for. We had added a front porch. Our ancestors did not get it wrong when they put front porches on their houses; the air changes significantly by just opening the front door, which means that you have to reheat. It is interesting, and good to see, that quite a few house builders are looking to bring back porches for new builds. My porch did not count towards anything. We had a secondary front door and we even replaced the front door with a top-end thermal insulated door, but that made no difference to the EPC.

We also put in solar photovoltaic panels; the surveyor said that that would make no difference because he was looking at the fabric of the building. Things might have changed since then, but that was pretty depressing, after having spent money on those measures. We are more comfortable because of them, but they were not reflected in the EPC rating.

That is a UK-wide issue; the EPC needs a full overhaul, if I may be so blunt. The sooner that happens, the better. It needs to happen so that we can take account of new developments.

Ash Denham: Do you have any idea of how many properties are potentially miscategorised in that way?

Professor Smith: Because EPC categorisation is written in stone through information that is input into the software, properties would not be regarded as "miscategorised". It is a difference of opinion. Ash Denham gave the example of the person who has an eco home and is not burning gas but is doing something else, and that is not reflected in the EPC. It would be interesting and useful to take a sample and ask how many homes' ratings might change if we change the metric to take account of such measures.

Andrew Mouat: Part of the problem is that a building's design performance and its actual performance do not often correlate particularly well. Equally, the results after an EPC is done are not necessarily fed back into the programme, so we are not getting continual evolution in the programme and the resulting improvements.

Elizabeth Leighton: We should differentiate between what is good about EPC and what the problems are. What is good about it is that people understand and relate to the scale—they have had it for years for appliances, and now they have it for cars and homes. That is something good that we should stick with, but I agree that improvements to the assessment methodology are needed. As Sean Smith said, improvements are being made through the UK process; the UK Government has just closed a consultation on the latest round of improvements. There may be ways—the Scottish Government is aware of this—to run in parallel with the EPC rating something that takes into account low-carbon heat, which is not very well represented. The EPC is much more focused on energy efficiency, which is fine as long as that is recognised. Let us not throw EPCs out, but fix the underpinning methodology and maintain a way of communicating with people how good their home is using the A to G rating.

10:15

Ash Denham: Residential policy outcome 2 is a really ambitious target. It is that

"By 2032 80% of domestic buildings' heat is supplied using low carbon heat technologies".

In my patch in Edinburgh, a big housing development of something like 700 homes, I think, is planned. There will be a mixture of houses and apartments, and a quarter of them will be affordable homes that might be managed by a housing association. This perhaps relates to what you said about needing to do more now, rather than wait any longer. We want 80 per cent of homes to be heated by low-carbon technologies. Housing associations and local authorities can apply to the district heating loan fund, which sounds like an interesting idea. In a mixed-tenure situation such I mentioned, district heating for the entire development would make sense, but only a couple of hundred homes and perhaps one other building could apply to the district heating loan fund. Should we ensure that all new developments have district heating?

Professor Smith: That would work only for a particular size of development, otherwise economies of scale are not so good. We recently heard from a major house builder that the Scottish Environment Protection Agency stepped in and raised an objection to a development, despite its doing good work on buildings' fabric and planning to use solar power in the development. That sector has been really badly hit by the change in FITs; it is a big sector that is made up of small and medium-sized enterprises. I know that the issue is beyond the control of the Scottish Government, but for small enterprises that have been trying to train apprentices and to get microgeneration certification scheme installer accreditation, all the changes and fluctuations have been hard to take.

The house builder that I mentioned said that SEPA has said that it will write to object to the development because its ambition on low carbon is not good enough. The builder was a bit taken aback by that and came to us to ask for advice, and said that if they had known the trajectory, they would have pre-planned. If we go down the district or community heating route—particularly for new build—as long as we give enough time and warning that that is the intention, we should have industry and the public on side.

Page 61 of the plan talks about the take-up of loans for district heating having been lower than expected. It would be useful for everyone to know why people did not take up the district heating loans; there will be evidence or information on that somewhere. There is a lesson to be learned for the future; if we want more district or community heating, we need to know why people have not taken up loans when they are available.

On new build, the plan mentions that there might be a review in 2017 of the energy performance of new homes. Our strong recommendation is that the regulations for new-build housing are not changed, because the industry is still bedding in the previous regulations from 2015. Give the industry time—it is still bedding in the silver level of sustainability for energy performance. There will be a bigger bang for the buck from retrofitting and supporting that sector than from changing new-build regulation.

If new-build regulation is to be changed, sustainable transport policy should be linked with new build. You should encourage incorporation in new-build homes of ULEV—ultra-low-emission

vehicle—connecting points for electric vehicles, which cost about £390 per home, with a grant. That would start a transformational shift. If people know that they are buying a home with a charging point and their employer's car park has a charging point, the home community speaks to the business community—public or private sector. There would be A to B transport and charging points.

Ash Denham: Finally, what is the lifetime of heating interventions such as upgrading the gas boiler to make the system more efficient, and will they have to be replaced with another technology in the future?

Elizabeth Leighton: I can answer that and pick up on the previous question, too. The replacement cycle should be considered as people put in new, efficient gas boilers, which have a lifetime of about 15 years. If a boiler is put in now, we would be in a good place to look at low-carbon alternatives by the time it needs to be changed. That should also apply to extending the gas network. Should we be doing that instead of putting people on to low-carbon alternatives such as heat pumps or very efficient electric heating? Should we be looking for alternatives rather than defaulting to technologies that the plan already sets out as outdated?

There is a consultation on requiring local authorities to produce heat maps and on whether district heating should be regulated so that some of the drivers that we are talking about are put in place. They would require connection, if they were thought appropriate, and that approach would support the taking forward of district heating. We very much support district heating and would like more prominence to be given to it in the climate change plan.

There is a proposal for something that would almost take the form of a third Sullivan report, which would look at building regulations for new-build and existing homes. I would argue that setting a trajectory for new-build homes would send an important signal to the new-build industry. Regulations could also provide for innovation with regard to existing homes, in relation to which there are routes by which standards can be brought in at the point of major refurbishment—after all, the most sensible time for someone to undertake energy efficiency measures in the rest of their home is when they are already having work done. That could be done through building regulations.

Richard Leonard (Central Scotland) (Lab): I am reminded of the words of the pioneering socialist and ecologist, William Morris, who said:

"Hard it is for the old world to see the new."

In the world as it is, 80 per cent of household heating comes from gas, and we are in the midst of a programme of smart gas meter installation. We are living in a world in which gas replacement boilers are being installed up and down the country every day of the week. I am, therefore, struggling to understand how, in just 15 years' time, we will get from the position today to a position in which 80 per cent of heating that is supplied to households will come from low-carbon technologies. Can somebody help me to understand the transition from the old world to the new?

Elaine Waterson: I am not sure that anyone understands how that will happen. That is part of the problem. It is unclear what the mix will look like up to 2032. Will the majority of people be on air source heat pumps? How many people will be connected to district heating? What proportion of households will be heated by gas, but with hydrogen injected?

It is correct to say that, arguably, we are looking at more than 2 million households having to have heating systems retrofitted. If that is expected to happen in that really short time period between 2025 and 2032, what will happen with regard to someone who installs a new gas boiler in 2025? That boiler will have a lifetime of 12 or 15 years, which goes beyond the 2032 timescale. Will we ask people to replace that system before the end of its life? There is a lot of uncertainty in this area, and I am not sure that anyone knows the answers.

Richard Leonard: Presumably, the author of the target knows the answer.

Elaine Waterson: Even the author of the target suggests that more work needs to be done to define the issues.

Elizabeth Leighton: The TIMES model knows the answer. It is the modelling that is driving the work forward and which suggests that it is cost effective.

It is difficult to get your head around what is happening, but if you think back 20 or 30 years to the dash for gas, you can see that the transition can happen, if the right drivers are put in place and if the transition is seen as being in the public interest.

As I said, we should focus on what we know that we can do now to deal with the off-gas and electric side and get the district heating systems in place. By my estimates and the estimates of the Scottish Government, that gets us to about 30 per cent. Granted, that is not 80 per cent, but we know that we can do it. Let us focus on making sure that that happens in the next five to 10 years, as well as continuing to work on the fabric improvements.

Professor Smith: I agree. The opportunity should be taken, particularly in some of the rural areas and in small villages. For towns and cities, it will be a stratospheric and very difficult change.

The other issue is the incentive. If your current gas expenditure is a third of what people pay for electricity, you might ask yourself, "Why would I shift to something electric based if it's three times the price?" Of course, prices change, and there might be other incentives or taxes—who knows? It is a very difficult issue.

Let us not forget the pressures on the grid that are coming up in the next few years with the electrification of cars, further electrification of the railway lines and various other measures. It is not easy to find the resources to meet the coming demand and need.

Richard Leonard: In an earlier answer, you referred to the importation of pipes from Russia to fix up district heating projects. You then made a wider point about the supply chain, and, given that we are the Economy, Jobs and Fair Work Committee, I wonder whether you can develop that by saying something about the potential for job generation in order to grow the supply industries for some of these new low-carbon technologies.

Professor Smith: With regard to jobs, perhaps I can start with the more negative side of things and look at what is coming over the next few years, because the construction sector, not just in Scotland but across the UK, faces a really tough task. Let me give you some Scottish figures. By 2021, 19,000 people will have left the construction jobs market in Scotland through retirement and various other means; we need to meet an annual recruitment requirement in Scotland of 4,000 people per year; and we will be required to train an additional 1,200 people per year for the next five years to meet the trajectory of the 28 per cent growth in population that will happen in south-east Scotland, particularly around Edinburgh.

As for Brexit, we need to bear in mind that 12 per cent of the UK's construction workforce are from the European Union, with the percentage in Scotland 9.6 per cent, or roughly 1 in 10. In London, however, 35 to 50 per cent of EU workers are based on house-building sites. As we saw in the 1980s and 1990s, when London booms or needs the skills, the workforce internally migrates south.

Taking into account everything else that we have to do, I think that the task alone of getting enough skilled people just to come in will be a significant one. I think that construction really needs further support from the Government; I know that the sector has put in for more modern apprenticeships, but it is crying out for a lot more help in order to build hospitals, care homes, flats and residential homes and to do all the retrofitting. I also point out that every new-build home that is built equates to 4.3 jobs.

Interestingly, I see that the figures show that every £100 million of investment in retrofit equates to 1,000 jobs. I have to say that I think that the figure is higher than that and that those who have done those statistics have done themselves down a bit. They cite Scottish Government analysis, but they do not reference a report. I would like to see that information, because our feeling is that the figure is much higher than 1,000 jobs for £100 million of investment. That said, there will be significant employment, particularly if we consider what we were saying about retrofit. Going after one home every minute represents a considerable amount of activity.

Gordon MacDonald (Edinburgh Pentlands) (SNP): Most of my questions have been covered by other members. I will ask about the services sector. I note that the services sector carbon envelope is expected to reduce by 96 per cent over the next 16 years, the second most ambitious reduction after the electricity sector. How realistic is that number?

Professor Smith: We do not think that it is realistic. The biggest gap that we face in going forward with carbon reduction and energy efficiency plans across all building stock is in the non-domestic—by which I mean commercial and public sector—area.

There are some great projects going on in Scotland to determine more accurate, better solutions. The City of Edinburgh Council is mapping all its current non-residential building stock so that it can look at the various solutions. Other local authorities have also been looking at various aspects of their building stock. It might be better to ask someone from one of the local authorities for a response.

A huge amount of work is required in the private sector. At least we can take a standardised approach in housing. We have 170,000 four-in-a-block properties and 240,000 tenements in Scotland, so we have a fantastic opportunity to take a standardised approach. As soon as you look at commercial or public buildings, you can see the wide variation in stock across the country, so the remedial treatments—the fabric or energy solutions—that are required to reduce the carbon footprint become more complex and bespoke.

10:30

Gordon MacDonald: Are there any easy interventions that could be made to push everyone towards the targets?

Professor Smith: I do not have a full answer to that question.

Elizabeth Leighton: I might be straying outside my existing homes brief, but the Climate Change

(Scotland) Act 2009 included enabling powers to allow the introduction of regulations on the non-domestic buildings sector. Those regulations came in just last year. It is good that they exist, but they are quite weak—they are very light touch; basically, they just require an assessment, without much of a requirement to take action. I hope that the climate change plan will require those regulations to be reviewed and strengthened as soon as possible. It must be relatively easy to regulate the non-domestic sector. It may sometimes be a bit of a challenge to find the solutions, but in many cases the introduction of proper regulation would quickly bring up standards.

Dean Lockhart (Mid Scotland and Fife) (Con): We have spoken quite a lot about policy and regulation, which has been helpful. A lot of my questions have been covered, so I will turn to the role of technology. I want to get the panel's thoughts on the use of new technologies in relation to energy efficiency and decarbonisation, and on how the energy strategy can best incorporate the use of new technologies.

Professor Smith spoke about smart meters and how they have resulted in a reduction in energy usage at key points. I understand that in the future it might be possible for people to monitor energy consumption using their mobile phone. That would be real step forward. Policy will obviously have to keep pace with new technologies, so what other changes might be coming down the pipeline?

Elaine Waterson: I will add to what Sean Smith said about smart meters. We are working on linking the advice that is provided through Home Energy Scotland to people's smart meter data, so that we can provide more personalised and specific advice, based on a person's actual energy use patterns. We can spot what is happening and talk to people about their behaviours in the home and what they can do to control their heating better. We are keen to do more of that.

Elizabeth Leighton: My answer will address the use of new technology rather than the technology itself—after all, it is by using technologies such as smart meters that we will realise the potential in how they can help us to reduce energy use. Much more support needs to be provided on how people use energy in their homes. I would like to see that spelled out in more detail in the climate change plan.

Some of the new technologies are fantastic—using a smart phone to remotely manage heating, for example—but many people do not have a clue how to do such things, or even how to use their home heating controls. Some of the pilot studies for the new energy efficiency programme are looking at what kinds of support works best. We need to identify people's energy use needs and what the solutions are, and then introduce an aftercare programme to make sure that people know how to use the radiator controls and understand about curtains and all the basics. That approach is proving to make quite a significant difference as well as providing value for money. People are not just having the kit put in; the performance gap between predicted savings and what actually happens—including in terms of the person's experience—is being addressed.

Professor Smith: We have been through various phases recently with some of the new technologies, with industry, Government, construction and product suppliers looking at different products. Somebody had great plans related to a new type of thermal board, for example, for older housing stock—particularly pre-1919 stock. That thin board would have been super-efficient in terms of performance. Ourselves, Historic Scotland and others have looked at that type of board, but there are issues, particularly with the cost and matters such as creep over time.

Other things are happening, including the internet of things, which has been touched on, and the new software that is being developed by Scottish companies. We have found that people are not too keen on controlling their energy use from their phones or wherever else; they are more interested in the data and information so that they can see what is going on. To that end, a number of companies in Scotland are developing software that will help people to understand how they are utilising energy at home or in relation to their car. They almost become the energy person—whatever they drive or do and wherever they live will be part of that software.

It is great to see developments in some of the electrical sectors reducing the amount of energy required. For example, we all remember seeing organic light-emitting diode TVs about eight or nine years ago. It is a learning curve, as we saw with the push some years ago on passive homes and passive direction. It is a strange name; it is not passive but is a mechanical ventilation system. I remember walking a few years ago into a demonstrator passive, or near-passive, house with MSPs from the Government, civil servants and others. Most people were pretty frightened by it—they did not like the feel of it because the air did not move. There were a few myths—you can, of course, open windows in passive houses. We have to be careful; if we drive up the energy performance of a building too much and people do not ventilate or understand how to live in a passive home, we get black mould, damp, asthma and so on. With the mechanical ventilation heating systems that are required for passive-type direction of energy standards, the filters need to be changed. Most people do not change the air filters above their cooker hoods, yet we will require

them to change the air filters for mechanical ventilation heating systems quite regularly. There needs to be a paradigm shift in how people understand how to use those new technologies in their home.

The best steps that are coming are in the fabric. Scottish house builders have recently built a series of prototype homes that are now coming on to the market. The average dual-fuel energy bill in Scotland is about £1,400 a year; the bills for those new homes are £300 a year or less. The mechanisms are there through less sexy technologies, if I can put it that way—the more standard approach to some of the fabric. Scottish companies can deliver that, which is tremendous. Architects are designing it and the local authorities are very supportive, because it hits the energy performance standard and is not too high-tech in its requirements.

Andrew Mouat: I was just going to point out that we do not need to rely too much on new technologies. A lot of stuff is already there that we are not doing particularly well yet.

On behaviour change on the non-domestic side, we have found that it is best to target our implementation by using interventions that do not require the input of the user. That takes behaviour change out of the equation altogether. Building fabric improvements that do not require people to know how to do things and which do not need maintenance or any of those longer-term thoughts are preferable.

There will always be people who pursue technologies and want to have the latest kit and gear. That is fine. However, the technologies are already there to support new building fabrics, localised electricity generation, energy generation in general and local district heating networks. We do not need to worry too much about what is over the horizon.

Elaine Waterson: It is important to note that, when we improve a home's building fabric, people inside the home often do not know how to change their heating controls—for example, they will open the window to control their heating as a result of living in a warmer home. I come back to the point that, even if we just focus on building fabric improvements, the people in the home are really important. It is really important that people know how to use the heating controls if we are to get the carbon savings that we should be getting.

Professor Smith: In relation to the fabric, back in 2007-08, like others, we advised that we should be putting at least 200—not 100—millimetres of insulation in lofts. Sadly, that did not happen. It is interesting that, now, one of the policies is to have—by 2032, I think—200 millimetres of insulation in lofts. We will have to go back to a lot of homes to put in that second layer.

I ask the committee to note one point. In section 8.2.3 on page 48, the climate change plan says that the first milestone is that

"by 2020 60% of walls will be insulated".

According to our stats, the figure is already at 60 per cent.

Elizabeth Leighton: That is for cavity and solid walls.

Professor Smith: Yes, that is right. On page 47, the report says that the figures are up to 71 per cent for cavity and 11 per cent for solid walls. The figures that are available for solid and cavity walls show that we are at roughly 60 per cent now. I think that elsewhere the figure is stated to be 57 per cent at the moment for external walls; it would be nice to see that milestone lifted above 60 per cent, so that it reflects a real milestone.

The Convener: While we are speaking about milestones, for those who think in old measurements, is 200 millimetres about 8 inches?

Professor Smith: It is. The optimum depth is 270 millimetres, but 200 would at least be better than 100.

The Convener: Thank you very much. On that note, I bring this item to a close and suspend the meeting to allow us to change witnesses. I thank all four of our witnesses for coming today. I also note that committee member Jackie Baillie, who had expected to be here, has intimated her apologies.

10:42

Meeting suspended.

10:51

On resuming—

The Convener: Welcome back, everyone. I thank our second panel of witnesses for coming along this morning. In no particular order, we have with us: Gina Hanrahan, climate and energy policy officer with WWF-UK; and Professor Keith Bell, who I think is of Scottish Power—"ScottishPower Professor of Smart Grids" is what I have written here; perhaps you can correct my misdescription, if that is what it is. He is also co-director of the UK energy research centre at the University of Strathclyde. We also have with us: Dr Mark Winskel, a research fellow at the University of Edinburgh; and Gillian Hurding, ACCESS project manager at Community Energy Scotland—ACCESS is the assisting communities to connect to electric sustainable sources project. Welcome to all of you.

I will start with a general question. Will each of you briefly give us your key points and concerns about the climate change plan and the energy strategy?

Gillian Hurding (Community Energy Scotland): In general terms, I echo the points that my colleagues on the previous panel made. We are happy about the continued ambitions of the plan and the maintained support for community energy under the strategy.

We view community energy as a fundamental driver of the transition that needs to happen in order to change consumer awareness and consumer behaviours as we move towards smart energy.

Perhaps not so much a concern as a consideration is the role that we expect communities to play when they are pursuing such innovative projects. Previously, communities have been able to access funding for renewable energy systems easily through the feed-in tariffs and so on. That was a good way for communities to engage with energy policy, in a roundabout way.

Now, when we expect more innovative solutions and technologies, communities are taking on a risk in delivering projects. That is not to say that there is a lack of motivation, ambition or even capability, but there is concern around sharing that risk. The energy strategy reflects the expectation that some projects will fail because of their innovative nature, but it would be wise to consider the impacts on local communities and what it means to pursue further smart energy projects in a similar way.

Professor Keith Bell (University of Strathclyde): I am not "of Scottish Power", I should say. I speak as an independent academic, although Scottish Power sponsors the chair—just to get that on the record.

The Convener: Thank you for that clarification. I apologise if I got that wrong.

Professor Bell: That is all right.

We should warmly welcome the energy strategy. As a responsible and civilised nation, we are right to play our part in the global efforts towards decarbonisation. We need to ensure reliability and affordability of energy, and it is right that we express that through targets and that those targets are stretching. However, the strategy must also be realistic and ensure that the targets are achievable, albeit that they should be ambitious.

Another thing to be applauded is the attempt to consider the whole energy system together—not just electricity, heat and transport separately. In doing that, there are a lot of very difficult trade-offs to evaluate. The strategy is not the final answer, and what has been presented in the draft climate change plan and the draft energy strategy should be seen as a starting point for discussion, debate and further analysis.

The Scottish Government has been working hard to improve its modelling and analysis capability, which is also to be applauded. However, there is more to be done. The task is challenging and there are uncertainties both in respect of the modelling—inherently, given the kinds of approximations that one needs to make to have a sense of whether all of this is achievable and what the main pathways seem to be—and in respect of the data that is put in, including what the trends are likely to be, relative technology costs and, as was discussed earlier, how energy users will engage with the different technologies and interventions.

Therefore, it is good that the plan has been published and that there are ambitious targets, but we need to explore the achievability and detail of the different pathways and their further implementation.

On implementation, the Scottish Government is one of a group of really important stakeholders. The UK Government is also very important and, to date, the European Union has been very important—we will have to see how that pans out. Industry and individual consumers are also very important in all of this.

Gina Hanrahan (WWF-UK): WWF strongly welcomes the 50 per cent target for renewable energy by 2030 that is set in the energy strategy. That target is both credible and achievable and is something that we, along with a range of stakeholders and industries, have been calling for. It is a welcome step forward and gives general confidence about Scotland's direction of travel.

On the climate change plan more broadly, we are disappointed by the level of policy detail. It used to be called the report on policies and proposals and it now has a snazzier title, but ultimately it is supposed to give a clear indication of all the policies and proposals that will deliver the targets that are set out from the TIMES model. We do not have confidence that there is enough in there to ensure that the climate envelopes are delivered.

The Committee on Climate Change has repeatedly said that there needs to be more policy effort if we are to deliver on existing targets, let alone future targets. There are three deficient areas that fall within the remit of the Economy, Jobs and Fair Work Committee and which we can focus on.

The first is energy efficiency. We heard this morning that the approach is pretty much business as usual, despite the very welcome commitment to

make energy efficiency a national infrastructure priority. However, if we are going to be strong on that and maximise the benefits of making it such a priority in bringing all homes up to a really good standard, we need to move much faster than is indicated in the plan. We need to fund it and we need to make clear how we are going to deliver on it. There is not enough detail there.

Secondly, on heat, there is a stretching policy outcome in both the residential and services sector for almost complete decarbonisation—80 per cent in homes and 94 per cent in the non-domestic sector. However, there is very little detail about how that will actually be delivered and what the technology mix will look like. There is a proposal that backloads effort to the late 2020s, starting from 2025. There is an issue around policy credibility there.

Finally, on electricity, overall the energy strategy and the climate change plan are good. They are welcome steps forward and it is good to see an acknowledgement that we are going to have a near-decarbonised system by 2020. However, I would question the reliance on CCS for negative emissions from the mid-2020s. That might come to pass, but we should not build it in as our plan A.

11:00

Dr Mark Winskel (University of Edinburgh): I agree with most of what has been said so far. There are some high-level issues to do with how the two documents look together and the consultation process.

Keith Bell is a UK energy research centre colleague of mine, and I also work for ClimateXChange, which is the Scottish Government national centre for expertise on climate change and energy policy; we have been working reasonably closely with the Scottish Government to provide advice on its energy strategy and plan.

Overall, as I think everyone has said, we welcome the ambition. Climate science is ever-more confident about the urgency and scale of the challenge globally and about how that cascades down to Europe and nations. There is raised ambition in the climate change plan; the overall carbon envelope is raised, which relates to the most recent advice from the Committee on Climate Change, so that seems appropriate.

One problem is the amount of detail that is lacking from both documents on how we can engage and offer advice on alternative pathways and technology portfolios, levels of assumed demand and so on. It is appropriate that we have a single pathway and climate change plan, given that there must be single advice to Government, but there is no attempt to look at alternative pathways or to consider systematically, for example, what happens if carbon capture and storage does not appear or if demand can be reduced more rapidly than is assumed in a single climate change plan. That is a problem.

If we look at the energy strategy—the companion piece—we see no alternative, integrated pathways that would enable us systematically to interrogate the assumptions about overall system cost and the relative efforts on supply and demand. At the end of the committee's discussion with the previous panel, there were interesting comments about technology already existing and there being no need to think about radical technologies when we can use the technologies that exist. It was suggested that the smart thing is to avoid disruptive behavioural change. All those issues need interrogating and thinking through systematically. What happens if those technologies do not appear?

Therefore, there is a bit of a problem about how we engage in the consultation period from now on. The Scottish Government's intention is to make the information available over time, but it is not there at the moment.

The Convener: Thank you. Dean Lockhart will start the questioning.

Dean Lockhart: Sorry, convener, may I come in a bit later?

The Convener: Certainly.

Andy Wightman: I thank the witnesses for their opening remarks. There are a number of things to pick up on.

The overall target is set—that is clear—but it is not entirely clear to me why the individual sector envelopes have been set at the levels at which they have been set. I am not clear about the constraints that were placed on the model to get the pathway that we have got. I have asked the Scottish Government about that and it said that it will do as much as it can to provide greater transparency, but I am still not clear. Are any of the witnesses clear about why the different sectors have the targets that they have?

Professor Bell: No—that is the simple answer. There are two ways of looking at that. One is to say, "Come on, give us the detail. You've done all this modelling and you are producing a strategy that is, quite rightly, receiving a lot of attention and generating discussion"—among not just us but a lot of investors—"so surely you can give us more detail and more sensitivity analysis." We absolutely could say that.

On the other hand, I understand that the Government is really just building up its modelling capability. Perhaps it should have invested more time and resource in that work, because it has

such an influence on how the strategy is perceived and on how different sectors will respond to it and see it as potentially the right—or a good—pathway to follow. I certainly encourage greater investment of time and effort on the part of the Scottish Government and its advisers to produce that kind of analysis and detail. As Mark Winskel said, there is a lot of uncertainty about precisely what pathway should be taken—this is only one among a number of potential pathways, and the assumptions that have gone into the work are not clear.

Gina Hanrahan mentioned heat decarbonisation, for example. There are things in some of the charts that are produced in the documents that look like modelling artefacts rather than reflections of a real world as we might expect to see it. However, we have to start somewhere. There is more work to be done, and let us encourage the officials and their advisers to get on with it.

Dr Winskel: I agree with that. The Scottish Government has already said that there is a process whereby the modelling results are fed back to the policy teams and then to the Cabinet sub-committee for sign-off. The modelling is almost a starting point for taking a systematic look at energy and climate policy. It is a particular tool, which means that there are other ways of doing it. The RPP2 process was very different—it involved a bottom-up, sector-by-sector approach—and it provided a lot more detail in some of the policy domains than we have in the climate strategy. There are advantages to the use of the TIMES model. In the UK energy research centre, we have spent a lot of time using the same tools, but we have learned that system models provide only a partial insight. A great deal of off-model knowledge has to go into any kind of properly integrated strategy.

On the sector envelopes, the UK Committee on Climate Change published a pathway analysis for Scotland in March last year that was based on the same period—2028 to 2032. If we compare the sector envelopes that the CCC came up with with those in the climate change plan, they look quite different. For example, there is much less emphasis on building sector emissions—domestic and non-domestic—out to 2032 in the CCC work than we find in the climate change plan. There is much more emphasis on transport sector emission reductions in the CCC work. The CCC did not use a system model; it carried out bottom-up analysis. As with RPP2, it commissioned some modelling work, but the TIMES model was not used. I do not think that the CCC has had use of the Scottish TIMES model.

That begs the question why there is such a pattern of sectoral carbon envelopes and what sensitivities have been looked at. I think that that work has been done within Government. In the evidence that it gave to the Environment, Climate Change and Land Reform Committee last week, the Government said that it had looked at different scenarios and at what would happen if we do not get carbon capture and storage on the system. That has been looked at and costed. What we are seeing is a version of a least-cost pathway, but we are lacking enough data and evidence on the assumptions, which are things that would help with the consultation process. Given that we have only a few months for that process, it would have been helpful to make that information a bit more systematically evident. That would have enabled us to get to work on the assumptions and the data.

Andy Wightman: That was very helpful. I note, for example—

The Convener: Before you proceed, Gina Hanrahan wants to comment.

Gina Hanrahan: I echo the points that have been made, but I would just like to clarify something. I think that two of the biggest-emitting sectors in the 2030s—agriculture and transport—were inputs to TIMES rather than outputs from TIMES. Is that correct?

Dr Winskel: The assumptions were made elsewhere.

Gina Hanrahan: It is important to note that the assumptions were built outside the TIMES model.

Transparency is key here, and we need to understand what policy and political constraints were imposed on TIMES and how far away what we see in the climate change plan is from the original TIMES run. It is very important that we understand the various iterations of it. Does the fact that the plan goes particularly hard on heat let other sectors off the hook when it might be possible to make huge progress much faster in transport, for instance? We are less ambitious on that than we are on heat. It is crucial that we understand TIMES and why it has done what it has done.

Gillian Hurding: This is a general point. I take Keith Bell's point about having to start somewhere. With modelling in sectoral envelopes of this sort, it is important to maintain an acknowledgement that if we are transitioning to smart energy systems, there will be a sharing of generation and demand and of the CO^2 outputs, which will need to be encompassed in whatever is taken forward. I do not know how that modelling would look if we are not sure about the existing modelling, but it is important to bear in mind the fact that the smart energy transition will involve sectors operating in that way.

Andy Wightman: I have two supplementaries. The first question is to Gina Hanrahan. What evidence do you have about assumptions being built outside the TIMES model? If they were, I would like to know what those assumptions were. You might not be privy to them, but what evidence do you have that they were built in that way?

My second point relates to WWF's recommendation that there should not be an assumption in favour of negative emissions for electricity by 2032. If CCS is a technology that works, I presume that it should do as much as it can. Is that recommendation underpinned by the fact that you do not think that CCS should be given the status that it has been given in the plan?

Gina Hanrahan: To deal with the first question, on agriculture and transport, I am not privy to the full workings of TIMES, but what I said came from my understanding based on conversations with modellers. I am sure that the Scottish Government could provide you with much more detail.

On the second point, there might be an important role for carbon capture and storage globally, particularly in the industrial sector in the long term. A lot of people view it as an important part of the decarbonisation pathway. We have done a number of pieces of research on it over the past few years. In conjunction with Friends of the Earth Scotland and RSPB Scotland, WWF commissioned work by Ricardo Energy & Environment, which examined the Scottish electricity system and renewable energy more generally. It showed that we do not need to have CCS to decarbonise electricity in Scotland and deliver security of supply by 2030—we can maximise our renewable energy resources and in effect have a wholly decarbonised system without CCS. We do not need CCS for electricity here, although it might have an important role to play in decarbonising industry in the long term.

We are questioning the credibility of relying on carbon capture and storage to deliver -1.1 megatonnes by 2032. That is a significant amount of emissions. If that does not come to pass, where do we flex in other sectors to deliver more? We do not view CCS as part of plan A for this climate change plan, particularly in electricity.

Professor Bell: I echo what Gina Hanrahan said about the risk that is associated with relying on a particular technology, but a reliance on any particular technology is not what a strategy should set out; it should set out shorter-term policy interventions that enable the longer-term outcome, even if the pathway by which we reach the longer-term outcome is still largely to be determined.

That means going for the low-regrets actions in the short term so as to keep open different options that show potential for the longer term. That seems to include CCS. If it came to pass in the region of the cost that people are talking about, the benefits could be very large. If we have it, if it works and if it is cost effective, we should use it.

Of course, we do not know what the costs will really be. This is not my area and I do not feel confident speaking about it. I know that you will hear about CCS in an evidence session next week. You will hear from a geologist, who can tell you a lot about the storage aspects. I encourage you also to talk to a chemical engineer, who can talk about the other aspects, so that you get an idea of whether the cost assumptions that energy economists typically use are robust.

11:15

Dr Winskel: I return to Andy Wightman's point about the extent to which the assumptions on transport and so on are being made outwith the TIMES model. That is specified in the TIMES model annex at the back of the CC plan, which makes it clear that the carbon envelope for transport was developed through consultancy research and Transport Scotland. For the residential sector, the national housing model was used.

It is interesting that the version of the model that is being used for demand is not elastic demand. That means that the levels of demand were input to the model, rather than being allowed to develop within the model. If we are thinking about the overall approach and whether there is enough emphasis on demand reduction, it would be interesting to know why there are the levels of demand that are assumed—the demand reduction levels in the heat sector look quite modest. I would like to understand that a bit more; that seems to have been based on external assumptions, so that is a key area for me.

Gina Hanrahan: On the issue of negative emissions, the energy strategy seems to indicate that a lot will be delivered through bioenergy and carbon capture and storage. We do not have enough detail on that. The strategy commits to a bioenergy action plan or strategy that will come forward in the next year or so, but that raises sustainability concerns about where the bioenergy will come from. We do not know enough at this stage to know whether that is credible and sustainable.

Bill Bowman: I go back to something that Gillian Hurding said. You talked about community energy being key and said that some projects were being inhibited by risks that were being passed to them. Are they financial risks or other risks, and how do you suggest dealing with them?

Gillian Hurding: Community energy is driving innovation and is at the forefront of innovation, and

it is a real achievement of Scottish communities. We have reached that stage with the financial support that the Scottish Government has provided through various schemes.

Given the regulatory constraints—or, rather, the political constraints from Westminster that can impact on projects—there is a risk for communities if projects fail. What does that mean for people as individuals and for voluntary organisations if they have to take forward additional projects in their communities, and what does that mean for other similar smart grid projects in the future?

In relation to risk sharing, such projects involve a lot of broad stakeholder partnerships. If communities are working with organisations such as energy suppliers—with distribution network operators or distribution system operators—conversations will take place that communities might not normally be involved in. It is helpful—this is not just a plug—to have organisations or intermediaries such as Community Energy Scotland working to navigate that path with communities.

More basic things such as extending delivery times for such projects, perhaps from three to five years, and acknowledging the time that it takes to go from conceptual ideas to full-scale delivery and implementation would be helpful. Help with the financial risk of projects would be beneficial, too. With the removal of the feed-in tariffs and so on, it is proving more difficult for communities to get financial support such as loans. It is difficult for them to muster the capital investment up front.

Bill Bowman: Do communities need more advice or some form of legal protection?

Gillian Hurding: There is definitely an acknowledgement of the complexity of the projects. As the move is made to more demand side management-based projects, communities are working with energy suppliers to provide heating services, for example. In the projects that I manage, we are working with the legalities of the energy supplier that is in the project partnership. Having some sort of consistent general advice for innovation projects would be helpful.

Gillian Martin: As a follow-up to Mr Bowman's question, can you be more specific about the projects in which you have seen a risk being taken and there has been failure? Can you give me an example of where that has happened and why?

You talked about communities that have invested in a project that has not worked for them, perhaps as a result of a change of policy, tariffs being imposed or subsidies being withdrawn. Can you give me an example of that?

Gillian Hurding: I am sorry; I was not referring to particular projects that have failed. However, the energy strategy acknowledges that some projects might fail, so there will be learning to take forward. In that context, when we put bids together for such projects, we should allow scope for funds to go towards operational costs and should be doing comprehensive risk assessments. I was talking preventatively rather than about something that has happened.

Ash Denham: As I read through the documents, I was interested in the proposal for the creation of a Government-owned energy company, which might be funded by selling Scottish renewable energy bonds. I am interested in the panel's view on what impact that might have and on whether the Scottish Government should pursue it.

Gillian Hurding: In general, anything that extends the funding mechanisms that communities or consumers can access is helpful. The option of a Government-owned energy company offers a bit more longevity in that sense. Renewable energy bonds would be a positive step forward, as they would allow individuals or communities that might not own properties or their own space the opportunity to buy into renewable energy.

Professor Bell: I am not quite sure what the legalities are of the state getting involved at whatever level, but the idea of a bond has some attractions.

Gina Hanrahan: The proposal for the Government to have extensive power purchase agreements is interesting as a way of providing alternative support for onshore wind. It is raised and hinted at in the plan, but it is not fully fleshed out. I understand that the Government already has a contract to procure 100 per cent renewable energy, but such an approach would be a more direct way of supporting onshore wind, which would be welcome.

Dr Winskel: The climate change plan pathway depends on a doubling—at least, if not a trebling—of onshore wind by 2032. How will that happen? We know that the current UK Government is unlikely to offer any more support for onshore wind, so what is suggested is a necessary consequence of the pathway. We are lacking details about the Government-owned energy company and about exactly what the risks and liabilities, as well as the advantages, of it would be. Ultimately, the Scottish Government, rather than private companies, would become the risk manager and the risk taker, and that needs a closer look.

Professor Bell: That unpicks one of the key issues over the past few years for energy strategy at a UK level, a Scotland level and a European

level: the management of risk and uncertainty. Until now, renewable electricity seems to have been the most cost-effective way of decarbonising energy use, but some uncertainties have been associated with the technologies—for example, some costs have been higher than those for fossil fuel-based alternatives. However, largely as a result of policies that have been put in place, the costs have come down so, in the right circumstances, it is realistic to talk about subsidy-free onshore wind, solar photovoltaics or whatever.

The trick is how to enable the investment in those things to take place. The UK Government has not been afraid to intervene, so it has not left things entirely to the market. The capacity market that members will have heard about in the news in the past couple of days—the auction will be taking place, so bids should be submitted in the next few days—is one example. The contracts for difference auctions are another example.

The central procurement of certain volumes with guaranteed prices is a way of de-risking and facilitating investment. In a way, that kind of step has been taken, which means that the point about a subsidy-free central procurement has been acknowledged. The issue is less about what the subsidy is than it is about how to facilitate the investment. As Mark Winskel said, the question is about who picks up the associated risks.

There are still uncertainties about the whole energy system, what the most effective way of decarbonising it is and what we should commit to in the short to medium term. If we are to commit to anything like this, it seems that a longer-term contract is necessary—we hear that all the time in relation to flexible demand, electricity generation capacity and so on. Longer-term contracts are reasonable, but there is always the risk of some stranded assets or of making a commitment to a contract that, with the benefit of hindsight, turns out not to have been the cheapest way to go.

Who bears that risk? Arguably, it is the sort of risk that is socialised, because the decarbonisation, reliability and affordability agenda suggests that it should be. We need to get into the detail of how we do that and how the costs are met—in other words, what split of the bill goes where. That is absolutely the right thing for policy makers to talk about. For example, to date, the renewables financial mechanisms have been imposed on bill payers—someone's part of the total cost is proportional to how much energy they use—and we hear people saying that a tax basis should perhaps be used. That is a perfectly valid debate, which I would look to the likes of the committee to engage with as part of our political representation.

Ash Denham: A Government-owned energy company that was capitalised appropriately could take more risk by getting in earlier with technologies that the market might not support. I am thinking of wave energy, which has had problems in getting off the ground because of a lack of investment from the market. Although you said that we do not need to pursue new technologies as such, because we have technologies that could work, there might be opportunities if we had different modes of investment.

Professor Bell: There are already different modes of investment. Wave energy is a long way off. Just because we have some technologies that have grid parity on overall cost, that does not mean that there is no need for innovation. There is enormous potential to harvest energy offshore—unfortunately, it is the same energy that tends to break the machinery. There are issues there. Given that the level of technology readiness is still quite low, there would be a different investment mechanism with a different perception of risk.

One of the big issues that is still to be addressed is the system as a whole. We have talked about the right pathway but, if we limit the discussion to electricity, which is my specialism, a 100 per cent renewable electricity system is highly challenging. If a place happens to have the right geographical resources to have lots of hydro, that is great and you should go for it, because that has lots of flexibility.

One of the massive challenges is the huge disparity between the demand for heating in winter and the demand for heating in summer. The total energy does not tell us the whole story, because we have to consider the time dimension and the spatial dimension—we have to get the energy from one place to another. That is where the need for further innovation and research lies to finally get the reliability that we want, at least cost, while staying within a particular carbon trajectory.

Ash Denham: Looking ahead, there could be more electricity demand—I am thinking of further electrification of rail lines, orders for electric cars, which could take off, and people switching to electricity because we are trying to decarbonise domestic and non-domestic heating. Do you think that the assumptions that have been made about future demand are about right?

Professor Bell: The whole energy system model that we have been talking about—and criticising a bit, although it is a good way to inform the debate—starts with energy services, rather than a particular number of megawatt hours of electricity, gas or hydrogen. There are some uncertainties about the energy service demand. Mark Winskel made the point about the inelasticity of the model—such models tend to take the

energy service demand as a given. There are feedbacks in society and the economy that mean that that is not the complete answer and there is a need for more sophisticated modelling that iterates with other models.

In principle, if you believe the way in which TIMES is set up, it optimises how you meet that heat need—whether that is through electricity or burning hydrogen or whatever. As we said earlier, that is where some of the uncertainties lie. We are not totally sure about some of the relative costs, and we are not sure about deliverability in terms of the whole supply chain, but at least TIMES gives us a set of potential pathways that allow us to dig down in more detail and test the assumptions. I see the value of TIMES modelling not in terms of answering questions but in helping us to know the next questions to ask.

11:30

Dr Winskel: I will answer the question about demand, but I also wish to make another point about risk. I will try to work it in.

I will consider the point about demand sector by sector. We are getting pretty close to the 100 per cent target for electricity. The future growth of low-carbon electricity is based on assumptions about export, predominantly to the rest of the UK, which makes a lot of sense at the Great Britain and UK levels. That is a consistent, least-cost economic approach to decarbonisation.

For the other sectors, in the absence of a lot of evidence published in the plan, it seems that the demand reductions for residential and non-domestic buildings are very modest. If I have got this right, the plan suggests a 6 per cent reduction in residential heat demand by 2032, and a 10 per cent reduction for the non-domestic sector. We have seen dramatic changes in heat demand in the residential and non-residential sectors over the past 10 years, partly because prices for heat have been doubling. There is also a suspicion that that partly involves efficiency measures and so on.

The prospect of going further on heat demand reduction is not sufficiently recognised in the plan as it stands. That is important not only because it is the least-cost way of doing the job of decarbonisation; it also makes the business case for heat supply infrastructure investment. It changes the economics of that. If there is less demand to service, the case for building loads of new heat infrastructure, whatever it is—electrical or heat networks, or even gas grid repurposing—becomes weakened, as there is less demand.

We need to get demand right. The whole system or strategy should start with a serious examination of demand levels, what can be managed out of the system and what is realistic. We do not expect that to be a silver bullet, and we have the problem of rebound effects, but we know that demand reduction is already happening in heat—indeed, it is pretty dramatic.

Turning to my other point about risk, because of the very ambitious overall carbon envelope to 2032 and because the carbon envelopes are concentrated on heat and electricity in particular, the trajectories are now significantly ahead of where the UK views itself in the heat and power sectors. We are waiting for the UK Government's carbon emissions reduction plan, which I understand is due in March.

However, there is already evidence that Scotland is embarking on a heat transition at least five years ahead of where the UK Government and the Department for Business, Energy and Industrial Strategy envisage it, judging from the latest discussions. The implications of that are that there might be advantages in getting ahead and building up your supply chain. I am sure that there are advantages in a transition. However, if Scotland is going ahead on heat ahead of the UK, are we able to socialise the costs of infrastructure around the whole of the UK? There is an issue there.

Furthermore, the power sector trajectory is for an earlier introduction of CCS than what the UK Government envisages. I do not think that that will change. We have not heard much about that. The UK Government published an industrial strategy that notably avoided saying anything about CCS. It covered lots of other things such as e-vehicles and smart power, but it did not say anything about CCS. I do not think that there will be a turnaround on CCS in the near term.

We need to support CCS at the UK level, but the Scottish trajectory on power and heat is exposed to a lack of effort at the UK level. The financial implications of that—if we are socialising around the Scottish economy rather than the UK economy—need thinking through in terms of the macroeconomic consequences.

Gina Hanrahan: I echo the points that have been made. I fully agree that the ambitions on demand reduction seem modest; I was here when one of the witnesses in the previous panel held up that interesting graph looking at the projections from RPP1 and RPP2 versus the current plan. It looks much less ambitious than it did previously, followed by a very ambitious fall-off from 2025.

Managing the electrification of heat and transport requires us to think hard about how to improve the fabric of our homes as much as we can as quickly as we can, so that we are not wasting that heat—the demand for heat is reduced in the first place. In that respect, we think that the plan does not go far enough. There are still 1.5

million homes below a C standard in Scotland, so a lot more can be done a lot faster.

We have not talked much about transport. The plan is broadly reliant on electrification. It focuses primarily on technological change in the transport sector, which looks like a clear policy decision. However, modal shift and promoting modal shift—whether it is to active travel or public transport, or freight consolidation and other areas—is a critical component of ensuring that demand on the electricity system is manageable in the future.

On the issue of heat pumps, in our report that I mentioned earlier, by Ricardo Energy & Environment, the vast bulk of heat pumps that it introduced were hybrid heat pumps, which is hybrid electric and gas to reduce the peakiness on the system at certain times. That could be a technology that will possibly form part of the mix. The CCC has said that it could be a transitional technology, but there are other ways of managing the demand; getting the demand down in the first place is what we need to concentrate on.

Gillian Hurding: We have focused on the risks associated with being more innovative; it is important to note the role that community energy projects are playing, aside from the local energy economy benefits that are associated with them.

In communicating those quite complex technical systems, it will be vital to focus on the positive aspects of community energy in moving towards the demand reductions that we need to see from various sectors—how they are normalised and how they are socialised through peer-to-peer learning, which comes through the practical, on-the-ground solutions that people can see in their neighbourhoods and around their local areas.

Previously, we focused on the Highlands and Islands, as a lot of those projects are within that area or other rural communities. As we move into more local projects such as the tower power project in Edinburgh, in which we approach people who traditionally have not been involved in such projects, or those whom we have a social obligation to reach out to, we can transfer that message into broader areas of influence.

Gordon MacDonald: I return to the point that Mark Winskel raised about Scotland being five years ahead and about the impact that the UK Government could have on the climate change plan and the targets that we achieve.

The evidence from the existing homes alliance says that in order to go to a low-carbon heat technology, the plan

"relies on the UK Government to make decisions on the long term future of the gas network".

On transport matters, emissions standards and excise duty are still a reserved matter for the UK Government, and in industry it is the UK Government that is looking at climate change agreements and a climate change levy.

What is the role of the UK Government in this plan? Is it acting as a brake rather than supporting it, given that five-year difference?

Dr Winskel: We do not know how much ambition will be built into the carbon emission reduction plan. That is absolutely critical to the feasibility of what we see in the Scottish climate change plan.

I probably know most about heat, because I have been looking at that for a couple of years now. I agree with the existing homes alliance that the heat problem has become the focus of attention for the UK Government as well as the Scottish Government—it is not just a Scottish Government concern. However, the evidence on heat and what is the most affordable decarbonisation approach for heat has been difficult to pin down. We have moved away from thinking that electrification is the way to do it towards an interest in district heating. In the last two years, the idea of using hydrogen in the gas mains and distribution network has come back into policy interest. I know that the Scottish Government is really looking at that. A modest amount of that is already built into the climate change pathway. The Government is looking at a much greater take-up of hydrogen for heating in the energy strategy to 2050.

The problem, as Gina Hanrahan said, is that not much is happening in the climate change plan in terms of deploying such technologies up to 2027, and then there are seven years of very rapid change. Almost the wholesale transformation of the Scottish building stock is to take place in a seven-year period, which is remarkable. I was looking at the penetration rates from when we went from town mains gas to natural gas for heating and the transformation is as quick as that—and that transformation used the backbone pipeline that was already in place, having been built for the liquid natural gas, so it was not totally new infrastructure.

The fact that Scotland intends to do that ahead of the UK Government is an issue. It is quite a radical transformation, but the plan does not say exactly how much district heating, heat pump or hydrogen will be in there. All three are quite disruptive and costly and, from the evidence, there is no obvious winner among the three.

Somehow that transformation will be compressed into seven years. I am not saying that that is beyond belief, but what happens before that is critical. What are we doing in the decade from now to 2027 in preparation? As Keith Bell said, presumably some of that can be associated with

the way in which the model optimises—it concentrates effort at certain times and there are break points in the trajectories, which is not how things tend to happen in the real world. That means that we have 10 years of preparation time on heat and there has to be a lot of work on demonstrating the technologies, at sufficient scale, to make sensible business plans for their mass roll-out.

We need a proper demonstrator on hydrogen. There is a lot of speculation, with a lot of different people saying different things about it. We need an understanding of the appropriate role of district heating. We need some proper scale pilots. I know that Scotland's energy efficiency programme intends to look at supply as well as demand, but at the moment demand is more of an obvious area for roll-out, rather than supply, where the evidence is still missing.

There are real risks and we need more detail. Once we have seen what the UK Government intends to do, we can clarify how exposed Scotland will be in some of those areas.

Gil Paterson: Gina Hanrahan mentioned a point that was raised earlier this morning, but perhaps we can go further. We talked extensively about heat loss and retrofitting in the private and public sector. Although we are doing reasonably well in the public sector, when it comes to the private sector—in industry, business and domestic situations—things are very difficult. What should we do to encourage them? Should it be the stick or the carrot, or do we need regulation?

11:45

Gina Hanrahan: The answer is a bit of everything. The SEEP programme, which is supposed to deliver the massive retrofit of all commercial buildings and domestic homes over a 15 to 20 year period, should be designed with a mix of measures. The intention is that there will be a mixture of incentives; there will be regulation for the private rented sector, regulation—in the long term—for the owner-occupied sector, which includes commercial buildings, and a range of different financial incentives such as the capital budget. There will be a mix of different approaches.

A consultation on SEEP is out at the moment. The SEEP programme has been in development for about 18 months and the commitment to a national infrastructure priority was made in 2015. There is not enough detail in the consultation on the Government's preferred scenario for SEEP, on what the balance is between those measures, on how much money will be put up and on exactly when regulation will come in. Seeking clarity from the Government on those issues would be very useful if the plans for emissions reductions in the residential and services sectors are to be fully credible.

The Convener: Does anyone else want to make a brief point on that?

Gina Hanrahan: I want to add one more thing. The SEEP consultation sets out the long-term intention to introduce regulation for the owner-occupied sector. Those regulatory proposals were contained in previous RPPs, so there has not been a massive development of policy on the regulatory aspect. There has been a commitment to do that for a long time and a working group was set up in the previous parliamentary session to look at regulation of the private sector as a whole. It was known as the regulation of energy efficiency in private sector housing, or REEPS, working group; some members will be familiar with its workings. The working group came close to producing a consultation on the regulation of all owner-occupied and private sector homes, so given that that has been in the pipeline for a very long time, that needs to happen much faster.

John Mason: Following on from the previous point, I want to ask about continuity. There have been some suggestions, for example, that we have made some progress on heat, that we are easing off and that we will make more progress in the future. Overall, how do you see the continuity between the previous RPPs and what is in this climate change plan? Are we looking at a big change, or is it continuing what we have already been doing?

Dr Winskel: The RPPs have been produced in different ways. I was involved in consultations on RPP2 in Parliament and we made the criticism then that it was very difficult to get a level of consistency across the sectors regarding how the information was presented and how the justification for proposals and policies was set out. The idea behind using an integrated model was to make it more consistent and there is now a nice level of consistency to how the sectoral information is presented.

Some things have not changed. However the RPP is done—by a bottom-up, sector by sector approach, or by optimising across the whole system—there are some consistent messages, such as about electricity first or about the low-hanging fruit of decarbonised power and so on. RPP2 also had ambition for CCS and I remember that we made the very same criticism about there being a lot of expectation. RPP2 had CCS coming in in the mid-2020s to a significant level and we know that that is quite unlikely. Even in the late 2020s, we have moderate amounts for CCS in the CC plan.

Whatever way the plan is drawn up, the fundamentals do not really change. Although we have been quite critical on many of the specifics, we welcome the attempt to integrate policy across energy, climate change and land use. That should lend greater transparency. We are, however, struggling without all the data and information that has gone into the Government's thinking.

What happens with the system model, starting at the integrated version, is that it then goes to the policy teams and the Government sub-committee. They will put a feasibility imprint on it, so that we end up with something rather similar. We are not saying that the move to using a more integrated version from the outset is at all unwelcome. It is welcome, but it has its own strengths and weaknesses. Broadly, I want some more information so that we can see what sorts of sensitivities and so on are involved in the CC plan.

Professor Bell: The clear message that seems to be emerging from all of us is that there is a lack of detail, for example in how the pathway came about. As I said at the beginning, it is good to have an ambitious target, but it needs to be achievable, even if at a stretch, so let us see how far we are stretching ourselves in the different sectors. We have all touched on that in different ways.

Another aspect of the detail is the implementation. What concrete steps should be taken now? Some of the questions that you have asked were addressing that point. For example, some things that Gillian Hurding talked about in relation to community energy and the building sector were about implementation—that is what we have not seen yet. If what has been published so far is the starting point of a further process of deliberation, analysis and debate about the implementation, then when we do finally get some concrete steps it will have served a very useful purpose.

I will return to the question about the UK Government. That is one of the tricky bits. Policy at that level has an enormous influence on these plans and is a key part of the implementation of any of them—there is only a certain amount that we can do. Within Scotland we can make certain choices that will have social and economic impacts; there are cost implications to a lot of the possible pathways. Many of them will actually have an economic benefit over the medium to longer term. We have not seen an analysis that fleshes that out, but other studies have suggested that and it feels as though there should be. Even for those choices, there is the question of finance: how do we unlock the money and the investment, and who takes on the debt in the short term?

Those are perfectly reasonable things to discuss, but there is the possibility that, by embracing a very ambitious target that is out of step with our immediate industrial competitors, we impose some costs on ourselves. That is a choice that we can take, but we should take it with our eyes open to the potential benefits on health, empowerment, the general environment and so on. In short, the next step is to provide more detail.

Gina Hanrahan: If I may, I will aid the committee's scrutiny by suggesting what kind of detail we should see in addition to all the things that Keith Bell and Mark Winskel have spoken about. Things that we have lost from the previous RPP include clear abatement figures. There were tables at the back of the epic RPP that set out what each policy was doing each year in terms of emissions reduction. That was very clear, and good for monitoring. We could see what was supposed to being doing what, and when. At this stage we do not know either the relative contribution of the individual policies or exactly what is happening over the timescale, so clearer figures on that would be useful.

There were also costings in the last RPP that we do not have any more. That was essentially the budget that would be attributed and what individual policies would cost. More clarity on that would be useful, and, of course, more clarity on the TIMES output, as we have discussed, as well as on new policy.

John Mason: You mentioned the lack of detail, and there has also been mention that there has been a change in something that I do not know whether to call mood or fashion or swing. In the past the assumption was to put everything on to electricity because that would be good, but one or two of you have said that that does not seem to be quite the way that we are going now.

It seems to me that, leaving aside carbon capture and storage, district heating systems are the flavour of the month. Are we all convinced that that is definitely the way to go? I think that we heard evidence previously that the UK individual-boiler-in-a-house system is quite efficient. Are there really gains to be made with district heating systems?

Dr Winskel: The evidence on heat is really mixed. I have spent quite a bit of time looking at what different people are saying about the relative attractiveness of the different options on low-carbon heat. We are at the stage where every option for heat has its advantages and disadvantages. District heating is getting a lot of interest within the Scottish Government and in the Scottish energy community. There are dangers there, and this is where we need—

Professor Bell: What sort of dangers?

Dr Winskel: Some of the scenarios suggest that district heating is an expensive infrastructure commitment, involving a very expensive step-by-

step approach to putting in the infrastructure. There are also concerns about where the low-carbon heat comes from. Heat networks are essentially a heat pipe in the ground that is not connected to anything specifically. At the moment they tend to be used with a gas combined heat and power engine.

Let us consider the carbon savings that we get from running that, assuming that we get the electricity decarbonisation. Even by the time we get the electricity decarbonised—electricity being pretty well decarbonised already in Scotland—district heating running on a conventional gas engine does not provide any carbon savings.

John Mason: It strikes me, as a non-expert, that one big boiler would be more efficient than 20 little ones.

Dr Winskel: It would be if we were starting by building something from scratch. In the UK we have spent a long time developing an efficient national system of gas transmission and distribution, using domestic-scale boilers. The implications of going from households to a community-scale heat system involve quite a disruptive change for the UK. That needs to be factored into the pathway.

Some work that was carried out by KPMG to examine different vectors for heat was referenced in either the energy strategy or the climate change plan. That work was quite cautionary on district heating, and it was one among a number of studies of that kind. It is not that district heating does not have a role; it is likely to have a role in certain areas for certain types of housing stock, especially for new build.

I was at a meeting on heat in London, and the head of strategy at the new department for Business, Energy and Industrial Strategy was saying that the UK Government does not have a good grasp of the evidence on heat. He did not quite say that, but he said that we need to get to grips with the evidence, to own the evidence and to make some sensible judgments on heat. The problem is the same for the Scottish Government.

Some sector-specific consultations are taking place at the same time as the energy strategy consultation. Gina Hanrahan mentioned the SEEP consultation. There is an onshore wind consultation and a local heat and energy efficiency consultation, both of which are quite specific. The local heat consultation deals with regulating heat in a new way, so that local authorities will have the power to create heat zones where district heating will be the preferred technology. Concessions, as they are to be called, will be granted, so there will be a kind of compulsory connect within certain parts of local authority areas.

On the heat problem, there is a bit of a disconnect between what is happening at a system level, where there is a lot of uncertainty—and we need to spend quite a bit of time on demonstration and trials, examining the evidence systematically—and what is happening at the regulatory level and the local authority level. There is already a lot of ambition about designating areas for preferred technologies. Those things are not joined up very well, however. I would like to hear from the Government about exactly how it is joining those two things up—what it thinks at the system level and what it is doing by way of planning at the local authority level.

Richard Leonard: We have heard quite a bit about the decarbonisation of electricity and that we are almost 100 per cent reliant on renewables. That overlooks the nuclear question as things currently stand, does it not? Would you like to reflect on where nuclear is and on where it might go in the future?

Dr Winskel alluded in passing to our being part of a GB electricity grid and energy market. To what extent can we credibly measure CO_2 from the Scottish system if we are part of a bigger grid that might contain CO_2 elsewhere in it?

12:00

Professor Bell: Mark Winskel was quite careful in using the words “low carbon”, which includes nuclear energy. We depend on being part of a bigger system to be able to say that the amount of electrical energy that we generate in Scotland in a year equals or exceeds the total amount of electrical energy that we consume in Scotland in a year. There are times when we have a surplus of renewables plus nuclear and there are times when we have a deficit. We depend on being part of the bigger system so that we can balance out that surplus and deficit. In turn, GB depends on being part of a bigger European system, albeit that the capacity in it is relatively limited.

That possibility of balancing in time and space is important to maximise the efficient and cost-effective use of resources. That will remain a critical part of the stability of the electricity system. There is a debate to be had about the cost-effective way of doing that balancing. Flexible demand and more interconnection capacity with the wider continent of Europe have a big part to play, as do pump storage and other forms of energy storage. The whole energy system picture has a big part to play. In a way, we ain’t seen nothing yet, by the time that we try to decarbonise heat. That is why it is getting so much attention.

Storing heat or the energy that is used for heat also offers some opportunities. That is pretty low-grade energy that we are not doing an awful lot

with. If that heat demand can be dealt with, then we can do cleverer stuff with electrical energy.

Mark Winskel made a point about district heating and condensing boilers. Energy efficiency should be better when you do things at a bigger scale, but the cost-effectiveness of delivering a certain amount of end product, which, in this case, is heat, may be different, because of the sunk costs of the infrastructure or the need to build up a certain infrastructure. That is where it becomes a tricky judgment to make—in respect of the electricity system as much as anything else.

Some amount of schedulable generation still seems to be important, at least on a GB basis. There are good arguments for saying that schedulable generation in Scotland is important to deal with, for example, extreme weather events and the possibility of needing to black start the system.

Schedulable generation could include hydro, interconnectors using the right technology, another type of nuclear plant, albeit one with much less flexibility, and CCS. Black start could be achieved if you happened to want to do it on a windy day and you could make use of that. The basic point is that it gets a little bit more complex to think about what the right investment strategy is and what the right mix of technologies is.

Dr Winskel: The power system relies on 35 per cent nuclear generation in Scotland. That percentage has increased as the coal-fired plants have closed. I am not sure what the retirement lifetimes of the nuclear plants are, but they are being given lifetime extensions and we are relying on them for the period that the draft climate change plan covers. There may be a hidden reliance on—

Richard Leonard: To 2035.

Dr Winskel: Well—

Professor Bell: I cannot remember when Torness is supposed to close.

Gina Hanrahan: The early 2030s, I think.

Professor Bell: Yes, it is 2030ish. Hunterston would have gone before that.

Dr Winskel: Yes. I suspect that the assumptions are for the continued operation of both plants to 2030 and the lifetime of the climate change plan.

Gina Hanrahan: My understanding is that the Committee on Climate Change's scenario for the power sector for Scotland, which was published in its March 2016 report and assumed nuclear phase-out by the early 2030s, showed that Scotland could remain a net exporter.

Unsurprisingly, WWF does not support the need for continued or new nuclear beyond that point. Our evidence base shows that Scotland can play to its renewable resource strengths as part of a GB grid. Integration is critical to that, and grid reinforcement to deliver it is absolutely part of the picture, along with demand reduction, flexibility and storage. We can make a plethora of interventions to ensure that we deliver security of supply. It should not always be generation first—that should not be the first principle on which we operate, particularly given what is happening with Hinkley Point C and the price that has been awarded to it. We certainly should not be banking on delivering new nuclear for Scotland, or extending the lives of plants forever. We do not need to do that.

The Convener: As there are no further questions from committee members, that concludes the session. I thank all our witnesses very much for coming today.

12:05

Meeting continued in private until 12:28.

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