OFFICIAL REPORT
AITHISG OIFIGEIL

Economy, Jobs and Fair Work Committee

Tuesday 30 May 2017

Session 5

The Scottish Parliament
Pàrlamaid na h-Alba

Tuesday 30 May 2017

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ECONOMY, JOBS AND FAIR WORK COMMITTEE
17th 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:

Janet Archibald (Fife Council)
Teresa Bray (Changeworks)
Fiona Goodenough (Scottish Cities Alliance)
David Handley (SGN)
Professor Stuart Haszeldine (University of Edinburgh)
Elizabeth Leighton (Existing Homes Alliance Scotland)
Keith MacLean

CLERK TO THE COMMITTEE

Alison Walker

LOCATION

The David Livingstone Room (CR6)

Scottish Parliament

Economy, Jobs and Fair Work Committee

Tuesday 30 May 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 17th meeting of the Economy, Jobs and Fair Work Committee in 2017. I ask everyone to turn off their electrical devices or switch them to silent, as they will interfere with the sound system. I have received apologies from committee member Gil Paterson.

Agenda item 1 is a decision on whether to take item 3 in private. Are we all agreed?

Members *indicated agreement.*

Draft Energy Strategy

09:30

The Convener: We have three witnesses on our first panel on the draft energy strategy. The sound engineer will deal with the sound system—there is no need for our witnesses to press any buttons or do anything apart from speak into the microphones. I ask committee members and witnesses to be as succinct and to the point as possible in their questions and answers. Witnesses do not have to answer every question but they might wish to come in on questions as themes develop. The witnesses are Teresa Bray, Elizabeth Leighton and Janet Archibald. I ask each witness to tell us briefly which organisation they represent and what it does.

Teresa Bray (Changeworks): I am the chief executive of Changeworks, which is an environmental charity that delivers a range of services. We act as the managing agent for a number of the area-based schemes, working with the local authorities in the south-east of Scotland. We also deliver home energy Scotland in south-east Scotland and the Highlands and Islands, and we are part of the consortium that delivers warmer homes Scotland.

We are also specialists in behaviour change. We believe that we have to integrate the technology with the people who live in homes and work in buildings. We will not be able to get just a technological fix—we have to think about the people as well.

Elizabeth Leighton (Existing Homes Alliance Scotland): I am a policy adviser with the existing homes alliance Scotland, which is a coalition of housing, anti-poverty and environmental bodies, as well as businesses, who work together to argue for greater investment and effort to be put into improving the energy performance of our existing housing stock, to eradicate fuel poverty and meet our climate change targets.

Janet Archibald (Fife Council): I am the energy engineer for Fife Council. I work on the non-domestic side of energy management, looking mainly at delivering energy efficiency projects across schools, primary schools, nurseries, care homes, leisure centres and the like. That has been my main area of work for most of the time that I have worked at the council, which is since 2008.

The Convener: Thank you all very much for coming today. I start with a question about current domestic energy efficiency schemes and business and public sector support. What currently works well, what aspects of existing schemes might benefit from change, and what challenges should be addressed by the draft energy strategy?

Teresa Bray: The Government has had a lot of ambitions with regard to energy efficiency and a number of schemes over the years, including home insulation schemes. A lot of the easy hits have been achieved. We now have to take a more challenging approach.

Starting with the easy hits, getting lofts and cavities insulated has worked well and we are moving towards having more external wall insulation. Although we talk about the schemes being area based, they have actually been very small scale. The area-based schemes have worked well on mixed-tenure estates, particularly system-built estates where there have been a lot of right-to-buy properties and there is a combination of social housing and private sector housing. However, those schemes have been tackling only people who are more likely to be in fuel poverty.

Our largest energy users are not those in fuel poverty. If we are going to meet climate change targets, we must start to engage with what we might call the able-to-pay market—perhaps it is better to describe those people as the not fuel poor, because not everybody has excess funds. How do we tackle that area, which is one with which we have not engaged so far?

We have also had much less engagement with the non-domestic sector. There has been progress in some of the public sector stock but much less progress in the non-domestic private sector.

We need to start taking a proper area-based approach, to see how we can tackle, for example, swathes of Edinburgh or areas such as Peebles, in the Borders, to engage everybody—the fuel poor and the non fuel poor, and businesses in the private and public sectors—and see whether we can make big differences.

Elizabeth Leighton: I will build on that. As regards what is working well, Scotland is in the fortunate position of having a lot of excellent building blocks in place, from which SEEP—Scotland's energy efficiency programme—is being developed. We have HEEPs—home energy efficiency programmes—that are working relatively well. We have a good blend of local area-based schemes plus a national fuel poverty scheme, to make sure that nobody misses out on having their needs addressed if they are outwith an area-based scheme. That balance of local and national is good.

More recently, the warmer homes Scotland programme has been seen as the gold standard as regards performance and providing quality assurance, as well as delivering co-benefits such as jobs in local communities. It is seen as a model that can be built on.

We also have a very good, nationally funded advice service in home energy Scotland, which can be built on to incorporate elements of behaviour change, advice and direct support to householders before and after measures are delivered.

As for challenges, although we have those excellent building blocks, we have been lacking long-term certainty about policy and funding, so that householders, business—the energy efficiency and renewables industry—and Government decision makers know what the plan for the future is for one or two decades ahead. However, that is now indicated by SEEP. If the right policies are put in place, along with long-term budgets, certainty can be provided and the market and householders will respond.

The other aspect that is missing is demand. People do not want energy efficiency enough. There are lots of reasons for that, but part of it is about market failure—the social costs of energy are not incorporated in the price. That needs to be addressed by regulation, which is also being consulted on as part of SEEP. There is also a need for enhanced advice and information provision, as I said, and for improved consumer protection, which are also considered in SEEP.

It is all there to play for, but success depends on the leadership that we see from Government—right from the top, with the First Minister and her Cabinet saying that energy efficiency is one of their number 1 priorities—and the next several Governments.

Janet Archibald: I can speak only about the non-domestic side. Scotland's problems are very challenging. I have done my best to do as many projects on the non-domestic side as it is economically possible to do. In future, we will have to start doing things that do not add up, as far as the business case is concerned, so we will need more money to be able to do them. The cuts to carbon emissions that can be made from a school are limited: even if we cut the lighting and as much as we can on the heating side, we will still not reach the targets that the Government has set for everyone. The barriers are enormous and have not been addressed by what I have seen in everything that has been introduced to date.

Fife Council is looking at keeping its buildings wind and watertight, doing essential maintenance and trying to clear maintenance backlogs. When I look to push energy efficiency measures, I have to compete with things like roof repairs and putting extensions on buildings because there are more children in an area.

The barriers that we have include things such as asbestos in our buildings, listed or not. We have a lot of buildings that do not have wet systems—

they are heated by direct electric heating—and in which we cannot substitute other kinds of fuel unless we put in some kind of wet system. The timescales are also very challenging. For the pathfinder project for SEEP, we found that there was not enough time to get everything ready to allow the whole thing to be done in the timescale that was set. We need longer than one year to plan and execute projects. We need a longer timescale, such as two or three years, during which we know what funding will be available.

I have tried to do as many projects as possible across our entire non-portfolio stock. For example, we have done an energy audit for 172 schools and for 175 buildings that are not schools, and we have tried to do as many projects as we can across those buildings. We now have real challenges about how we go forward from here.

Richard Leonard (Central Scotland) (Lab): I thank all the witnesses for making useful and in some cases quite provocative submissions. I will begin with a broad question. The dual vision of the draft energy strategy appears to be, first, demand reduction, which you have spoken about, and then the decarbonisation of our energy supply base. Is the Government able to reconcile that with its continued pursuit of economic growth and its inclusive growth strategy?

Elizabeth Leighton: We welcome the fact that the draft energy strategy takes a whole-system view and looks at energy demand and energy generation together. There is still some way to go to change the culture around energy policy. When I go to meetings on the draft energy strategy, it still seems that 75 or 80 per cent of them are about the generation side and growth, jobs and related issues. However, there is a step in the direction of taking a whole-system view.

We have not commented directly on how the strategy can be reconciled with economic growth. However, we are disappointed with the ambition on the amount by which energy and heat demand will be reduced over the course of SEEP and in the draft climate change plan. The expectation for the domestic sector is for only a 6 per cent reduction in heat demand; we think that that should be much more ambitious. In reality, the Government is predicting a growth in heat demand, because it projects 15 per cent growth and is cutting only 9 per cent off that. We believe that there should be no growth at all; indeed, there needs to be a reduction over the period.

Research by Ricardo-AEA that we have called on suggests that there needs to be a 30 per cent reduction in heat demand across the building stock as part of the energy mix. When we talk about energy mix, that is not just about the supply side; energy efficiency plays a part in that. Therefore, in our response to the draft energy strategy as well as to SEEP, we have called on the Government to spell out what it sees as the energy mix going forward and to say what proportion energy efficiency needs to take up if meeting renewables and climate change targets is to be affordable. After all, the cheapest form of energy is the energy that we do not use.

09:45

Teresa Bray: The vast majority of energy efficiency projects have a positive payback period so are a sound investment for individual households, in the long term, and for the private sector. We need to look at the issue in the longer-term timescale in order to understand the payback.

We need to find a solution to the problems around decarbonisation in the long term. The majority of the buildings that we live and work in will still be around in 2050, so we will have to deal with them. Unless we start taking a planned approach to dealing with them now, we are going to hit major problems in future. That approach, whether it involves improving the energy efficiency of properties or considering alternative methods of heating such as district heating or decarbonisation of the gas network, will take a long time—all infrastructure projects take a long time. There needs to be economic stability in the long term, and we need to start planning ahead.

Janet Archibald: You ask whether the strategy is consistent with growth. The projects that Fife Council has undertaken have stimulated the local economy, because every time that we do a lighting project, a cavity wall insulation project or any other kind of project, we stimulate a little bit of growth. The question is whether that is local growth or growth that affects places such as Ireland—we had Irish companies coming in and doing work when we installed a couple of biomass boilers. However, I still think that that is stimulating growth. Some of the money might go back to Ireland, but some of it will remain where we are. With biomass projects, you want your fuel chip to come from a local source, as far as possible, and we have specified that we want as much local wood as possible, so that wood has to be grown, harvested, chopped and prepared in the local environment, which is consistent with economic activity in the local area. We are slightly struggling with regard to procurement, which is open to the whole of Europe. If we could specify that something must travel a slightly shorter distance, that would help.

We should be trying to reduce demand as much as we can before we go to renewables. Renewable generation is a great thing, but we should try to reduce the demand for energy as

much as we can before we start doing work of any kind on generation.

I am losing my place—sorry; I have lost focus a little bit.

The Convener: That is all right.

Richard Leonard: My colleagues will ask questions about the supply chain in due course. That is an extremely important area, and one that we are especially interested in, as a committee whose remit covers the economy, jobs and fair work.

The existing homes alliance submission states:

"We believe there should be an independent body with the remit for delivery of SEEP established through the Warm Homes Bill."

Elizabeth Leighton, could you elaborate on that and say what that body would look like? Do equivalent bodies exist in other areas of policy? Do Teresa Bray and Janet Archibald think that such an independent body is necessary in order to take the approach to the next level?

Elizabeth Leighton: We have thought about that proposal over the past few months, and we addressed it in more detail when we came to deal in depth with the consultation.

We are dealing with a massive infrastructure project—it involves our entire building stock and ambitious changes that need to happen for social and environmental reasons. There is much to be gained, but, given the challenges that we have already heard about, we will not succeed unless the approach is given the right profile and has the right leadership and resources that are needed to deliver it. The approach will not succeed if it simply sits on the edge of a few civil servants' desks. I do not dispute that those civil servants are working hard, but SEEP is not their A, number 1 job day in and day out—they have other responsibilities to deal with in their portfolios.

Once Government sets targets and, with input from the Parliament, puts in place the framework and the policies, it is for an independent body to deliver and report on that strategy. The project will last over several Administrations—we are talking about up to 20 years; it is a long time until 2038. It will have a big budget—the Government has estimated a cost of £10 billion, but it will probably be much more, given that we are talking about the entire housing stock—and there is possibly a role for regulation, research, innovation and a host of other issues. It is a big job to make the project effective.

We have researched a little bit of what the National Audit Office said about examples of good infrastructure projects in the rest of the United Kingdom. The NAO found that having the ability to bring in skills and expertise to operate a bit more flexibly as a project developed and changed over time through its project cycle, and having a very high level of reporting to the Cabinet were important factors in the success of projects such as the Olympics. We had something similar with the Commonwealth games. People might say that those are events, so they might be different, but they were multi-year projects with a project cycle from development through to achieving benefits after the event. Another example is Transport Scotland, which was created to deliver big transport projects. For the reasons that I have laid out, it needed to be separated from the day-to-day jobs of the civil servants.

The warm homes bill provides an opportunity to create such a body. We can look at international examples; it could be something like the Danish energy agency, which fulfils many of the functions that our proposed body would have. The idea should be explored in depth over the next months as the SEEP consultation responses are examined, and we should look at options for how the project could be delivered through an independent body. We have not given the body a name—that could be explored—but we think that it would be well worth setting such a body up.

Teresa Bray: I agree that there is a need for an independent body. Otherwise, the project will put an awful lot of pressure on civil servants, who do not necessarily have the technical skills to see the project through and provide the oversight, and on local authorities. Local authorities have a key strategic role, in that they understand their areas, but the level of technical skills and expertise that is expected of them, especially in cash-strapped times and given that we have in some cases transferred housing away from them, puts a lot of pressure on them. A lot of technical issues are associated with refurbishing our housing stock and the non-domestic sector. There is a need to ensure that the right standards are set and that there is a true understanding of energy performance.

When we look at procurement, we see that some of the contracts that Scotland Excel has proposed are service contracts, when building contracts will be required. We have seen what happens when there are not strong managing agents in cases such as the procurement of schools in Edinburgh, when there was not control of private finance initiative schemes.

Quality is a big issue, so we have to ensure that standards are set for quality and that the infrastructure is in place. There could be a lot of different methods of delivery, but we need to ensure that we set the overall standards, because if we make mistakes that impact on the performance of our housing stock we will live with

the consequences for decades, and that will impact on the places where we live and make our homes. If we do things wrong in the non-domestic sector, we will make mistakes in millions of different places.

We must ensure that we get things right, but that can sometimes lead to our being too cautious. We must provide the support mechanisms, to ensure that we are not reinventing the wheel, that we share best practice and that we consider the technological challenges of a place and the people who live there, so overall guidance is required. Local authorities might well be involved in delivery, but they will need to be able to call on the level of support that I have described. Otherwise, we will be setting people up to fail, and we should not do that.

Janet Archibald: It is worth pursuing much further the idea of an independent delivery body, because a local authority such as ours has limited resources to devote to energy management or energy efficiency projects in its non-domestic building stock. As I said, such projects compete with every other maintenance task that needs to be done at a school or a leisure centre, for instance.

As Elizabeth Leighton said, the delivery body would be independent of the political cycle. I felt that in Fife there was great reluctance to commit to a budget prior to the recent election, because no councillors really wanted to risk doing that before their election—and there will be another election in only another four or five years. The timescale for a grand project of reducing our emissions is way longer than any electoral cycle, let alone any budget-setting cycle.

Even if there was an independent political delivery body, there would still need to be quite a lot of local authority resource. Every time we need to do any kind of project, we must have asbestos reports, drawings and details of what is there already. Somebody has to go and survey the building. Those are the kinds of detailed things that we do whenever we do a project. Will the delivery body do that? It might do a large amount of the work, but it will still need our resources if it is to be able to do it properly.

The other thing that strikes me about having an independent delivery body is that such an approach would avoid the issues that arise because all the local authorities and different bodies in Scotland have their own little energy management teams—some teams are small and some are bigger, but all would take a slightly different approach, depending on the individuals involved, which would lead to a patchwork quilt of effort, with a different amount of effort from each local authority, depending on its political nature.

In the case of Fife Council, we have been lucky. We have been driven from the top, which has said, "We will do this." However, I sense a change of direction and that the attitude will be, "We will do this unless it will impinge on our budgets for doing lots of other things that we need to do." I am getting a feeling that we will have less money to do things, at a time when we have a greater ambition to fulfil and we have to take on the hard-to-do projects, because we have done the best—and the best-paying—projects.

In an independent delivery body, there would not be that great split of different people all trying to deliver a grand ambition in slightly different ways. Another point about having an independent delivery body do the work, which is good and bad, is that there might be a lack of ownership. We must be able to own the projects that need to be done. If there is too much distance and too many splits between the delivery of the project on the ground and whoever is asking for the project, we do not get as much buy-in for the project, as we lose ownership of it. We would potentially get more from an independent body, but it would have to be strong enough to be able to deliver.

John Mason (Glasgow Shettleston) (SNP): Following on from that line of thinking, if we are hoping to raise standards for buildings, in particular existing buildings—domestic and non-domestic—the question is how we go about it. Do we impose regulations and say that every time a building is sold it must meet the standard or there will be a fine—or a tax incentive? I want to know about that whole area of how we take things forward, not so much for areas where the public purse is paying the bills but for everybody else. Do you have any thoughts on that?

10:00

Elizabeth Leighton: The alliance has long been a supporter of the use of regulation to drive standards forward and influence and transform the market so that, as a society, we value energy efficiency more. Such regulation would be reflected in the property market. That is already starting to occur to some degree: an owner can get a premium for a property with an energy performance certificate rated A or B and will get a deficit for a property that is rated F or G. That is starting to happen, but regulation would really drive it.

We welcome the current consultation on regulation of the private rented sector, because we know that there is a problem in that sector. Fuel poverty is concentrated in the lower-rated houses. For that reason alone we should be acting to drive up standards in the private rented sector.

However, we should also be applying standards to the owner-occupied sector at the point of sale. I understand that the Government has committed to consulting on standards in the owner-occupied sector in the winter. Again, we welcome that and think that it is absolutely essential to create the demand that I mentioned earlier, which will make the SEEP programme a success.

John Mason: Can I push you on a couple of things that you just said? You mentioned energy performance certificates. Are they the best measure? Are they fit for purpose?

Elizabeth Leighton: The energy performance certificate has its issues, but we need to be clear whether we are talking about the A to G scale or the methodology. The banding is easily communicated; people understand it and are used to it from its use on appliances. In other contexts it has been successful at driving up standards and getting the worst-performing products to move up or be taken off the market.

However, the methodology that underpins the energy performance certificates—the standard assessment procedure that is used—needs improvement. In our response, we made several recommendations about how the methodology should be improved to make the EPC more accurate in both how it rates a house's performance and what measures it says should be installed. We should be aware that the certificate is about the building's theoretical, rather than actual, energy performance.

The energy performance certificate can be used for regulation. The consultation on the private rented sector proposes that it will be used. The Government has suggested adapting the assessment slightly so that it makes a more bespoke proposal about the least-cost pathway for someone to take to meet the minimum standard. I can go into more detail.

John Mason: That is enough for now.

Elizabeth Leighton: The certificate can be used for regulation, but it needs improvement and I think that those improvements can be made.

John Mason: That is probably the main point.

You said that people will get a premium if they invest in their property—they will get a higher price for it. Does that match the investment? If I spend £5,000 on improving my house, will I get £5,000 more when I sell it? How does that work?

Elizabeth Leighton: The most important thing is that regulation should be done in such a way that people are better off or, at the very least, no worse off. A lot of the improvements that we are talking about making to get up to a minimum standard of E or even D are very simple insulation measures such as hot water tank jackets and loft insulation. It is not a big deal; they are common-sense measures, on which the payback is very good in two, three or four years' time. People will be paid back and it is money in their pockets after that. Various studies have been done on how the property market is responding to the energy performance certificate ratings, but I cannot say exactly how that would work in Scotland in the context of the standards that are proposed. Research could be done on that.

John Mason: I apologise to the other two witnesses for focusing on Ms Leighton. Does anyone else have anything to say on the issue?

Teresa Bray: Regulation is very much part of the suite of delivery—we have to have both carrot and stick. If there is no regulation we will not hit a significant proportion of properties. In the private rented sector it is correct that we are addressing certain areas first, because those are often the worst properties.

On the financial impact, once there is regulation and people have to sort out the problems there will be a decrease in property values, because people will know that they have to sort out the work that is needed. If they need to put in a damp-proof course or something like that, the mortgage lenders will withhold funds. Energy performance will be reflected in the price when regulation comes along.

We must start by encouraging people in the owner-occupied sector, which has experienced such change, to think about their home as somewhere in which they should invest not just by putting in a new kitchen and bathroom but by making sure that the home is fit to live in throughout the occupant's lifetime. Regulation is an important part of that. Building regulations for new builds have improved properties. Given that so much of our housing and business stock will be there for the long term, regulation is needed to ensure that improvements are made.

John Mason: Ms Archibald, is the situation exactly the same in the non-domestic sector?

Janet Archibald: No, it is not the same for schools. Schools are not sold and do not change hands, so there is no reason to make those changes, although schools are required to have energy performance certificates.

EPC regulation has driven us to make improvements, as we are required to have EPCs for all our non-domestic buildings that have a floor area over a certain size. We chose to get energy audit reports at the same time; the surveyor was already on site, so he was able to write a report on improvements that could be made. We ended up with 279 energy audit reports, from which 1,250 projects were identified. We found that 804 of those projects would pay back in less than 10

years. We investigated 616 of those projects further, and, of those, we have completed 306. There is a certain rate of attrition. We start off by looking at our overall stock, where we are and what we can do. Regulation has driven all that.

Having said that, nearly half of our properties—approximately 200,000m^2—are G rated. If we add to that total the F-rated properties, that covers 50 per cent of the non-domestic stock for which we have EPCs. If we include E-rated properties, that amounts to nearly three quarters of our property. If we were to think about improving properties to a D rating, only a quarter of our stock would currently meet the regulations.

John Mason: So, if we passed a law that said that you had to get all the properties up to a D rating—

Janet Archibald: Three quarters of our buildings would not conform.

John Mason: There would be a huge financial impact.

Janet Archibald: A huge financial impact.

John Mason: But it would strengthen your case when you were competing against things such as roof repairs, which you mentioned earlier.

Janet Archibald: Exactly. If you make something law, you make something happen, as has been the case with regulations on asbestos, legionnaire's disease, gas safety and other things along those lines. If it is the law, we have to find the money for it. The question is where the money is going to come from. It cannot necessarily come from the local authority, which is trying to keep a roof over each building. It could possibly come from Government, but that is taxpayers' money.

I read through the committee papers, which mentioned equity bonds or something like that. Pension funds would be a very good funding method, because we are talking about very long-term projects, for which long-term investors are needed. It is a bit like investing in forestry—people will get their reward in 40 years' time. With energy efficiency, it will be a very long process to get any money back, and a lot of money will be needed up front.

I will give you another illustration of the scale of the task. Of our 19 high schools, five have under-floor electric heating that is more than 40 years old and is coming to the end of its life. We cannot build another five high schools and just knock the old ones down. Those five high schools were built in the 1960s; they are not very well insulated and are full of asbestos. One of them is electrically heated, full of asbestos and listed. [*Laughter*.]

John Mason: Okay. I think that we are raising more issues than we are getting answers, but—

Janet Archibald: Seriously, though, the scale is huge.

John Mason: What you have said is very helpful, but I think that I will hand back to the convener at this point.

The Convener: We will move on to a slightly different area.

Gordon MacDonald (Edinburgh Pentlands) (SNP): Before we move on, I want to ask Janet Archibald a quick question about non-domestic buildings. Her submission states:

"thousands of new buildings are using double the energy that they should because developers are massively overestimating their efficiency."

It goes on:

"We believe that there may also be a need for punitive measures to penalise developers and designers who deliberately overstate the future performance of a building."

We are talking about how to resolve the problems relating to the existing stock, but do we have a major problem with new buildings that we are putting up?

Janet Archibald: Yes.

Gordon MacDonald: How do we resolve that?

Janet Archibald: I am not sure that the overestimation is deliberate. You start with a theoretical model, you put in all the dimensions of the building, you attribute properties to all the walls, floors and ceilings, you put in your systems and you do your very best to get the right answers about how the building will perform. It is not necessarily deliberate overestimation if the building does not then do what you thought that it would do.

We demolished one of our schools and built another one in its place. The school that we put up is rated A+, but its performance is not A+. That modelling is really difficult, and overestimation is not necessarily deliberate. It can take quite a lot of time to get a building to perform in the way that we want it to perform. The first year, the performance will probably be about the same as the performance in the building that has been knocked down. It takes two or three years to get the building more tuned in to the way in which it should perform, and even then it might never perform as well as the theoretical model says it should do. It takes a long time to calibrate the models and make sure that they match reality. Overestimation is a major problem, but it is not necessarily deliberate.

I do the same task. When I am doing a project in a building, such as putting in new lighting or cavity wall insulation, I do all the calculations in theory and come up with a saving. I then set out the cost and the cost saving, which is the payback.

However, it is difficult to say whether that will actually happen in reality and we will get exactly what we want—we might not. That overestimation might not be deliberate.

The Convener: I do not mean to interrupt, but I want to say to the witnesses that there might be issues that we do not have time to cover. If you want to submit further comment in writing and add a bit of detail, that would be helpful for the committee. That is a way to deal with things.

Perhaps Gordon MacDonald will come on to his next question.

Gordon MacDonald: My questions relate to funding for SEEP. Since 2008, there has been a substantial amount of investment in domestic housing and 49 per cent of social housing is now at band C or above. However, only a third of private dwellings are at the required level. Given that a large proportion of housing is private and that it lags behind social housing, what is needed to encourage private investment to ensure that there is greater take-up of home insulation products?

Elizabeth Leighton: Thanks for that question, because just those statistics speak volumes about the value of regulation and the role that it can play. The result of regulation of the social sector is that that sector has much higher-quality homes than the private sector does. The same can happen in the private sector if we introduce regulation. I should say that the bulk of those improvements have been done through local authorities or housing associations, but the tenants have been paying for them. It has not all been paid for by the public sector; it has been paid for by the tenants. The regulation brought that investment into the social sector.

It is about regulation; it is also about behaviour, because the social housing providers have worked quite hard with their tenants to ensure that they understand how some of these new systems work and how they can get the most out of them. They are winning the benefits, not just getting the standard.

10:15

Gordon MacDonald: You mentioned behaviour. We are aware that savings can be made by switching electricity providers, but a large proportion of people still stick with their traditional supplier that they have used for many years. Given that many households simply cannot afford to make short-term expenditure for some kind of long-term saving, what must be in place to encourage people to make such investments?

Teresa Bray: Obviously regulation is the backstop for changing behaviour, but we must also look at how we can facilitate people's undertaking energy efficiency measures. It is a challenge for a person or indeed a business to get such work done, and the question is how that can be made easy for them.

People want to be able to use trusted traders, and often they want to be able to call on quality assurance to assure the work that is done. One major issue is that under some of the previous schemes, particularly those that were funded under the energy company obligations, the level of quality has varied. In one local authority, for example, 50 per cent of the cavities that had to be filled were either not filled—holes were just drilled—or only partly filled, all because tradesmen were unskilled. We therefore have to skill up our workforce, because Scotland does not have a sufficient number of people trained to do that. A lot of traditional workpeople could adapt their skills, but there are just not enough joiners, plasterers and the like to undertake the tasks.

We also need community engagement and involvement. We need only look at the regeneration that has taken place through some of the area-based schemes that have been constituted; we can see the external cladding on people's properties and the pride that people take in them. External wall insulation is not appropriate for an awful lot of stock, but it is appropriate for certain sectors. However, in order to make it happen, it has to be organised; as with any medium-sized building project, it has to be managed well and the quality assurance has to be in place to ensure that the standards are met.

On switching, an interesting fact is that although a one-off charge might be involved, it costs only a relatively small amount of money to keep switching each year. On the whole, however, switching does not make people use less energy; in fact, most people do not know how much energy they actually use. They know if they find their fuel bill difficult to pay, but they are not aware whether their bills are high or low compared with those of their neighbours or people in other localities. What support mechanisms or behaviour change programmes need to be put in place so that people start paying attention to that issue? After all, we need to get people involved in reducing our carbon emissions, and the challenge is how we get them interested in doing that.

Full area-based schemes could have a role to play in that respect, but the excellent programmes that we already have, such as the warmer homes Scotland scheme, have not had huge amounts of promotion. Because demand is so high, we are not promoting those programmes to the extent that we should be promoting them; if we did so and people knew that they were there, we would not be able to meet demand with the current budget.

There could be interest if you promoted the programmes, but you would have to think about how they would be funded.

Grants are applicable to those who need them, but we need to make things easier through loan finance and other such facilities, and we need to think about how we can get the mortgage industry and the very well-established lending market involved. Finally, businesses also present a big challenge, because they often make much shorter-term decisions and are not prepared to invest in anything that does not give them a six-month return. As a result, you will need a regulation to make businesses consider such issues.

Gordon MacDonald: You mentioned external cladding in relation to flats and tenements. What role should the local authority play in that respect? I know that in Edinburgh the council steps back from intervening in repairs if there is at least one private tenant in the building, and it leaves it up to the combination of tenants and owner-occupiers to make the arrangements. Given the extent of the problem that we have with external cladding, and the nature of the job, that would be quite difficult for an individual to organise. What should the role of local authorities be in the process?

Teresa Bray: Local authorities have a strategic role that they must play. If we are going to have programmes such as SEEP, we need to be sure that authorities will support their delivery. SEEP envisages local authorities having a key role. Without having an external body, it will be impossible for people to organise themselves to carry out work. In Edinburgh, some middle-class areas are sorting out their roofing problems, but it is very challenging to get 10 people to agree to carry out works. There has got to be some facilitation there, which could be done by the local authority. We need to start looking at the Tenements (Scotland) Act 2004 and the warm homes bill that it is hoped will be introduced, to see how we can make that happen. Glasgow is in a different situation, in that it has property factors. There are disadvantages to that approach, but people are taking a lead there. In buildings with many owner-occupiers, we cannot expect work to happen without an external party to facilitate it.

Gordon MacDonald: Will the equity loan scheme that was introduced recently provide all the necessary funding to encourage people to make such improvements?

Teresa Bray: Yes.

Elizabeth Leighton: The equity loan scheme is one of several offers that are on the table at the moment. We welcomed it, because it is good for people who do not have the cash or the up-front capital to pay for measures. We will need a mix of carrots and sticks; we will need a range of incentives, such as loans to cover the up-front costs and tax incentives, through rebates after measures are completed, to suit people's different circumstances and how they want to pay for measures.

In the design of SEEP, we said that we should evaluate the many years of experience of loan schemes, starting with the home renewables loan several years ago. To my knowledge, there has not been a review. The Energy Saving Trust has delivered loans on behalf of the Scottish Government, but there has not been a comprehensive look at what has worked and why, what the successful triggers have been, how they have been marketed and why people have not followed through once they have made inquiries. The answers to those questions would be valuable in designing incentives for the future.

Bill Bowman (North East Scotland) (Con): I want to move on to the availability of advice and information for consumers. Perhaps some of that has been touched on slightly before, as you mentioned that the Government currently has advice available through Home Energy Scotland and the resource efficient Scotland programme.

Before its consultation, the Government recognised that effective advice and information mechanisms needed to be available to consumers—whether they be individuals or businesses—to enable them to make informed decisions about energy efficiency and supply in the future. It also considered that there would be value in having a trusted source of advice so that awareness could be raised about what is available. Does the panel think that the energy strategy and the SEEP consultations adequately address the need for meaningful public engagement and effective behaviour change? Behaviour change is something that we have asked about before, because members have had the feeling that experts can do their models, work out the outcomes and decide that they want to change a variable, but when it comes down to persuading people to throw away their gas boilers or penalising them when they want to sell their houses—or even stopping them selling—we have to ask how we can get people onside in a practical way.

Teresa Bray: It is a big challenge. Often, people are time poor and have many other priorities in their lives. In a lot of the areas that we work in, we are looking at how we balance out those priorities. A lot of the things are actually quite challenging. If you ask people how they adjust their heating system, the majority have a vague idea of how to do it but they are not certain. There are myriad difficulties—you get given a little manual, but I can never find my glasses when I need to read it.

We have to find better ways of engaging with people. Look at behavioural change science. It is not just about telling people, because people do not just want information. They need to be supported when undertaking the exercise. You could tell them that they could experiment by adjusting the radiators; they can always change them back again. It takes time and resources.

Sometimes we think that it would just be easier to slap some materials on the outside of a building, but you have to engage with people. For example, how do people work in an office? There are people who like it hot, and people who like it cold, but exercises can be carried out to get people involved and engaged. It might involve moving people around, or people might not have the right information. The office might be quite warm at 22 degrees, which is an acceptable temperature, but somebody might still be feeling a bit cold. That kind of engagement programme has to be developed, put in place and supported for implementation to take place, and that will require resources.

Most people do not want to waste money. If you reduced workplace arguments about the temperature, you would probably increase productivity, as so many people have issues with that. We are doing such exercises. A lot of work has gone into things such as recycling in Parliament to make people change their behaviours. There is a science behind that and there are specialists in it, but the programme has to be supported. Work can be done provided that such investment is made.

We then start talking about the wider provision of advice. A lot of the time we focus on providing information, but information is different from advice. We can provide people with a lot of information, but we then have to provide guidance about what the best route is for them to take in their circumstances. We need to be prepared to move beyond the provision of information.

We also have to make sure that people get advice and support in different ways. A lot of people still like engaging on the telephone, but a lot of people, particularly high energy users, are not going to ring up a helpline. They want to be able to find resources digitally. We must look at how our systems evolve.

We must not leave people behind. Some people still need in-depth, face-to-face support. A spectrum of support is required, and it is support that is required, not just the provision of information.

Elizabeth Leighton: Part of this will be about engaging the wider public—businesses, people in the workplace and people in their homes—with the vision for 2050. How marvellous will it be when we are living in zero-carbon homes, when we have small energy bills and when we are generating electricity in our homes? We have to engage people with that exciting, positive and desirable vision.

I do not know whether any of you has ever experienced the comfort of being in a Passivhaus and been told, “We don’t pay any bill and my house never loses any heat overnight,” or, “I have been away for the weekend and the house is still just as warm as it was when I left.” That is the future that we should aspire to. It is the vision of the strategy.

Engaging everyone with that vision is number 1, so that people want it and are knocking down the door to ask when they can have it. Then you can provide the advice, which needs to be people centred. It cannot be a measures-based programme. It cannot be someone knocking on the door offering solid-wall insulation when people are not interested in that. People want warmer, more comfortable homes with affordable bills, so they need tailored solutions.

Again, that means more up-front investment, but we know that that is how we will get results in the longer term. People need to be engaged and feel that they are getting good quality, fair and independent advice. Enabling measures also need to be put in place. Make it easy for people to do it voluntarily and to comply with regulation. It should not be seen as a penalty but should be about helping people to save energy.

10:30

Janet Archibald: I would like to give you some context. I was involved in a SEEP project to replace electric heating with biomass heating in a business centre in Dunfermline. I needed to put in some sensors so that we could monitor how well the project was going, so I had to engage various business owners in the centre. A podiatrist really was not all that interested. He wanted to go from one appointment to the next and he did not want to spend any time with me, but I managed to install the sensor. Another guy was similar. The picture frame guy was really not interested in speaking to me at all. When I started to put the sensor in, something went wrong with his computer. He blamed me for that and ripped everything out, and I had to leave hastily. Later, I saw him chatting away with another business owner over a fag, and he was saying how this stupid woman had come around. My goodness, it was awful.

Business owners who are time poor are not really interested in energy efficiency; they are interested in whether they can pay their bills and get the business to work.

I will give you another bit of context. Three days out of five, when I come home from work, I have a message on my answerphone from someone trying to replace my gas boiler or sell me some energy efficiency thing, and they tell me that it is part of the green deal. I delete all those messages. I am not interested in them, even though I am an energy engineer. We need people to buy in, not to be sold to. People do not want the hard sell—they do not want those messages on their answerphones.

We had a local campaign to get people to engage in buying a piece of land for community ownership. There was a community engagement event in the church hall, which worked well, with people coming along and talking about the project. You have to have face-to-face engagement. We have to get people voting with their feet, coming along to meetings and buying into projects. Nobody wants the hard sell.

People in Fife do not live in a city. They do not have lots of neighbours nearby, so we cannot have a tight little district heating scheme or a campus-based scheme. However, neither are we in the remote sticks, where people are off-grid and alternative energy is very expensive. We have low gas prices, so we have to make our scheme stack up against low-cost energy. People on the gas system are already not paying huge amounts for energy. You have to think about things in that context, too.

Bill Bowman: I think that you are saying that, although we are talking the talk, we are not yet walking the walk with regard to behaviour change.

Dean Lockhart (Mid Scotland and Fife) (Con): Given that, by 2030, today's school leavers will, we hope, be home occupiers or home owners, what role does formal education play in behaviour change? Is there a possibility that we can start educating kids who are about to leave school about these issues—they could even talk to their parents—so that, in the future, they will feel that they understand them?

Janet Archibald: Fife has done a lot of in-school energy education with young children. I see that as an extremely long-term energy efficiency project. You pay the money now, but you will not see the effect for 20 years or so, until those children grow up and can buy an energy efficient home. It is a good thing, but it competes with every other energy efficiency project that we could be doing.

Elizabeth Leighton: One interesting aspect of that issue, which links to our earlier discussion about regulation, is that those young people will most likely be renters. At the moment, renters have little agency with regard to their ability to rent a more energy efficient property. They are probably going to end up in a property with quite low levels of energy efficiency. It is hard for renters to find out information about that. Energy performance certificate ratings will now be included in tenant information packs. However, with short-term rentals, there are not many properties available and tenants are not exactly shopping around.

That is where regulation can come in. Tenants with increased knowledge can ask questions, pointing out that the property is not up to standard and that it is their right to have a more energy efficient property. It will be very important to work with the National Union of Students and bodies such as Shelter to raise awareness so that, when regulation comes in, it is enforced and makes a difference.

Gillian Martin (Aberdeenshire East) (SNP): I return to something that has been touched on by a couple of you, relating in particular to the question from Richard Leonard about jobs and opportunities for job creation and economic development. Two things came out for me. First, it will be a massive undertaking to achieve the goals that have been set out. There is great potential for job creation and for existing companies to take advantage of the work that is out there.

You also mentioned that we already have a skills shortage, however. I want to open up that point further and get your views on it. What should we be doing now to ensure that companies can take advantage of the opportunities? What should we be doing now to upskill our workforce so as to carry out all that work?

Teresa Bray: We currently have two models of delivery for energy efficiency programmes in the domestic sector. One is the area-based schemes, involving large-scale procurement. Those are very short term, and they involve individual contracts. There are only four companies that are large enough to bid for those contracts and prepared to take the risk of taking on a short-term contract. They struggle to get the staff to do that. A lot of subcontracting takes place, and a skilled workforce comes from different parts of Europe to deliver that.

There is a seven-year contract for the fuel poverty programme, warmer homes Scotland, which is delivered by Warmworks Scotland. It sets very clear guidelines about the need to ensure wider community benefit. There are 30 local subcontractors delivering the programme, from Shetland down to the Borders. The long-term nature of the contract brings certainty for smaller companies, so that it is worth while for them to get involved in delivery. They will be taking on apprentices to deliver it, and a certain amount of work will come through.

The stop-start nature of the work and the short-term funding associated with the initial programme are preventing new players from coming to the market and existing companies from training up, moving into the market and making it worth while.

You must also consider the terms of procurement. There is a big difference. For huge contracts, only the very big companies can go through the framework. If things are delivered on a much smaller scale, with suitable standards in place and ensuring value for money, different frameworks can be developed, particularly if the contractual arrangement is not with the public sector—although it is different for some schools. For individual companies—small non-domestic firms or those involved in private housing—different frameworks can be set up to ensure quality control and to provide comfort for the consumer, but a huge contractual framework is not necessarily required. Because of the contractual framework, it is not possible to ensure that many of the standards that are required are included. You need to think about the procurement framework and the duration of funding.

Despite that, you must have the people you will be skilling up to work in the area concerned. You have to consider the role of local colleges and the position of young people leaving school, as well as people retraining. There has to be more focus on tying the two things together and on how to develop skills.

There will be a role for technological fixes when working in the existing stock. You will find better ways to do things, so some off-site work can take place that you can try to ship in, but often the skilled craftspeople will be needed to do the work on site, because the sizes of things will have to be adjusted.

You have to be prepared to make long-term investment, so that people can see that there is a career there and so that the investment takes place. That uses a combination of colleges, procurement and the companies that are there, ensuring that local companies are interested. Most of them are not short of work so, if a project is seen as difficult to work in, they will look elsewhere.

Elizabeth Leighton: If we ask industry what it needs, we find that one element is certainty that there will be resources—the budget for the programme—and another is to have the target, or what we are trying to achieve in 20 years and the milestones along the way so that industry knows what is expected of it. As Teresa Bray said, alongside that certainty we need a skills development strategy. Another role for the proposed independent body would be to work with industry on that.

We have been talking about SEEP for two years. The national infrastructure priority was first announced in June 2015, and it is now May 2017. The consultation has just concluded, but for a lot of the questions that we have been talking about, we could have had the conversation two years ago. For example, the skills development work could have started two years ago. What are we waiting for? Perhaps another rationale for a delivery body is to deliver the pace and scale that we need to achieve the ambitions.

Janet Archibald: If the demand is there, the skills will follow. If, for example, you create a programme of work on lighting that will go on for a long period, the skills can be developed for that but, if it is for only one year, that is not long enough. Fife Council has a direct labour organisation that has done a lot of my energy efficiency projects, such as lighting projects. The problem is that we have to have match funding for SEEP. We could use the Scottish Government's newly developed non-domestic energy efficiency framework, but my problem with that is that it is for projects of £1 million and upwards, and I would prefer much smaller lots for energy efficiency work. With smaller lots, I could get much smaller companies involved.

Ash Denham (Edinburgh Eastern) (SNP): We have touched on the important role that local authorities have in delivering SEEP. What are your views on area-based schemes, and how do they stack up against schemes that are targeted at sectors or tenures?

Teresa Bray: If we were to look only at individual sectors, we would have to keep coming back to each area, because it is likely that the easy wins would be picked off first. However, we have to cover all of Scotland because energy is used throughout Scotland, and an area-based approach will achieve that.

We want to learn things from working with one sector that can be applied to other sectors. The hospitality industry is a very dispersed sector, so it is necessary to ensure that best practice in it from one area is used in other areas. It will be much more difficult to get people wanting to take part if the approach is very dispersed.

A combination of the two approaches is needed. There will be specific things to do in hospitals, for example, that are possibly not so transferable. We have a limited number of hospitals, so it probably makes sense to consider dealing with hospitals as a whole. However, an awful lot of smaller things, such as small businesses and other domestic and non-domestic things, will need to be combined in an area.

That approach also allows local contractors to be involved. It is likely that larger contractors

would work on big projects in hospitals, but working on an area basis means that small contractors can be involved and there can be that community buzz and engagement.

A difficulty is that in a 15 or 20-year programme, some areas will not be reached for 20 years. It is also necessary to think about how to deal with people who are in fuel poverty and who cannot wait for their homes to be made more energy efficient; there has to be a national programme to deal with those who are most in need. There will also be early adopters, who you will want to encourage to take action.

So, to cover all of Scotland, area-based programmes are needed, but it must also be ensured that the different demographics of those who are most in fuel poverty are accommodated and dealt with as need arises, and the early adopters must be supported. If there is ever going to be district heating it will have to be done on an area basis, because it will not work unless everybody—domestic and non-domestic—is engaged.

10:45

Janet Archibald: With regard to area-based work, Fife Council's asset management team has been going through our non-domestic portfolio to look for redundant buildings or buildings that are being only partly used. In Kirkcaldy, for example, we have quite a number of community centres, so it might be a case of considering whether we need all of them or some can be closed. We are starting to look at things in an area-based way for other types of activity apart from energy efficiency. One of the problems that I have when I do energy efficiency work in places other than schools is that I have to work out, before we improve it, whether we are going to retain the building.

Jackie Baillie (Dumbarton) (Lab): I am increasingly persuaded by the argument for a national body, but I want to explore with the witnesses where responsibility should lie and what the balance between local and national responsibility should be. It is all very well for national Government to set targets and leave it to local government to deliver against those responsibilities, but is there a view that some local target setting would also be appropriate?

Elizabeth Leighton: I will take that question. We see the issue as needing a national body, but it would not do all the work; there would be a balance between the national and the local with regard to delivery. We think that there should be local target setting, as envisioned in the local heat and energy efficiency strategies; the fuel poverty strategies that local authorities or local fuel poverty groups would develop would also be brought into that. However, oversight would be needed to ensure that the local targets add up across the piece and meet the national target. The national body would have that role as well as reporting in some way on that.

Some local authorities will, however, be able to deliver more than others can. Some will have opportunities to make greater progress faster, while others will face more challenges and might take longer, so flexibility should be allowed for local approaches. Indeed, a variety of approaches would be an advantage in that we would be able to learn from them.

In response to Jackie Baillie's question, then, responsibility would be shared, but the national body would have oversight and, as Teresa Bray has said, could actually take some of the load off local authorities with regard to standard setting and providing support with regulation to ensure that enforcement is more consistent across the piece. Moreover, the collection and mapping of data and data sets could be shared, which would save everyone money.

Jackie Baillie: In pursuing the idea of setting up some different or arm's-length body, I raise a concern about accountability to Parliament and setting of budgets. Can you comment on that? I can see how it might work, but the fact is that you would be pushing direct accountability into the distance. How would you lock that down?

Elizabeth Leighton: Reporting and scrutiny arrangements would have to be set when the body was established, which is why we have suggested that it be established through the proposed warm homes bill. It would report regularly and be accountable to Parliament but, ultimately, the target setting—the vision for SEEP—has to be at ministerial level.

Janet Archibald: The reporting aspect is very onerous for us. We are not doing 100 homes at a time; we are doing individual buildings, and with the bureaucracy involved in something like SEEP or any of the national schemes, I have to say up front how much something is going to cost and how much it will save, when such things are actually quite uncertain. At the start of any individual project or building, there is a great deal of uncertainty about cost and scope; we home in on such aspects as we get closer and closer to implementation. We sometimes find once we have implemented a project that there is a difference between the cost when we ordered it to go ahead and the cost when it was actually delivered.

If there are rounds of reporting, things will get bureaucratic to such an extent that Fife Council might say, "Do we really want to go with SEEP at all?" The number of layers of reporting make things very top heavy and. If that reporting goes all

the way up to Parliament, it will be a lot to put on individuals like me. That was certainly the case with the SEEP pathfinder projects, for which I had to report on what were really quite small projects and individual buildings both to internal people in the council and to external people.

The Convener: Thank you. Finally, we will have a question from Andy Wightman.

Andy Wightman (Lothian) (Green): The draft strategy includes the goal of setting a target to meet 50 per cent of all of Scotland's energy needs for heat, transport and electricity from renewable sources. I do not think that this is your specialist area, but can you comment on the feasibility of achieving that by the intended date of 2030—a little over 10 years from now?

Elizabeth Leighton: The existing homes alliance supports the setting of that target largely because it covers not just electricity but heat, which is an issue that we need to talk about. We have not really discussed it today, but I think that one of the biggest challenges for SEEP—and obviously the energy strategy—is decarbonisation of heat.

I realise that I am not commenting on the achievability of the target across the board. However, as far as the domestic sector is concerned, the target will certainly be challenging, but it is a direction that we have to go in if we are serious about adjusting the climate change targets. Moreover, when we make the change from fossil-fuelled to decarbonised heat, it is equally important to ensure that it is not more expensive and that we are not increasing the problem of fuel poverty. After all, we still have to pay for that heat.

As a result, we have called for more effort to be put into fabric energy efficiency in SEEP's early years. Reducing demand for heat will mean that we will not be burdened with the need to create even more decarbonised heat, and costs, too, will be reduced. As well as putting more effort into fabric energy efficiency, we should look at heat pumps and really focus on off-gas-grid areas in the early years. That is something that we can do now, because we know what the solutions are and that they have a good track record. Let us get on with it.

Teresa Bray: The target is very ambitious, but it can be achieved if the political will exists and there are regulatory requirements behind it. After all, we have seen the retrofitting of the gas network to housing and businesses, which has led to the majority of properties—including 80 per cent of the domestic stock—being heated by gas. A large number of properties were not built with gas central heating in place.

You might have to change a lot of the systems that are already in place. In a district heating system, people would need a heat exchanger instead of a gas boiler. That could be done, but at the moment we do not have the mechanisms to make it happen. What is happening with district heating in Scotland is way behind what is happening in other parts of Europe and in England. It is not standard practice to put in heat pipes when roads get dug up here, but you could make that happen. Moreover, you could insist that all new developments be built with the opportunity to be connected to a district heating system or heat network, even if that connection did not happen immediately. That would significantly reduce costs. There is, of course, the possibility that the connections might not be used, but that would be much less of a regret if they had already been put in as part of the infrastructure. If you feel confident that the heat network needs to be decarbonised, you will have to think much more about district heating.

In some cases—say, a much more dispersed area such as Fife—there will be a role for hydrogen, but a lot of our cities lend themselves ideally to district heating systems. Cities have much higher-density housing, what with the tenements and flatted properties: we could easily put district heating systems into them if there were the political will and the regulation that would make it happen.

Janet Archibald: I would add money to political will and regulation—there is just not enough of it. A new housing estate is being built next to my housing estate, and I know that district heating pipes are not being put in there. If regulation was in place, it would be much simpler to do that.

That said, Fife Council also has 41 education establishments that have direct electric heating with no wet systems. As a result, we could not make them part of a district heating or decarbonised heat system; we certainly could not do 41 of them in 10 years with the money that we have at the moment. Our team put in a bid for what are known as unfunded spending pressures in order to get some of those establishments done—although the fact is that all of them need to be done urgently, because they are at the end of their lives. Although ours was the number 1 bid, it did not get finance because the councillors felt that lots of other things—including social care for elderly people and nursery provision for the under-threes—were more pressing and needed to be done. Even though we made the best possible case for the money, we still did not get it.

The Convener: We are now under time pressure, so we will finish with that point about unfunded spending pressures. I thank our witnesses for attending.

I suspend the meeting and suggest that we reconvene at about 11 o'clock.

10:55

Meeting suspended.

11:02

On resuming—

The Convener: I welcome our second panel of witnesses. We have with us David Handley, head of regulation at SGN; Fiona Goodenough, hydrogen project manager for the Scottish cities alliance; Keith MacLean, chair of the UK Energy Research Centre advisory board; and Stuart Haszeldine, professor of carbon capture and storage at the University of Edinburgh.

I will start with a question about local heat and energy efficiency strategies. Should local authorities be required to produce such strategies? Would that be best done by local authorities individually or in conjunction with one another. How would that work? Who will start us off?

Keith MacLean: I clarify that although I am the chair of the UK Energy Research Centre advisory board, today I am speaking as an individual rather than as a representative of that organisation.

Local authorities have a key role to play in heat and energy efficiency strategies, because of their local knowledge and involvement in housing, planning, building standards and other relevant elements. They are not able to do what is necessary on their own, because so many of the solutions—particularly solutions to decarbonise heat as opposed to those to achieve energy efficiency—require the provision of infrastructure that is not in the local authority's gift, and it is difficult for a local authority to put forward a strategy if it does not know whether there will be hydrogen in the gas pipes or hot water pipes for district heating, or whether the electricity system will be reinforced to allow electrification to take place. Local authorities might play a key role, but input from other bodies that are responsible for monopoly regulated networks will be absolutely necessary.

On the question of co-ordination, the answer is yes: implicitly, they need to work together. Although there will be local specificities in individual strategies, it is essential that there is common learning from what others have done; that resources, which are always rather tight, are pooled; and that individuals and consumers can expect common standards and approaches from different local authorities.

Fiona Goodenough (Scottish Cities Alliance): I can speak only on behalf of the Scottish cities alliance. My colleagues and I are taking forward various work streams for the seven cities on the Government's behalf. I work predominantly on hydrogen, whereas one of my colleagues works on the low-carbon agenda. We are concentrating on a number of different areas to bring about collaboration, to share knowledge and to engage with whomever we need to in order to carry out projects on a large scale across the seven cities. That includes bringing back district heating strategies. Dundee has written its strategy and would like to be able to write an energy strategy. Other cities feel exactly the same and, if they cannot complete the work now, they will at least have something written down in black and white for when they do what they plan to do in a few years' time; it gives them a focus.

Professor Stuart Haszeldine (University of Edinburgh): The answer also depends on what we are trying to deliver. In simple terms, we are trying to deliver two things: energy efficiency and lower-priced energy, as you have talked about this morning; and zero-carbon energy by 2050, which is a very different question.

I am concerned that if work is undertaken at a local authority level, we could—rather like Keith MacLean said—easily end up with the wrong answer. People will be answering the question in the context of a local, bottom-up vision, looking at how we install a heat network in the buildings over which they have control, but that could lead to the wrong conclusion about where we will get our energy from, which might involve reliance on top-down solutions such as national electrification or national hydrogen networks that require a very different design process and different conduct and co-operation among all local authorities across Scotland. One has to be careful about the question that one asks, because that will determine the timescale and the answer that one gets.

David Handley (SGN): I thank the committee for inviting me to speak today. As the other witnesses have said, we see local authorities as having a very important role and an important central co-ordinating function. They can link in with multiple groups and help to create bottom-up plans. However, we need to ensure that there is consistency across regions in regulation and market structures, which will help to promote investment and bring about networks at least cost.

Dean Lockhart: There seems to be a consensus that local authorities can, and should, play a vital role in the strategy. I have two questions. First, do local authorities have the necessary skills, resources and relevant support to measure and implement strategies successfully?

Secondly, the strategy sets out 12 key functions; I am sure that you are all aware of them, so I will not list them. Would you care to comment on whether those 12 key functions are appropriate? Are there too many, or should more be added? I would like an overall sense of whether the functions are appropriate and relevant.

David Handley: On the question of skills and resources, working in partnership with local authorities, we find it particularly important to ensure that we are able to deliver skills and resources where there are shortcomings and to provide an effective sounding board. That is especially important when we are looking at some of the innovation projects and asking how we can bring out innovation in a way that is flagged for local authorities' specific needs.

Keith MacLean: Most of the conversations that I have been part of or have heard suggest that resourcing levels are nowhere near where they would need to be to enable organisations to carry out all the different functions that are needed. Even if there were adequate resource, I do not think that it would be sufficiently knowledgeable yet. I am afraid that that is a key characteristic of the heat policy arena at the moment, although it has been ignored for many years. The simple suggestion in decarbonisation scenarios was often, "We'll decarbonise heat and transport through electrification. Tick. Job done." However, in reality, it is probably the most difficult area to address.

Whether in academia or in organisations such as local authorities, I do not think that there is yet the knowledge to make the necessary decisions. We will have to build up that knowledge not only through education but through practice. In Scotland, we have very little practical experience of applying some of the solutions that we are talking about—particularly hydrogen fuel cells and heat pumps, but even district heating. Therefore, we need to undertake appropriate pilot projects to gather knowledge and experience before we can make any of the key decisions that need to be made about decarbonisation.

The Convener: I should say to our witnesses that there is no need to answer every question, although you should feel free to join the discussion as individual questions are raised.

Ash Denham: We have a proposed new regulatory approach to the promotion of district heating. What do you think about the regulations? Are they fair? Do they strike the right balance between choice and compulsion?

Keith MacLean: The problem is that we are grasping at one particular aspect of the heat challenge, district heating, which is not the right answer in every case. There are areas where it is a good solution, but there are other areas where it probably is not. I highlight the link to energy efficiency. If we really build new properties to a high standard, the heating requirement will be so low that it will not justify the cost of district heating—heat can be provided through simple means that do not have the same capital costs. Similarly, there is a dilemma in that a certain customer density is needed to make the economics of district heating work, yet the most dense urban areas are the most difficult areas to put district heating into. I barely need to remind you of the chaos that was caused here in Edinburgh when the streets were dug up for the limited exercise of putting in the tram network. Imagine doing that throughout the whole city—or throughout all the cities—over a 20-year period. We need to think about not just the costs but the non-cost factors.

Where district heating is suitable and we need regulation to deal with it, the proposals start to address some of the right points. However, it is important to recognise that, even in those areas, there can be different reasons for introducing regulation. Customer protection is important at the supply end, as is giving access and wayleave rights to put the pipes in in the first place and finding ways to regulate the asset bases to bring down the risks and cost of capital, as is done for other monopoly networks. Regulation goes some way towards addressing those issues.

Ash Denham's last question, about compulsion, is the key point, to which I do not think that there is an answer yet in Scotland or UK-wide. The Danes are always given as the classic example of how to make district heating work. Their regulations mean that people have to connect to district heating; they have the alternative of choosing to heat homes electrically, at very high cost, but they still have to pay the fixed costs for district heating. We are not yet in a position to tell people that they have to do that, but without that, I cannot see the economics working.

11:15

Professor Haszeldine: We must be careful about applying a one-size-fits-all solution. I agree that district heating is not automatically a good thing. Where other sources of wasted heat can be linked in, it can be a helpful and efficient opportunity. However, if you are trying to replace tens and tens of individual household boilers, which are already very efficient, with an equally efficient central district heating system, I do not see any gain—there is no carbon saving or efficiency gain, and there is a huge infrastructure cost. I never see a pricing per household of what district heating really costs: it might cost £10,000 a household, or £20,000 or £30,000. We need to

work out where the correct value-for-money actions are, rather than say that this is what we will mandate nationally.

The track record of district heating schemes around the UK seems to be patchy. If they are well run by the monopoly owner, they can produce a saving for a property's incumbents. If they are poorly run, the incumbents are stuck with that monopoly and could end up paying double the price of an ordinary heating system. It is essential that industry regulation is appropriate for the intended delivery model, whether individual buildings or small complexes; and the regulated industry still has to achieve its performance targets, like every other.

David Handley: District heating is the right solution in specific areas, but lots of other solutions also need to play a part and we need to promote those as well to decarbonise heat.

On whether the proposed regulatory model goes far enough, potentially we need to create more of a structure around the model to ensure that both consumers and investors have confidence in it. That means having a regulatory structure in which, over the long term, there is confidence that bills will not vary unnecessarily and that investors will get the lowest cost of capital. Then, district heating can work successfully.

I immediately become nervous about compulsion, because I do not know whether the public are with us yet. Bringing the consumer alongside us is absolutely essential to make district heating work.

Fiona Goodenough: I have worked with local authorities in the cities. Aberdeen has its heat and power company and Dundee, Perth and Angus are trying to set up their energy service companies. District heating systems have been successful where they have been put into social housing, and tenement blocks are 70 per cent more efficient. The problem is that some tenants have been so used to fuel poverty that they are terrified of using it, particularly in Dundee. Education is needed. I am not saying that district heating is a panacea, but at least it is something with which to tackle the difficult problem of fuel poverty.

John Mason: I build on Ash Denham's questions about district heating. The Commonwealth games village is in my constituency, and people moved in knowing that they would be part of a district heating system. There have been teething problems, not least because there are different housing tenures and the housing associations charge the residents in different ways. It is quite complex.

On risks, the consultation document "Consultation on Heat & Energy Efficiency Strategies, and Regulation of District Heating" refers to

"Design risk ... Construction risk ... Operational risk ... Demand/Market risk ... Performance risk ... Financial risk ... Regulatory risk".

Just reading the list is quite scary to start with. How can we manage all of those risks? Are some of them more serious than others?

David Handley: I will try to respond to that quickly. I must admit that when I saw that list of risks, I had a similar response to you. They are all very real risks, they are all very important and they all need to be recognised. However, I think that we can simplify the list by, in effect, characterising risks into, first, the risk of construction—getting the product away; and, then, the risks of operation—the long-term operational asset. By creating a regulatory framework almost that addresses the long-term asset management aspect, people know what they are constructing and know how to design the risks of construction accordingly. There are still barriers that need to be removed, but to my mind the distinction is between the operational lifetime and putting the equipment in the ground.

John Mason: Okay.

Keith MacLean: Those risks are not new to people in the energy industry, because they are the sorts of risks that are managed already for gas supplies and electricity supplies. The question is about introducing another asset class alongside gas, electricity, water and all the others that we have. What is the justification for adding a new class with a new set of risks and players? If doing so makes sense because the risks can be easily managed, that is fine. However, there are a lot of other risks associated with district heating. Other than in some of the new build and in retrofit of high-rise buildings—or other places where there is perhaps a good economic justification for district heating—going at it wholesale and having all the additional risk management to deal with is an issue that needs to be seriously considered.

John Mason: Does some of that arise because we are relatively new at district heating in Scotland? For example, issues that have come up in my area are not knowing what the maintenance costs are going to be or how long pieces of plant will last, so we do not know when they will need to be replaced. However, I presume that, over time, we will become more familiar with those kinds of questions.

Keith MacLean: Yes, absolutely. However, since all of them have already been answered for the gas network that serves about 80 per cent of the population at the moment, why would we introduce a new set of risks that we know less well if there is an alternative solution, which is to continue to use the gas network? Increasingly,

that is the point that is being looked at, particularly in countries such as the UK that have a very strong gas network. Can the gas network be repurposed in the future to continue playing the role that it has played for decades now of providing energy for our homes with individual heating solutions and gas boilers. If that can continue, it is a way of avoiding a lot of disruption and new, additional risk that will always be more difficult to manage than the risk that we know. That is why it is really important, before we start looking at mass conversion to district heating or electrification, to understand clearly at a national level what the options will be for using hydrogen in place of natural gas.

The point that I want to emphasise is that district heating is not a low-carbon technology. District heating in Poland is very efficient, but it is run by coal and is very carbon intensive. Pretty much all the major district heating schemes across Europe use fossil fuels, because they are cheap enough. District heating with low-carbon sources is more expensive to do, and we do not even have the low-carbon sources for it in the first place. So, another risk of district heating is that it is not low carbon. Therefore, if decarbonisation is the task, we have to be very clear about where the decarbonised energy for district heating will come from in the first place.

Professor Haszeldine: I want to back up that point, which builds on the discussion that we had at the beginning of the meeting. We have the dual motives of low-cost, effective and efficient heat supply, and low carbon. If you develop many local heat centres throughout a city, which are all individually burning methane gas or even biomass, you will reach a cul-de-sac around 2030, when it will be difficult to decarbonise easily. For a longer term vision, one would look seriously at decarbonising the gas supply and converting it to hydrogen, which could enable us to go to zero carbon throughout the country, rather than just to reduce carbon by 20 or 30 per cent, which is what we are talking about with district heating.

We have to think about the money, too. Hydrogen substitution for methane gas in the current infrastructure could be three times or even 10 times cheaper than district heating.

John Mason: Ms Goodenough, I do not know whether hydrogen is your area.

Fiona Goodenough: It is.

John Mason: How long do we need to wait before we can make a real decision between hydrogen and district heating? We are hearing a lot of people saying, “It could be,” “It might be,” and “We are going to work out the costs.” Do we need to act?

Fiona Goodenough: We have been waiting for quite a while, to be honest. Hydrogen is the new word around the place. Previously, it has always been, “No, no, never hydrogen.” Hydrogen has a massive role to play, but a lot of people have to be convinced about the costs of injecting hydrogen into the gas grid. Some academics say, “Great,” but others say, “Absolutely not—we would need 43 per cent more hydrogen.” There are lots of numbers floating around.

SGN is going to undertake a trial in Scotland, and we need to do that trial in order to convince everybody. The Leeds city gate project was ambitious and fantastic, but it left a lot of uncertainties around the final numbers, and we need to address that. I am still convinced that hydrogen has a huge role to play if we are trying to decarbonise heat.

John Mason: Should we pause on district heating until we find out more?

Fiona Goodenough: No. It is down to local authorities that are trying to deal with fuel poverty and so on. We are very slow, to be honest, and we are risk averse in relation to doing large-scale projects. The stuff that we are doing at present is really novel, but we lack the funding and support to start to scale it up.

The Convener: Thank you. I will take a further brief comment from Professor Haszeldine before we move on to a question from Andy Wightman.

Professor Haszeldine: I am in favour of getting on with pilot projects because, otherwise, we will never have any real knowledge on the issue. Pilots can be at a scale of tens of homes or 1,000 dwellings. We are talking about a multidecade transition, so that will not prevent us from acting in parallel and fitting district heating in local authority tenements where that is appropriate. However, we have to bear in mind that we might be changing the energy source from methane to hydrogen in 10, 15 or 20 years’ time, so we need to build in resilience and an opportunity to change in the future. We do not want to build our infrastructure—expensively—into a cul-de-sac.

Andy Wightman: The consultation proposes that local authorities be given the power to zone areas for district heating and powers to award exclusive concessions to develop and operate district heating schemes. Do you broadly agree that local authorities need the power to zone areas for district heating? Are exclusive concessions the way forward for the construction and operation of district heating?

David Handley: We have alluded to the fact that local authorities have a critical role in co-ordination, and zoning will potentially help us to progress towards that level of co-ordination and create a clear signal around that. The question is

what we mean by a concession. That can be a multitude of things, from a concession in a fully regulated model to a very light-touch concession. I suspect that more established, robust regulation could be quite useful in promoting district heating. The key thing would be to ensure that we have co-ordinated concessions rather than a patchwork approach with a multitude of concessionary structures across the area.

11:30

Andy Wightman: Does anyone have any other thoughts?

Keith MacLean: I will make the same point: we would need to understand the reasoning for the zoning. While we are still considering how we should approach electrification and the repurposing of the gas grids, we would want to be sure that we were going for low-regrets zones in places where it made sense to do it anyway.

There are good reasons for district heating. It is an efficient way of producing, distributing and storing heat for use. Where we have it, it makes sense to have a model within the zone for how the developer and operator will be given an opportunity to tender to build and run the system, and to have some sort of concession for that. In the first instance, however, we need to confine that to clear low-regrets areas where it makes sense to do it anyway.

Andy Wightman: That is a very clear message. Do you have any thoughts on the proposal to create a Government-owned energy company and whether such a company might have a role in the delivery of district heating?

David Handley: I am afraid that I am not familiar enough with the details. A Government-owned energy company can be on the supply side or it can be a vertically-integrated company. I am not sufficiently clear about exactly what the proposal is to understand which of those structures is being proposed.

Andy Wightman: There is not much detail at the moment. I am wondering about the experience in other countries. A large transition has to be made over a number of decades, so Government has a big role to play. Are there any examples of Governments playing a leadership transition role, maybe not in district heating but in other aspects of energy?

Keith MacLean: It is worth remembering that nearly all our energy infrastructure was built in the public sector. It is still the case that very little has been done in the private sector that was not predetermined by legislation or regulation. In order for markets to play their best role, they need clarity of purpose. If that is given by a Government body tendering for what needs to be done—perhaps to get something built—and then tendering again for operation of the asset, that approach can work well. It gets over the problem of the design and construction risk, which is often priced in expensively in the cost of capital. For that reason, the option of a Government body should definitely be explored. However, that should be done on the basis that it will still be the private sector that delivers. We should not build up a massive state-owned and state-run organisation that builds and runs everything.

The clearest examples of getting the costs of capital down that have been calculated are with regard to nuclear projects. It is believed that doing it in that way can get the costs of capital down from about 12 per cent, which is where Hinkley Point C is, to about 3 per cent, which is the normal rate that would be applied to a Government project. That makes a massive difference to the overall cost.

Professor Haszeldine: I personally think that the role of a Government company in Scotland would be as the designer and architect of the system in order to give a long-term overview of planning and multidecade confidence. That would show people that it was worth while to engage with the system because the company was serious about doing the work over a number of years.

The role of such a company would really be in master planning of where you want to build pipes and where you will build them first, where you want to have wires and where you want to have them first, and whether you want to have a massive roll-out of district heating early on or whether you want to wait a bit longer and see, which is what we are counselling at this end of the table. Its role would not be the delivery. The boots on the ground, the turning of spanners and the welding of beams would be provided by private enterprise, although that must be contracted through the system architect.

At the moment, in the UK, I do not think that we have a strong system architect role. It is laid off from the Westminster Government to National Grid or the Office of Gas and Electricity Markets—it is always laid off to somebody else, who denies overarching responsibility for it. That is not going to enable us to change our infrastructure easily.

Andy Wightman: Thank you.

Richard Leonard: The watchword has been "decarbonisation", but one of the other threads running through the energy strategy is decentralisation, and I wonder whether you have a view on the extent to which that applies. I presume that some of the support that lies behind the keenness on district heating projects is precisely that localised, decentralised delivery mechanism.

What are your views on that? Does the draft energy strategy strike the right balance between a more centralised approach and decentralised delivery?

Keith MacLean: On the point about central versus decentral, in my book, the model that we have at the moment in the vast majority of homes—an individual boiler—is probably one of the most decentralised heat production systems in the world. District heating is actually a process of recentralising rather than decentralising.

In energy debates, it is always important to make sure that concepts about what we do around electricity do not dominate, which has tended to be the case over the past 10 to 15 years. Heat is very different, as it is local by its nature. Ultimately, it will be heat in our homes, which is what we are looking for. It will be hot water, heat for cooking and all those things at an individual building or an individual residence level. It is therefore difficult to say whether centralisation or localisation makes sense. Ultimately, we want heat locally in our homes; we do not want a heat source on the top of Arthur's Seat that we can all warm our hands on from a distance.

To be a bit more serious about it, I note that electrification and decarbonised gas are much more centrally determined solutions. We cannot have somebody choosing to have hydrogen in one house in a street, somebody else having methane and people in the other houses having biogas. If we are to make significant infrastructure investments either in electrification or in repurposing the gas grids, those will have to be much more national in character. Even with district heating, as I said, we need a source of low-carbon heat for it. That may well be electricity or hydrogen, but equally—as with the new project in Glasgow—it might be taking heat out of the River Clyde with a heat pump.

We need to keep an open mind about whether the best solution is a central or a local one. There is no silver bullet or single answer to the question of what is best for a particular area.

Richard Leonard: Maybe Stuart Haszeldine can answer this question. You said that you are counselling caution at that end of the table, and I think that we all get that message loud and clear, but is that a reaction against an action? In other words, are you saying that we should take this steady as she goes rather than leaping headlong into putting all our resources into district heating, for example? In other words, will you foresee, in all likelihood, a role for district heating but maybe one that is not as big as some people estimate it to be at the moment?

Professor Haszeldine: From my point of view, the second outcome is much more likely. It would be premature to make any of these big decisions, because we have engaged seriously with the problem of heat for only a few years in Scotland. We have had examples of individual buildings or small groups of buildings benefiting from district heating, and those schemes are going ahead to be developed. It is a low-hanging-fruit analogy rather than a geographic-swathing-through analogy. We should let those 1,000 flowers bloom, so the regulation, the policy and the approach should permit them to pop up and emerge where local knowledge and enthusiasm permit that to happen.

However, I strongly support Keith MacLean's point that the provision of the basic energy vectors will often—or even usually—still be centrally provided. There will still be a need for a centralised grid for electricity. Even if everybody has some solar panels on their house, they will still need electricity at night. People might like to have wind power, but they will still want electricity in February when the wind does not blow. Those energy sources will require national back-up systems and national infrastructure systems.

If we choose to keep methane gas as our biggest heat delivery system, supplying 80 per cent of dwellings, we will miss our carbon targets, so we will be in a stuck situation in 2030. If we choose to change the delivery of methane to all electricity, we will need to have unfeasible numbers of renewable systems built, which we have no idea how to deliver. We could choose to repurpose that into hydrogen, but it is impossible to envisage producing hydrogen at cheap cost locally. We will have 10 or 20 hydrogen production facilities around Scotland producing that hydrogen to send through the pipes, which is a national infrastructure role. It is a mix of horses for courses.

David Handley: It is important to recognise that we already have an established and well-developed network in place, which is running at low cost. As part of the iron replacement programme, we are replacing all the iron pipes with plastic pipes, certainly at the more local level. That helps to create the hydrogen economy and enables further gases to be transported through those pipes. It is important to ensure that we are using the assets that we have available, because that helps us to deliver that decarbonised heat at least cost.

Keith MacLean: May I make a further comment on the timing? The carbon intensity of heat production at the moment is relatively low. Because we burn gas quite efficiently, the carbon intensity of heating in most people's homes is about half of the UK electricity level, which means that we have to bring down the carbon intensity in other sectors for quite some time before the heat sector becomes the limiting factor. That gives us

the advantage that we have a little bit more time to find optimal solutions for the heat sector, and that is why we should properly wait for SGN and others to complete the tests that they are going to do, so that we have full, practical experience of things such as hydrogen to base our decisions on.

At a UK level, most of the estimates from the Committee on Climate Change for the period of heat decarbonisation are in the 2030s and 2040s rather than the 2020s, because in the 2020s we will need to be preparing and there are other, greater priorities in the power and transport sectors where we can make more substantial gains. There are some questions about the timing, and the timing in the draft energy strategy for the 2032 targets could prove challenging. They are ambitious, and they are laudable for being ambitious, but my worry is that it could be horrendously expensive if we rush into them without having done the preparatory work—and, probably, before it is necessary in order to get on the 2050 trajectory.

11:45

Professor Haszeldine: This comment is really for the record, rather than being about what we are talking about today. In the Scottish climate change plan, we have not recognised the connection between making hydrogen available for heating networks and making it available for transport, where we also have a problem. One will enable the other. The energy modelling needs to ask specifically how they connect and how that will reduce the costs of entry and roll-out of a network for hydrogenating transport with fuel-cell vehicles. That could be much more effective and cost less than the electrification of vehicles, which is the direction that we are heading in. Again, we run the risk of making a decision too early and going down a cul-de-sac.

Jackie Baillie: I want to pursue that a little further. Politics is all about timing. I am curious to know when SGN anticipates that the trials will be complete and we will get a sense of whether replacing methane gas with hydrogen is a real possibility. I hear what you say about the 2030s and 2040s for implementation, but when will we know, because big infrastructure projects take quite a bit of planning?

David Handley: Absolutely. This builds on a point that was made earlier: decarbonisation of heat is a significant challenge that has not been fully addressed, so we are at the beginning of the curve. Among the hydrogen projects that are currently under way, there is a feasibility study that will identify the next sites, which is likely to take a couple of years; I can provide the committee with precise timings. Hopefully, a demonstration plant will be provided about three to four years after the feasibility study has been completed.

It is important not to lose sight of the fact that, in addition to the pilot projects, there is the surrounding safety case. Much of the work that we did in the pilot project in Oban on opening up the gas market involved looking at the gas safety regulations for broadening the bandwidth to allow different gases to go through. Such changes take time if we want to ensure that everyone is comfortable with them. We should not lose sight of that, because it is an important part of the story.

Jackie Baillie: We would be interested in getting further detailed information on that.

Keith MacLean: The other thing to remember about hydrogen is that it is not that new. Until the 1960s, 50 per cent of the gas in our gas networks was hydrogen. Town gas was a strange mixture—about half was hydrogen and the rest was a mixture of hydrocarbons and carbon monoxide. That is why it was so effective as a means of ending it all by putting your head in the oven. [*Laughter*.]

Jackie Baillie: That is a detail too far.

Professor Haszeldine: I support SGN's safety culture, which is absolutely essential, but the choice is not necessarily all or nothing. Much of the gas network seems to be rated for 10 per cent hydrogen, because historically, until 10 or 15 years ago, that much hydrogen was allowed. As an academic speculation, one could spike our existing gas delivery with 10 per cent hydrogen, without any adverse consequences. Obviously, SGN would advise us on how tractable that is.

We could start to do that, and I could buy in a hydrogen generating plant with carbon capture and storage, which is known technology—there are several examples already operating worldwide. I could drop that into St Fergus gas terminal—I could generate hydrogen, feed that into the grid and take away the carbon dioxide—and that could be operating by 2022.

I have not done this with SGN, so I will concede to anything that it says about safety, but I offer that as an illustration of the point that we can get on with large-scale pilot projects and gather more information. I do not want to wait; I want to progress at the appropriate pilot scale.

Jackie Baillie: That is very interesting.

David Handley: I echo that point and agree that there is a lot of work that we can be getting on with, such as increasing the blend, over the next four or five years. We are not yet clear on where the absolute limits are when it comes to the safety case, but we have a fair amount to go in decarbonising gas and that should keep us busy for at least the next five years.

Keith MacLean: National Grid has already started trials of injection on an isolated campus at Keele University. It will operate with blends such as those that Stuart Haszeldine has talked about. That process is already under way.

Fiona Goodenough: There is also an opportunity slap bang in the middle of the city of Dundee, where there is a very large site that is owned jointly by National Grid and SGN. That site, which has been in its current state for the past 20 years, could not be used for residential or any other purpose. It is very much a brownfield site that is ideal for carrying out the form of testing that we would like to do on an integrated energy system. I have concentrated on the transport side, because we need demand, which buses take. We are also decarbonising our city centres. There is a massive opportunity there, on which we could work together.

Equally, we continue to work with our European partners. Across Europe, we are undertaking some very ambitious large-scale projects on hydrogen infrastructure and fuel cell buses and fleets. There is another incentive that involves working with cities and regions on how we start to commercialise hydrogen technology across all the sectors. I am taking that forward with the cities, which I hope will sign memorandums of understanding, after which we will form a working group to progress the project. Together with our European and international partners, we could start to make a big change in Scotland.

Keith MacLean: Aberdeen already has the largest fleet of hydrogen buses in Europe.

Jackie Baillie: I know. I think that the committee has taken evidence on that before.

I turn to the question that I was supposed to ask you, which is slightly different. There are likely to be opportunities and challenges for existing industrial plant that generates waste heat. Do you think that there is any possibility of such plant connecting to, say, a district heating network or another form of heating network?

Keith MacLean: Clearly, that is possible. A lot of the heat mapping that has been done for Scotland has identified sources of waste heat. The difficulty with that is how sustainable it will be. At the moment, such heat probably comes from burning fossil fuels. We must ask whether that will be able to continue.

There is another big problem. When I was with SSE in the 1990s, we were developing combined heat and power plants. The big issue there was that the industries that we were heavily involved with at the time—such as the paper industry—unfortunately went bust in the years after 2000, and suddenly there was no longer any heat. If we have a big source of heat, we have to ask ourselves what we will do if it breaks down, goes out of business in the long term or converts to something else.

Given the pressure that is on decarbonisation at the moment, we would need to be really clear that we were making a worthwhile investment in the heat networks in order to be able to utilise that heat, and that it—or an alternative—would continue to be available. A lot of the economies on such heat networks work over 40 or 50 years, just as pipes and cables do in the rest of the industry, so if long-term sustainability is not there, it is questionable whether the extra investment is worth while.

Jackie Baillie: I will stop there, convener.

The Convener: Thank you. Gordon MacDonald has a question.

Gordon MacDonald: From the earlier discussion, I get the impression that we need some form of regulation for district heating. One of the comments was about the patchy performance of existing district schemes, so we also need technical standards. On the lifetime of such projects, which the panel has indicated is quite long, we need a form of consumer protection. Given those points, are there any drawbacks or challenges that a licensing system might create? Given the devolved settlement that we have, do we have the powers to introduce licensing?

David Handley: A correctly structured licence could address a lot of the challenges that you have identified. As we see in networks all the time, if we link performance and returns through to outputs, incentivising good delivery and ensuring that customer satisfaction scores are there, and that the customer has knowledge of and comfort in what their bill will be, has visibility of what the bill will look like and knows that it will be produced on a fair and equitable basis, that is a very strong structure through which we can progress.

On whether the existing powers are sufficient, I am afraid that I will have to defer. Ofgem has noted that it does not have the remit to cover the district heating side. I do not know whether that will change or whether there is a timetable for change, but there appears to be a gap at the moment.

The Convener: We now come on to a question from Gillian Martin.

Gillian Martin: I am interested in your views on how we can take the public with us in whatever we decide to do. I am a member of the committee and I am confused about that. There is a lot of choice out there, and a lot of technical language is used. The ordinary consumer does not even take advantage of the opportunity to swap energy supplier to the extent that we had hoped they

would. I am interested in your view on how we take the public with us, whatever we decide to do with our energy strategy.

David Handley: Taking the customer with us is vital. It is incredibly challenging, because we have multiple customers; each one will respond to information in a different way and each one will find different things informative.

This has been mentioned previously, but it is clear that making sure that the customer does not go through unnecessary disruption and end up with a stranded asset is key. It is probably preferable to use the existing equipment and to increase the blends of decarbonised gas that go into the network, so that the customer does not face a choice. Once we build out the district heating networks, consumers can move into that area in the full knowledge of what they are entering into. That is better than trying to bring about substantial change through retrofitting at a later stage, and potentially imposing it.

Fiona Goodenough: Early public consultation events should take place, and it should be about education all the way. Whatever we decide to go for, it will be confusing, but we have to have public buy-in, otherwise it will be a disaster. When we introduced the hydrogen buses in Aberdeen, there were mixed messages, so we had to constantly reassure the public about why we had them. It is vital that we get clear messages out about why we are doing something and what the benefits are to the public.

Gillian Martin: What worked?

Fiona Goodenough: Engaging through public consultations, going to schools and issuing press statements that reaffirmed why we were doing what we were doing in Aberdeen. The press will jump on anything that you do if you are using public money. Most of what we were doing was funded from Europe, but that was not the point. The press liked to focus on the price of a bus and to ask why that money was not being put into a school or a hospital—the same old things. The result is that the operators start to back off because, at the end of the day, they run the buses in live operations. If a bus has Stagecoach's logo all over it and it is on the back of a low-loader, that has an effect and suddenly the private sector does not want to work with you. That is one small example. Early engagement with all stakeholders before we even start the trials is key. It is not a panacea, but at least it means that people are informed about what we are doing.

Keith MacLean: We have to engage and inform people about what is happening. However, there is a problem with gaining acceptance. All the solutions that we are looking at for decarbonising heat are more expensive than the natural gas solution that people have at the moment. We are already starting to climb up a hill rather than to ski comfortably down one, which we have perhaps done in the past.

Nevertheless, there are some interesting examples of how we have made such changes in the past, almost all of which have had fairly clear regulation at their hearts. The clean air acts were, in effect, a ban on coal for heating in cities, to make people switch to alternative heating sources. The changeover from town gas to natural gas was decided on and there was a programme of change. We have had effective regulation to make gas boilers more energy efficient and similar regulations for such things as light bulbs. Ultimately, people have not had a choice. There were a few moans and groans, but those things were always blamed on Brussels. The only difficulty now is that we will not have Brussels to blame them on, so we will need to find somebody else to blame.

12:00

Professor Haszeldine: I agree; it is a process of progressive nudging. It is a question of having a strong Government mission that says that we will do the right thing because it will lead to better air quality, a better environment and greater sustainability. In some cases, we now charge a lot to take rubbish away to landfill. That has public buy-in, because people can see that it is the right thing to do and it has created a lot of jobs. Such measures create jobs, business and wealth. We are not talking about an onerous hair-shirt burden; it is a question of leadership, doing the right thing and creating new types of jobs.

Gillian Martin: What is your response to the previous panel's comments on the importance of having a particular body to oversee all of that? That strikes me as being a key way to engage the public.

Keith MacLean: That is essential. The scale of the task is so enormous and it covers such a long period that the approach has to be cross-parliamentary and cross-party. The skill set for such major programmes does not usually sit comfortably with the civil service. The Olympics and the Commonwealth games were good examples where there were clear objectives and delivery was managed independently and effectively. In both cases, delivery was not late—that was not an option for either of them. Other big infrastructure projects have been managed successfully, but such projects have to be done independently of Government.

We have one chance to put in a network, because it will still be there in 2050; we have two chances to put in generation, such as gas, wind or

solar; and we might have three goes at boilers and end users. Over that time, we will have five price controls, seven UK Parliaments and 35 UK energy ministers—that is the run rate at the moment. I do not believe that our governance system is capable of making the key decisions. Although the tenure in position has been much longer in Scotland than it has been at Westminster, a lot of the measures that we are talking about will be dependent on that. Between the UK Government and the Scottish Government, we need to put in place a governance system that will be long term, independent and capable of delivering massive programmes.

Bill Bowman: Gillian Martin has covered most of my questions about engagement and changing behaviour. The panellists seem to be saying that that process is very important and that it must start as soon as possible. However, we need to know where we are going before we start sending out a message; if we do not, we will get into one of the cul-de-sacs that were mentioned earlier. Just because the satnav says that a particular route is the best one at the moment, that might not be based on correct information.

Given our timescales, how stretchy do you think that they will have to be to be realistic?

Keith MacLean: I do not think that they need to be stretchy. To get into a 20-year delivery programme, we need to prepare. We cannot say that, because we need to start in the 2030s, we will make the decision in December 2029.

We need to prepare the path, but it is eminently doable. Indeed, we have shown that we are capable of that with major changes such as the move from town gas to natural gas, and we have shown with major energy efficiency programmes that we have been able to get the right run rate of measures. UK-wide, we are talking about 20-year programmes that will convert about 20,000 properties a week. On a pro rata basis, that will mean decarbonising 2,000 properties a week in Scotland over the course of a 20 to 25-year programme. That is challenging, but it is eminently doable, as long as we prepare the way and ensure that everything is in place at the start.

Bill Bowman: Are you talking about the 2030 date?

Keith MacLean: Yes. At the moment, we can be entirely consistent with climate change targets by rolling out the decarbonisation of homes in that timescale. That would follow the energy efficiency programmes and so on that we have talked about, which can be started beforehand. If we could start in 2025 in Scotland, that would be even better but, as I have said, I do not think that there is a need to impose an overly challenging timescale on this. If we do, the cost challenge will become too difficult.

Professor Haszeldine: I disagree slightly. For me—I think that we will all agree on this—the objective is to have very low carbon across Scotland by 2050. If we work backwards from that, we can see 2032, 2030 and 2025 just as milestones; we are in 2017, and we have already been doing this work for five or 10 years. We are not about to start—we are part way through.

The problem that we are finding is that we have done some of the easier parts and now things are becoming more complicated and interactive horizontally, if you like, and in the direction that our path is going. We need better long-term security of governance, which will also help us to do the pilots and the experiments that will allow us to take final decisions about certain things in 2025 and some more final decisions in 2030. It is the preparation as we go on this journey that I want to highlight; I think that Keith MacLean was talking about that, too. None of the intermediate dates matters to the final destination, but we have to tick them off progressively. We do not quite know in which order they will be ticked off, because we are still doing the work.

David Handley: The 2032 target is absolutely challenging—and I think that it is absolutely right that it is. The industry needs challenging targets, because they help to focus minds and to focus attention on how such challenges might be addressed. However, we should not underestimate how challenging it will be to reach the full percentage.

The Convener: So is it a chicken-and-egg situation or more of an inside-out puzzle?

Keith MacLean: I do not know that it is either. We are starting this work, and we can see a path to getting to where we have to go. The Scottish Government's commitment to SEEP and its recognition of the moneys that are going to be necessary in that respect are a very good start. I led the work across Government and with the expert groups that put together the recommendations that turned into SEEP, and I finished my report in January 2015. I agree with a previous witness that it is a shame that we are still taking quite some time to get there, but nonetheless I think that there has been a strong commitment to this. If you like, that was the chicken—or the egg—and we now need to build on that and put the necessary plans in place. They are doable as long as that commitment exists and the funding for it materialises.

The Convener: I thank all our witnesses very much. We now move into private session.

12:09

Meeting continued in private until 12:16.

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