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Pàrlamaid na h-Alba

Official Report

RURAL AFFAIRS, CLIMATE CHANGE AND ENVIRONMENT COMMITTEE

Wednesday 14 May 2014

Session 4

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RURAL AFFAIRS, CLIMATE CHANGE AND ENVIRONMENT COMMITTEE
14th Meeting 2014, Session 4

CONVENER

*Rob Gibson (Caithness, Sutherland and Ross) (SNP)

DEPUTY CONVENER

*Graeme Dey (Angus South) (SNP)

COMMITTEE MEMBERS

*Claudia Beamish (South Scotland) (Lab)
*Nigel Don (Angus North and Mearns) (SNP)
*Alex Fergusson (Galloway and West Dumfries) (Con)
*Cara Hilton (Dunfermline) (Lab)
Jim Hume (South Scotland) (LD)
*Angus MacDonald (Falkirk East) (SNP)
*Dave Thompson (Skye, Lochaber and Badenoch) (SNP)

*attended

THE FOLLOWING ALSO PARTICIPATED:

Dustin Benton (Green Alliance)
Lucy Chamberlin (Royal Society for the encouragement of Arts, Manufactures and Commerce)
James Curran (Scottish Environment Protection Agency)
Iain Gulland (Zero Waste Scotland)
Gordon McGuiness (Skills Development Scotland)
Alison McInnes (North East Scotland) (LD) (Committee Substitute)
Ewan Mearns (Scottish Enterprise)
Ian Menzies (Education Scotland)
Marilyn Wakefield (Dryden Aqua)
Colin Webster (Ellen MacArthur Foundation)

CLERK TO THE COMMITTEE

Lynn Tullis

LOCATION

Committee Room 1

Scottish Parliament

Rural Affairs, Climate Change and Environment Committee

Wednesday 14 May 2014

[The Convener *opened the meeting at 10:03*]

Interests

The Convener (Rob Gibson): Good morning, and welcome to the 14th meeting this year of the Rural Affairs, Climate Change and Environment Committee. I remind everyone to switch off their electronic equipment, as it can interfere with the sound system.

Jim Hume has sent his apologies. We welcome Alison McInnes as his substitute. Do you have any interests to declare, Alison?

Alison McInnes (North East Scotland) (LD): I have no relevant interests to declare.

Resource Use and the Circular Economy

10:03

The Convener: Agenda item 1 is an evidence-taking session on resource use and the circular economy with stakeholders. I refer members to the paper that was prepared for the meeting.

I ask that we all introduce ourselves briefly, so that we know who everyone is. After that, I will kick off with the first question, which is on an issue that a number of members have been thinking about.

Cara Hilton (Dunfermline) (Lab): I am the MSP for Dunfermline.

Dustin Benton (Green Alliance): I am from Green Alliance.

Ian Menzies (Education Scotland): I am from Education Scotland.

Claudia Beamish (South Scotland) (Lab): I am a South Scotland MSP and the shadow minister for the environment and climate change.

Gordon McGuiness (Skills Development Scotland): I am from Skills Development Scotland.

Ewan Mearns (Scottish Enterprise): I am from Scottish Enterprise.

Dave Thompson (Skye, Lochaber and Badenoch) (SNP): I am the MSP for Skye, Lochaber and Badenoch.

Colin Webster (Ellen MacArthur Foundation): I am from the Ellen MacArthur Foundation.

James Curran (Scottish Environment Protection Agency): I am from the Scottish Environment Protection Agency.

Nigel Don (Angus North and Mearns) (SNP): I am the MSP for Angus North and Mearns.

Alex Fergusson (Galloway and West Dumfries) (Con): I am the MSP for Galloway and West Dumfries.

Iain Gulland (Zero Waste Scotland): I am from Zero Waste Scotland.

Alison McInnes: I am a North East Scotland MSP.

Marilyn Wakefield (Dryden Aqua): I am from Dryden Aqua.

Angus MacDonald (Falkirk East) (SNP): I am the Falkirk East MSP.

Lucy Chamberlin (Royal Society for the encouragement of Arts, Manufactures and Commerce): I am from the great recovery project

at the Royal Society for the encouragement of Arts, Manufactures and Commerce.

Graeme Dey (Angus South) (SNP): I am the MSP for Angus South.

The Convener: I am the convener and the MSP for Caithness, Sutherland and Ross.

I will kick off with a general question. In thinking about the Green Alliance's paper, we are interested in identifying a thematic approach to how Scotland approaches the circular economy and how that should be structured and governed in order to meet the challenges that we face. I will put the issue in those terms, but for those who want to read the Green Alliance's more academic description, it is at the top of page 5 of paper 1 and says:

"This analysis was intended to identify sectoral opportunities, but was focused more on identifying the thematic, governance-focused challenges that Scotland faces in promoting the circular economy across all sectors."

We are quite keen on clear and simple English. The problem is that the issue is a bit academic when presented in those terms and we want to make it as practical as possible for people. Indeed, a reason that MSPs are picked from varying backgrounds is to bring that practicality to bear on the subject.

What themes should we focus on? How should the circular economy be governed? What can be done at Scotland level? Who wants to kick off on that?

Dustin Benton: Perhaps I can pick up that challenge. I will endeavour not to be too academic. I apologise for the wording in the paper, which comes from my background—when you work for a think tank, serious wonkery is expected.

We tried to look at Scotland as a country and consider how its strengths and opportunities might apply to the circular economy. We noticed three things that seemed to be particularly relevant. The first is Scotland's scale—being a relatively small country has benefits and drawbacks. Secondly, we looked at Scotland's institutions and how those might differ from other countries that are trying to progress the circular economy. Thirdly, we looked at politics and policy, which make a big difference.

I will touch briefly on those issues. On policy and politics, taking energy policy as an example, Scotland has been very successful in relation to other countries in the United Kingdom. An important element of that was the clear direction that the Scottish Government gave in favour of renewables and other low-carbon technologies, such as carbon capture and storage. That clear direction has enabled investment to happen and has given a sense of possibility rather than prevarication.

We noted that Scotland has maintained a robust range of institutions that could help to take technologies out of the lab through the commercialisation process and into the market. Having that institutional framework is really important. When we spoke to a suite of investors in Edinburgh around a month and a half ago, they told us about the importance of human contact—of knowing people and interacting with them. We think that Scotland's institutions might be able to foster that very effectively.

On scale—this is a really important point—Scotland has a relatively small economy in the context of countries such as China, India and the United States. It does not have a lot of material to process in big factories, which limits the large-scale reprocessing opportunities. We are unlikely to see a big aluminium smelter, for example. However, opportunities exist in the social connectedness that flows from the small scale. People know each other and can talk to each other. A substantial section of the Scottish business community can come together and talk as people rather than in big plenary sessions. That human-to-human contact will make a big difference in a circular economy, as it requires lots of interaction, connections and discussion across supply chains.

James Curran: It is right to look at the issue in at least those two dimensions, although perhaps there are more. The Scottish circular programme, which is jointly run by the Scottish Government, Scottish Enterprise and Highlands and Islands Enterprise, SEPA and Zero Waste Scotland, is looking at the issue in two dimensions: evidence gathering and engagement.

On evidence gathering, the programme is taking a sector approach and a thematic approach. Under the sector-specific studies, it is pursuing investigations on sectors such as oil and gas, renewable energy, aerospace and food and drink and is considering the opportunities and mechanisms in them for creating and developing the circular economy.

Under the thematic approach, the programme is considering more widely applicable approaches such as materials that are critical to the Scottish economy, fiscal measures, eco design, the types of business models that we might consider, extending and amplifying producer responsibility and wider regulatory activity. [*Interruption*.] I am sorry that I am croaking today. The wider regulatory activity is a particular interest of SEPA's and links to the definitions of waste.

The engagement is about identifying the opportunities, as our colleague Dustin Benton said. Our initial analysis leads us to think that the stimulation of the circular economy probably needs intervention, which could be fiscal—such as

subsidies and other mechanisms for promoting the circular economy—or it could be regulation or standard setting.

There is a lot of work following exactly the kind of lines that have been indicated.

The Convener: Does anybody else want to come in on that—perhaps Ewan Mearns from the Ellen MacArthur Foundation?

Ewan Mearns: I support what James Curran just said. We have been taking a team Scotland approach and I am not convinced that we need any new institutions to govern how we deliver the circular economy. Most of the main delivery organisations are involved in the exercise. As Dustin Benton highlighted, because Scotland is small scale, we can make connections, deliver quickly and be agile.

The key issue is the need to clarify the particular roles of development organisations and to have a strong policy lead from the Scottish Government. SEPA leads on regulation, and the enterprise agencies, Skills Development Scotland and Education Scotland are involved. Between the partners, we already have the right institutions involved.

The Convener: Thank you, Ewan. I realise that you are from Scottish Enterprise, having read my notes. I meant that Colin Webster might want to comment at the general level.

Colin Webster: To build on the last two points that were made, one thing that France has learned from trying to instigate a circular economy through Parliament is that it is necessary to start with an informed and collaborative process rather than a legislate-first approach, which was the route that France went down. As a result, the Government there drew criticism from some corporate partners because there was not enough business collaboration although, from what Ewan Mearns and James Curran said and from conversations that I have had, it sounds like that is going on in Scotland.

Another thing that the French found was that it is necessary to be careful not to make the circular economy a subset of environmental or waste policy. There needs to be a systemic overview of how the economy could work. Again, from what James Curran and Ewan Mearns said, that seems to be the direction that Scotland is taking.

Graeme Dey: I will expand on the issue of scale and give two examples for discussion.

As I understand it, the plastic bottles—Coke and Fanta bottles or whatever—that we generate in Scotland tend to go to a plant in England to be recycled to provide the recyclate material for the next generation of plastic bottles. In my constituency, there is an SSE regional centre that recycles much of the kit that the company gathers. However, that is stuck on the back of a lorry, taken to Aberdeen and shipped across to mainland Europe.

Are we doing that because we do not have the infrastructure in Scotland but could realistically have it, or could we not proceed with that on a Scotland level and might we have to consider it at a broader UK or perhaps European level? In practical terms, what can Scotland do?

10:15

Iain Gulland: There are opportunities for Scotland in a number of the materials that we currently collect from the household and commercial waste streams, specifically plastics. With the introduction of new regulations on 1 January this year, there will be more materials coming out of the waste stream. You are right, though, that the majority—three quarters—of the household waste that we recycle is exported out of Scotland, which means that there is a lost benefit or opportunity to our economy in relation to the reprocessing and remanufacturing of that material.

As has been highlighted, Scotland is a small country. There are opportunities but our evidence and work have shown that, given the amount of resources that we have, the approach to collecting materials is still quite fragmented, as it involves 32 local authorities as well as a number of businesses. We need to harness those organisations together and work collaboratively with that supply chain. You will be glad to know that work is under way on that. A joint task force, involving the Scottish Government and the Convention of Scottish Local Authorities, is considering how the wider public sector can pool its resources to make those things happen—to put it in simple language. That is one of the challenges.

We are looking at a brokerage model in which local authorities pool their resources not only to get a better economic price for the materials through scalability and economies of scale but, more practically, to use that as feed stock for those opportunities. If someone is trying to land a plastics reprocessing facility in the south east of England, they can go to 100 authorities and will need to get only 10 or 20 per cent of them to sign up. However, to get that kind of volume in Scotland, they would need all 32 authorities to sign up to some sort of supply chain. That is another challenge.

We are working with local authority colleagues and the wider public sector because it behoves everybody to try to make those opportunities land in Scotland. There is an investment challenge, and we work closely with Scottish Enterprise on that. It

is not just about the supply; it is about how we can make the funding or support available for facilities here in Scotland.

Graeme Dey: To be clear, if we get all 32 local authorities to pull in the same direction, what infrastructure can we realistically expect to be delivered in Scotland?

Iain Gulland: I could reel off a list of X number of plastics reprocessing facilities and stuff like that. However, getting the materials is one thing, but we need to ensure that we have the right economic conditions for those businesses here in Scotland and for the offtake of that material. Plastic bottles are a good example. We have milk producers in Scotland, and Coca-Cola has a factory here, too. Those businesses are looking for that specific material, so we could provide a closed-loop circular economy for it.

There are huge opportunities for plastics, some opportunities for other materials from household waste and enormous opportunities with some commercial and industrial waste through reprocessing, remanufacturing and looking at supply chains. It might not be all about a circular economy in Scotland. We might add value to material here and then export it at a higher value out of Scotland, or we might bring it back in and add value to it before it goes back into the supply chain. That is a pragmatic view but, certainly, we could add more opportunities in Scotland.

The answer to the question is yes—if all the local authorities work together, those opportunities would be more easily realised.

Claudia Beamish: In relation to scale, I was interested in the Green Alliance evidence about the bioeconomy sector and the importance of cross-sector opportunities in Scotland. Can the Green Alliance or any other panel members comment on how that could be facilitated in Scotland?

Dustin Benton: The bioeconomy example that our submission considers is that of by-products from the whisky industry. We included that to show how, if we extract valuable materials from those by-products and send them to the pharmaceutical and salmon farming industries, we could capture a lot more value than we presently capture. That could be done either through anaerobic digestion or by feeding some of the by-products to cattle and sheep, I think. Forgive me for not having all the details on that.

As regards scale, Scotland can separate materials more intensively. One thing that Biffa Polymers has done—in the north-west, I believe—is to switch from having many different types of plastic feeding into its factory to using a single polymer type. I think that it deals with 20,000 tonnes per year. That switch has made a smaller-scale approach economically feasible. That type of opportunity could be taken up in Scotland.

The intensive source separation of plastic bottles in Switzerland has been key to the Swiss having a plastic stream that is pure enough to be sent to a reprocessor in England. A decade ago, when Boots was developing plastic bottle recycling, it needed a very pure plastic stream, but it could source that only in Switzerland and not in the UK. That is the sort of opportunity that Scotland might be able to take up.

The idea behind cross-sector working is that sometimes the material that one organisation has might not be valuable to it. The best course of action for, say, a waste company collecting plastic bottles might be to sell to China—if it is good at separating things out, it might get £300 a tonne. However, if it can sell its bottles to a plastics reprocessor in a different sector, the value can rise to about £1,000 a tonne, as we have seen with companies such as Closed Loop Recycling in London and Ecoplastic Recycling.

Making that happen is really a question for RDAs and technology development bodies. It is about trying to make links—

The Convener: I am sorry, but did you say RTAs?

Dustin Benton: I was talking about regional development agencies such as Scottish Enterprise and Highlands and Islands Enterprise.

The Convener: Oh—RDAs.

Dustin Benton: Forgive me, convener.

We need to make connections and create enough space for people to get together. Someone might say, “I’ve got a problem—I’d really like to be able to get this material, but I don’t know where to find it,” and someone else across the room might say, “Actually, I’ve got it,” or, “I know someone who has it,” and the two might do a deal. That is where we think such opportunities might be found.

The Convener: Before I bring in James Curran and Ian Menzies, I believe that Nigel Don has something to say. I will then take Colin Webster and, by the looks of it, Alex Fergusson.

Nigel Don: I want to stay with the subject of materials. I think that my point is closer to recycling than to remanufacturing, but I hope that we will get round to discussing remanufacturing eventually.

On Iain Gulland’s point about local authorities, which, as far as the public are concerned, are our primary recyclers, if we were able to get all 32 local authorities signed up one way or another, on what kind of timescale would we be able to get them to change what they do? I presume that they

have some fairly long-term contracts, and there are other constraints on what public bodies can do. Can you give me any clues about the timetable for doing all this, even with the best will in the world?

Iain Gulland: Absolutely. We have work under way that analyses local authorities' existing contracts for the offtake of resources and tries to imagine that timeframe. Some authorities have short-term contracts, but some are tied into longer-term deals. As a result, the change would have to happen over a period of time.

The local authorities would still collect the materials—that sort of work falls within their boundaries—so, depending on when and if such a brokerage approach was kicked off more formally, it would probably take between three and five years before there was a significant move in the amount of material available. It all depends on individual authorities becoming involved and on when they come out of their other contracts.

In any case, we are still developing what the brokerage model would look like, what its governance would be and how it would integrate with the market. There are also public procurement issues to address, and we need to work out how local authorities will interface with the model. The model has a couple of intricacies, but the direction of travel has been well received by local authorities. They are interested in it; indeed, some have agreed in principle that they would like to go down that route. I might need to get into a bit of detail here, but a critical point is that, if the first five authorities that signed up to the brokerage model happened to be the biggest ones with the most materials, that would accelerate delivery.

The Convener: Quite a lot of people want to speak. I will take Ian Menzies first.

Ian Menzies: The question for Education Scotland is how we prepare the future generation for the changes that will take place in the Scottish economy. Our involvement began in 2011, when we were contacted by the Ellen MacArthur Foundation and the University of Edinburgh. We were struck by the foundation's motto—

"to inspire a generation to re-think, re-design and build a positive future"—

which chimes well with the premise behind curriculum for excellence of giving young people skills for learning, life and work and ensuring that they are thoroughly prepared for what is very much a changing world in the 21st century. Through the curriculum, we want to develop higher-order thinking skills in our young people, and, as far as the circular economy is concerned, there is a focus on systems thinking to develop those skills.

One of the big contexts for learning in the curriculum is interdisciplinary learning, or joining up different disciplines. That is a rich context for learning that could bring together science teachers, teachers from a technologies background and teachers of the expressive arts, maths, business studies, economics and so on. There are opportunities to get strong interdisciplinary learning working in schools.

We want our young people to be scientifically and technologically literate in a changing world. They need to understand such issues if they are to make informed decisions. In our work at Education Scotland, we are aware that the Scottish Government has identified science, technology, engineering and maths—STEM subjects—as a national priority. Learning for sustainability was also a manifesto commitment. We see the circular economy as pulling all those together in an exciting and innovative way.

In the past three years, we have worked in close partnership with the Ellen MacArthur Foundation. We have been very much part of the team Scotland approach and have worked with colleagues who are around the table. We value that greatly. For us, the focus is on how we build such skills in our young people from three-year-olds upwards—not just in those who are at secondary school—to ensure that they have the creativity and the imagination to develop innovative solutions for the future, so that they can drive Scotland forward and make their lives better.

This is an exciting opportunity and we have made a good start in the past couple of years. On Friday, we will bring together a group of educators from around Scotland to think about the next steps and what our strategy might be for education and taking the agenda forward.

The Convener: We will come back to skills in a wee while. We are dealing with materials and scale, as well as the practicalities of the circular economy. A number of people want to come in on that.

James Curran: I will open with a fairly general point. At its heart, the circular economy is about biomaterials passing back into the biosphere through composting or other digestions, and technical materials being reused in the manufacturing economy. Fundamentally, a true circular economy must rely on renewable energy to drive it, which makes me think that Scotland is in a better position than any other country to grasp the extent and depth of the circular economy.

As Iain Gulland rightly pointed out, we are not going to do everything, but some good examples are developing. For example, a company in Dumfries sources agricultural plastic. The food and drink and agricultural industries in Scotland

are pretty successful. The company successfully turns that plastic into a plastic-based building material, but it is importing agricultural plastic. Some years ago, a lot of it came from Ireland. In central Scotland, the old agricultural waste of tallow is being turned into a biofuel. There are good examples of targeted, cross-sector interaction that is building on strengths that we have in Scotland and using largely renewable energy.

As I said, there is an opportunity for smart regulation or standard setting to stimulate such activity. There is a great opportunity to do clever thinking about promoting the circular economy while promoting existing Scottish businesses. That opportunity lies in section 82 of the Climate Change (Scotland) Act 2009, which allows the Scottish ministers to determine the recycled content of products that are used or manufactured in Scotland. If we do that smartly and cleverly, we can build Scottish industries, build on some of our strengths and put ourselves in a position from which those industries can go on to become internationally competitive. That would be a good way of using the tools that are available to us.

Colin Webster: To build on what James Curran said and go back to the point about scale and materials, it is important to note that the circular economy is not simply about dealing with materials at the end of their life. There has been a lot of discussion about what we might do with recycling facilities and so on. Savings can be made at the start of life, or the designer's stage. We need to work out how we can design products that do not go anywhere near recycling facilities. That would be the economically wisest move for us to make.

10:30

The big question is how we do that. That is about setting up system conditions. Ian Menzies talked about some of the good work that we are doing in education, which is vital, so that the designers and business leaders of tomorrow see the benefits of taking the closed-loop approach. I imagine that we should also subsidise the activities that we want to stimulate rather than subsidise things that do not fit in a circular economy—subsidies for fossil fuels are a great example of that.

This is also about procurement policies, which James Curran hinted at when he talked about recycled content. Procurement policies can stimulate the circular design of products. If Scotland is to scale things up, that will involve the inner loops that we talk about. Rather than recycling, we are talking about remanufacturing, repair and reuse and about how we can keep things in those loops. That is where the economic benefit is derived.

The Convener: That is helpful.

Alex Fergusson has questions—are they on materials and scale?

Alex Fergusson: Absolutely—they are on scale and to an extent materials.

The Convener: Okay. We will stick with that just now, but I want to bring in other members.

Alex Fergusson: My question fits well with the current discussion and goes back to Dustin Benton's point. If I picked him up correctly, he said that the easy thing to do is to collect all the plastic boxes and send them to China—that is the job done, but it is probably a rather environmentally irresponsible approach. He went on to say that, if we take a little more of a specialist approach and downscale the operation, we will increase the value and probably achieve a better outcome. That is certainly more environmentally responsible in terms of the journey time and the carbon footprint.

That points to a future in which small is beautiful in the circular economy, rather like the approach that is taken by the excellent Solway Recycling company in Dumfries, which—as James Curran rightly said—specialises entirely in agricultural plastics and turns out a superb building material. I am aware that I am talking about recycling rather more than the circular economy, but I still have not worked out where the difference arises. Would a small-scale approach be more efficient and therefore fit into Scotland extremely well, rather than the massive large-scale approach, which Graeme Dey mentioned and which raises questions about whether we have enough plastic to keep a plant going? I wonder whether anybody has comments on that.

The Convener: Dave Thompson can ask his question, if it is in the same area, and then we will get responses to both questions.

Dave Thompson: An obvious problem is that our approach of reusing and recycling, which we have pushed for some time, will have to run in parallel with the circular economy, but one can militate against the other. For example, to keep an incinerator or pyrolysis plant going, a lot of plastics are needed. If a pyrolysis plant is burning all the plastic in an area, that plastic will not be available for further recycling. Where will the conflicts arise between reuse and recycling and the circular economy? At some point, they will have a major impact on each other.

I also have a question on scale that relates to the Highlands and Islands. For a number of years, I was the director of protective services at Highland Council, and one of my responsibilities

was waste management and cleansing. We have many issues in the Highlands because of the huge distances to travel. Our landfill site in Inverness gave us a surplus of £500,000 a year, but we had to close it and start shipping the waste in lorries across to Peterhead or down to Perth. That had a big environmental impact from the transport, as well as a cost. I am not sure what the current cost is but, when I left the council back in 2001, I think that we were paying £5 million a year to dispose of our waste, whereas before we were making £500,000 a year. That 5 million quid could have been used to develop recycling and other local measures in the Highlands.

I am saying that, in the Highlands and Islands, it is necessary to look differently at how we deal with some of the issues. There is no point in taking a plastic bottle from Wick to the other end of the country. It would be far better to do something with it in the north. That might involve a pyrolysis plant, although I know that such things are extremely controversial. We must look at the negative environmental impact that can arise.

I wanted to throw those points into the mix.

The Convener: A number of witnesses are waiting to comment. We want to hear from as many people as possible.

Marilyn Wakefield: We deal with glass and glass recycling. Through research and development, we have developed a product called active filtration media that is used in filters as a direct replacement for sand—it works better than sand. Last year, we built a £4.5 million factory to produce the product, for which we have developed a worldwide market. It is self-cleaning and it lasts for the life of the filter.

Last year, we used 2,000 tonnes of recycled glass. This year, up until April, we have used 3,000 tonnes. We are still in the initial stages of reprocessing, because the plant is new. What we are doing has never been done before and we are developing the process as we go.

We already have a market for our product, which we are developing in the States. We are considering building another plant. Where we build the plant will depend on our ability to get the raw materials. We are experiencing problems in getting the raw materials. We need to get glass that has been processed to a certain state. There are a lot of impurities in everything that comes with recycled glass—the paper, the plastics and so on—so we need to get it semi-processed.

Our next plant might be able to take bottles before those materials have been removed but, at the moment, we have huge trouble removing paper. What is paramount to us—I am sure that the same is true in every industry, whether it involves plastics or cardboard—is getting the product that will be recycled, which is the glass. We do not want all the other stuff that comes with it.

It is extremely important that the glass is not mixed, because we need green glass or brown glass, which is the least-wanted and least-used glass. We do not want clear glass, because it has flint in it, which means that it breaks in a different way. The size and the particle shape are very important to us.

The material that we produce is negatively charged, so it sterilises as well as filters. It does not get clogged in the way that sand does. After sand has been used a number of times, it coagulates and channels are formed, with the result that it does not work effectively and has to be recycled. The AFM lasts for the life of the filter. In our next factory, it might even be possible to take the material out of a filter that has come to the end of its life and reactivate it.

It is crucial for us to get supplies. We are already finding it difficult to get supplies. The supply chain is quite tied up, in that some of the contracts with the likes of Viridor are for 10, 20 or 25 years, so it is difficult to get in. We are small in comparison with the remelt industries, which take huge amounts of glass and are therefore the recycling companies' first customers.

There are only six colour sorters in the UK. Viridor is building another one through in Glasgow. We have approached Viridor, but it has told us that everything that will be processed there is earmarked for England. We import our glass from England. If we cannot get the proper glass that we need for our new factory, we will not be able to build it in Scotland. We will have to go elsewhere.

We must find a source of glass. Scotland has enough glass for us; the question is whether we can get it. The present factory will use 40,000 tonnes a year. For the new factory that we want to build, the figure will be 120,000 tonnes. If we cannot get glass in Scotland, that plant will have to be located in Germany or wherever we can get the raw materials.

The Convener: Such practical examples are precisely the kind of thing that we want to dig into.

Iain Gulland: I will respond to the small scale versus large scale question. The simple answer is yes—we can. The reprocessing that we are talking about does not have to be big. There is an attraction to scale for investors, but technology is changing on a number of fronts and becoming much more mobile and adaptable at smaller scales.

We have invested heavily in anaerobic digestion in Scotland, which is very good. Many of the early anaerobic digestion plants were on quite a

significant scale, but the technology is advancing all the time, and we are looking at smaller-scale applications. New technologies are coming on to the market; some have been developed in Scotland and some have been developed abroad. In the future, there might be applications in rural parts of Scotland. Such development is constantly happening, and we are seeing many more opportunities at the smaller-scale, local level.

Are we trying to look after our own materials? That is one of the challenges. It is clear that that is where we are trying to add value to our own supply chain, so that we are not exporting materials.

There is an opportunity to bring in materials or products from outwith Scotland. Instead of exporting, we can import material to add value to it. I believe that Hewlett-Packard runs a factory in Greenock to reuse and remanufacture computers and hardware. It brings in stuff from the whole of north Europe, and it is a success story. Hardware from Scotland and beyond is looked at. Small-scale and large-scale opportunities exist.

The rural issue is interesting and is about being creative. Ian Menzies talked about entrepreneurship and people thinking more creatively. I know from experience that there was a focus on glass in Shetland. Instead of shipping glass all the way to the central belt, people there developed decorative slabbing, for example. A small business was created on Shetland that started to export decorative slabs. That is a small example of a focus on specific materials. From previous work that I have been involved in, I know that that approach is obvious to rural economies.

Our programme is certainly keen to help such things. This is not all about getting everything to the central belt or getting something to the bigger markets overseas; it is about trying to get a mixed economy.

Technology is helping. We see much more dynamic solutions for local delivery. I suppose that there is a different mindset, as opposed to the more traditional approach of putting something in a big container truck and shipping it to somewhere else. Somebody talked about separating out materials more creatively and understanding that we could do something with one type of plastic, but not all plastics, in rural parts of Scotland. The question is how we separate that out.

The Convener: We shall stick with materials and scale before Alison McInnes leads on skills. That is for the benefit of those who are waiting to come in on those issues.

Lucy Chamberlin: I echo something that Walter Stahel said about scale to the committee last October. He talked about the importance of embracing a global scale and a local and regional scale in a circular economy. Scotland will never manufacture everything itself, but it is important for it to look carefully at the waste hierarchy and at reuse and repair, because they should and could happen in a Scottish context and a local and regional context. For that to happen, it is important that manufacturers release the design manuals for their products, so that local small repairers can repair products safely. We advocate that.

Dustin Benton: I will pick up on some points that have been made.

I was particularly taken by the question whether small is beautiful. For certain things, it absolutely is, but for others, it absolutely is not. I will give a couple of examples.

Autocatalysts are filled with platinum, palladium and gold, which are exciting materials. They are collected at a European scale, and 10 per cent of them are processed in a factory in Gloucestershire. They are remelted and the melted stuff is shipped to the United States to be very finely refined back into particular types of material, which are shipped back to Europe for manufacturing to stick back into cars. There is nothing that we are going to do about that. That is a global system because gold, platinum and palladium are worth so much money.

10:45

For plastics, if we use source separate collection for particular material types, it would make more sense, as has been mentioned, to do that on a local or regional scale rather than shipping the materials around the world and increasing their carbon footprint. For food, it is clear that anything that is organic and wet naturally needs to be processed on a very small scale.

Remanufacturing is a very specific area. Hewlett-Packard's facility is a good example. Remanufacturing could take place in Scotland, but we would be competing with other countries throughout Europe. As you raise the value of material or of a product, you can pay for more transport. It is a question of getting a factory wherever you want it and pulling in materials and products to Scotland, and then exporting. That is a circular economy that can work on a regional scale. That is an issue for industrial policy and how you get factories built, which is not my specialism. Reuse can happen on a very small scale because demand and supply are locally correlated. There is no point in sending the material around, even if it is worth a great deal.

To pick up on the point about material constraints and lock-in, there is a risk that we will end up using materials for something that is relatively low value when we could be using them

for higher-value ends. I will give you an example of the scale of some technologies. Oil refineries need to be run on a very large scale to be cost effective; I am talking about 5 megatonnes of material per year. Just to give you a sense of scale, an analysis was carried out to look at how much organic material is potentially available in Scotland, and it concluded that there are approximately 9 to 13 megatonnes. If we collected everything—food waste, agricultural materials that are by-products or waste, and forestry products—we might be able to support one, or maybe one and a half, big biofuel plants.

In contrast, if we feed that material into a biorefinery and ferment it to get lactic acid that can then be turned into polylactic acid, which is a type of plastic, we reckon that we can do that—although it is more technologically uncertain—on a scale of 50,000 to 100,000 tonnes per year. We could have many more plants, and the product is likely to be more valuable.

In effect, we would end up with a trade-off between quite certain very large-scale recycling processes and more technically uncertain but potentially more valuable smaller-scale processes. In our submission, and in our work generally, we focus on the opportunities in Scotland for innovation in policy. If Scotland can develop some of these exciting new technologies, such as protein extraction from pot ale syrup, it might be able to get factories in those areas that will work for its scale.

The Convener: We will move to skills and education soon, but I think that James Curran and Colin Webster want to come back in on the theme of materials and size.

James Curran: I will pick up very briefly on three elements from the earlier discussion. It is difficult to be prescriptive about the potential scale of the circular economy in either time or space. One example that springs to mind is the imminent decommissioning of many enormous installations from the North Sea oil and gas fields. It seems that there must be a business opportunity, and Scotland should perhaps look at recycling—using renewable energy—the low-embedded carbon steel from those installations and releasing it back into the wider economy. That might be a good idea in Scotland.

There were questions earlier about the flow of some materials—particularly plastics—into pyrolysis plants and so on. Two things occurred to me. One is that we should not forget that we have millions of tonnes of available plastic in Scotland. It is buried in landfills at present, but we should not forget that there is a buried resource there. At some point in the future, those landfills could be mined for the materials that are stored in them. That would be a good thing environmentally and, one would hope, economically.

Secondly, we need to understand where waste comes from, which was a point raised by the representative from Dryden Aqua earlier in the meeting. We are developing a bid with partners to the European LIFE fund to enable us to provide real-time information on waste transfer. Whenever anybody transfers waste from A to B, they have to submit information on the waste transfer, for which there is a very old-fashioned system at present. If we were able to get the information online in real time, that would allow everyone to understand where waste is flowing and to make the best of the economic opportunities that it offers.

Colin Webster: On scale, size and cross-border opportunities, I would make the point that the Scottish Government was the first national Government to become a member of our circular economy 100 programme, which brings together corporations, emerging innovators and geographic regions to think of ways of scaling up the circular economy, using a collaborative approach. Other geographies that are now part of the programme include Wallonia, central Denmark, Bavaria and Amsterdam. There is a growing body of geographies that are interested in the issue and I know, from discussions that I have had with some of the members of the Scottish Government who have been part of the talks around the circular economy 100 programme, that interesting collaborations are already starting up.

We are running something called project mainstream, which examines pure material flows. We are working on that with a range of chief executive officers across Europe and are trying to find how effective flows can be facilitated. We are examining the cross-collaboration approach, the cross-sector approach and the cross-chain approach to see where the potentials are to quickly scale up the circular economy.

It would be worth keeping an eye on the European resource efficiency platform, which we are part of. We think that that is interesting because it is likely that industrial policies in Europe will follow from that platform's recommendations. It makes a couple of points that are relevant to the discussion that we are having. One is that the European Union waste policy should promote the benefits of cross-border flows, which is the kind of thing that we have been talking about today. The other is that we need to create a pan-European network of industrial symbiosis initiatives. Again, there are opportunities for one person's waste to become another person's food.

We need to move away from talk of waste. One of the key goals of the circular economy is to eliminate the concept of waste so that there is no

such thing as waste; there is simply food for secondary or subsequent cycles.

Iain Gulland: Opportunities in the oil and gas industry have been highlighted. I want to reinforce the fact that a lot is happening already in that area. We are working with Decom North Sea, which is a trade body for companies that are involved in decommissioning in the North Sea, and an event in Aberdeen today is looking at the opportunities around the circular economy and reuse in that area. The recycling of the metal infrastructure is an obvious opportunity, but there are also possibilities to reuse and remanufacture the valves, the kit on the rigs, the subsea infrastructure and so on in the supply chains and the resupply chains in Scotland and possibly to export them to other oil installations around the world.

There is a huge opportunity for Scotland. We are at the forefront in this area, because the North Sea is the first oilfield in the world that is going through this phase. People in the Chinese fields, the fields in the Gulf of Mexico and so on are looking at us and asking how you can go through a decommissioning phase of this nature and do as much as you can to ensure that the kit is reused and remanufactured. The event that is happening today is starting that kind of conversation.

The Convener: Alison McInnes would like to lead the questions on skills.

Alison McInnes: Before I do, I have a brief supplementary question for Mr Curran. It seems to me that getting the public sector to share information not only across agencies but with the public, in an open-source way, would spark quite a lot of initiatives, as entrepreneurs could get access to that information. Has that been considered?

James Curran: I agree that that is the case. I cannot promise you that it is in the LIFE bid. I will check and get back to you on that.

The Convener: It would be good for the committee to know about that.

Alison McInnes: Colin Webster talked about the need to skill up the design industry for new ways of manufacturing. The role of design at the very early stages is important. We have talked about education at the secondary school level, but we have not talked about the role of universities, colleges and research institutes in opening that up.

Another skill that is important concerns the new business models. Scottish Enterprise has a role in helping businesses to consider new business models, such as leasing and servicing, rather than encouraging everyone always to buy.

I would be interested in hearing the panel's views on the area of skills and design.

Gordon McGuiness: A good example is decommissioning in the oil and gas sector, although we did not refer to it as the circular economy. There is a lot of activity under way that is badged or branded as another type of activity, such as low-carbon activity.

We need to consider the investments that the Scottish Further and Higher Education Funding Council has made in the innovation centres. The University of Strathclyde is taking a leading role among 11 of Scotland's universities in a new industrial biotechnology facility. We will get innovation and make the key economic steps that we need on the circular economy through the linkages and knowledge transfer back from the universities into industry.

We have spent a lot of time developing the workforce for Scotland's renewables sector in the work that we undertake with the industry leadership group on energy. The growth in that sector has not been as we expected, but we have built a strong infrastructure across our universities and the college sector. The colleges have formed an energy skills partnership with strategic hubs for development activity, so we know where the expertise is and we can connect up colleges. In some of the work that we have done on wind turbine technology, for example, we connected up Inverness College and Fife College, which was the pioneer for the work, and then went into Ayrshire College and Dumfries and Galloway College. We have laid a good foundation for that work.

If we look more broadly than that into the wider STEM agenda—Ian Menzies touched on that earlier—we see a range of activities in schools and colleges. There is a much stronger focus on the science sectors. We are trying to grow and develop that further and we have made good progress, particularly on the gender-related issues, just by making science more accessible. Good work is being done there.

We are doing more in schools. Again, it is perhaps not badged as the circular economy but, if we look at it in the round, it certainly fits that description.

We have been working with the Scottish Council for Development and Industry on the Saltire Foundation. This year, we have something in the region of 180 schools competing for the saltire award, which is a school-based project on wave and wind technology. The finals are coming up soon at Murrayfield. That is a good example of taking the type of activity that we are trying to create through curriculum for excellence in a practical way.

We are also doing some really good work in the schools in East Ayrshire through the primary engineer programme. We are taking engineering-

related disciplines into the schools and making engineering accessible.

On the back of the review of Scotland's young workforce that Sir Ian Wood is leading, we are considering how we can engage businesses in Scotland more effectively in the circular economy. A good example for us is the Scottish Leather Group in Bridge of Weir, which has followed a very aggressive zero-waste campaign in its factory. It has a deep school engagement programme throughout Renfrewshire and Inverclyde. It takes the schools in and shows them the process—many of the locals will know what the smell comes from—and how the factory has advanced. It is virtually self-sufficient in energy production and extracts many other materials, such as collagen, from the cow hides before they go for processing.

There is a good story to tell. We can always do more. We are doing more with Education Scotland and we want to do more with the Ellen MacArthur Foundation. We want to bring a bit more branding to the concept of the circular economy. It is hard enough for businesses to get their heads around it but, when we take it into primary schools, it is a bit more complicated to explain the process.

The Convener: Does Ian Menzies want to say a bit more about that?

11:00

Ian Menzies: We have been working with Skills Development Scotland and other partners to progress our science, technology, engineering and mathematics agenda. As we grow the strategies on that and support the development of those aspects of the curriculum, we can look at opportunities to bring the circular economy into that work.

We talked about bringing the circular economy into primary schools. That is our ambition. Young people in primary schools have a good understanding of and connection to the issues. The initial work phase has been around secondary schools, but there is scope to bring the topic into primary schools and nurseries as well, because they are engaging on waste, eco-schools and other such issues. We want to bring more challenge into learning and develop those higher-level thinking skills at a younger age. There are opportunities throughout the school years if you want to do that.

Lucy Chamberlin: I want to highlight the importance of creating a very strong design network. As most of you probably know, 80 per cent of the environmental impacts of a product are embedded at the design stage, so that is a crucial phase for intentional design for a circular economy to happen.

That also connects the arts and the sciences. STEM education has been mentioned, but the arts side is also important, especially in terms of communication. For example, lots of people talk about the difficulties of behaviour change for a circular economy. Design has a major influence on behaviour change and, crucially, that applies not just to product design but to service and system design. An example is Gothenburg. The city has transformed how it deals with its waste. Its civic waste amenity centre is called an amusement park, which incorporates a shop and a restaurant and, last year, it held an art exhibition. It has a turnover of around €1.5 million and it employs local people. That should be the vision for redesigning our waste centres.

Over the past two years, the great recovery project has produced our four design models. A very simple and engaging diagram shows the four models of longevity, leasing or service, remanufacturing and material recovery or recycling. Recycling is a last resort because, in most cases, that is downcycling, which involves a loss of energy and value. First and foremost, we must think about designing for longevity and for leasing or service.

Unlike for the waste industry, no provision exists for continuing professional development—CPD—for the design industry. We want to see that change, so that designers can take time out to learn about circular economy design.

Over the next year or two, the great recovery project will work on design residencies. Rather like artists in residence, designers will be set up at waste recovery facilities, where they will be engaged with the waste processes and the challenges and problems of waste recovery, thereby enabling them to go back to the drawing board and redesign the products, so that waste is less of an issue and, ultimately, is designed out of the system.

Zero Waste Scotland is working on a remanufacturing innovation hub. We very much advocate a design innovation hub for Scotland along the same lines.

Dave Thompson: Those were interesting points on design. What is the position on built-in obsolescence? I first came across that more than 40 years ago. There was a wee camera that included a component that was designed to make the whole thing fail after a relatively short time. The camera would probably have gone on for years and years if it was not for that. That has been an on-going approach—manufacturers have many ways to ensure that components fail, which means that people need to buy new products quite often.

How do we get the message across? Will the message that the circular economy will make manufacturers money overrule their desire to make money in the short term by building in obsolescence, rather than in the medium or longer term? These days we use so many things that we have to throw away, and it goes against the grain. When I was a boy, everything was recycled, and I hoard things in my garage, much to my wife's annoyance, but I always find a use for things eventually. How do we deal with built-in obsolescence, which I am sure still exists to a great extent?

Lucy Chamberlin: I agree that it is a huge problem. One of the things that we have now is technological obsolescence. People have a mobile phone for a year and the expectation is that, after a year or a year and a half, they will throw it away and get the newest model. People are conditioned to want the latest model.

A few companies are looking at the idea of modular design so that people can have a new model by changing the cover, the colour or the outside of the phone so that it looks like a new product. The insides of mobile phones have not changed that much in a few years, and you do not really need a new circuit board when you have a new phone. You just want something that looks new. The idea of design for modularity is a key idea.

Also, I go back to my earlier point about repair. Things are not designed to be repaired; they are designed to be thrown away. We need to make sure that we are putting pressure on manufacturers to ensure that their products are repairable. You might like to look at the restart project, which is engaging a lot of communities in England in repairing their own electronics and is taking a bottom-up approach. However, it is key to engage with manufacturers on design and manufacturing manuals, and on the right to repair. In the US, everyone has the right to repair automobiles, but there is no right to repair for home electronics, and that should be changed.

On your point about built-in obsolescence, it is often a small number of components that break in a particular product. If a product is designed for repair, those things can be replaced easily. It is about working with manufacturers on design, on modularity and on those repair and manufacturing manuals.

Colin Webster: It is really important that, in our education work, we get across the point that design for obsolescence lives in a particular context that might not exist any longer. A key part of what we do in education is getting people to understand the complexity of why things are the way they are and how things could be.

What is the missing context? The prices of materials and energy are no longer low or falling. When those two factors are in place—just those two, by themselves—manufacturers are likely to design for obsolescence because it is cheaper to produce something next year and they want to keep the flow of income. Another missing context is that the public does not have the income that it used to have. Manufacturers are finding that there is no longer the market for their stuff in the west that there used to be.

Without those three factors, design for obsolescence might not be the wisest business move. I say that in order to make a point about whole systems design. When we take the circular economy to education or to business, it is really important that people understand all the implications. This is not simply a model for environmentalism, for reduction of waste, for redesign or for how we can run our businesses. Rather, it is a model for all those things and more. It is ultimately about economics, and that is the point that we are trying to get across in our education work. We believe that it is important to share a compelling vision of how the economy could be, and that vision is based on abundance, potential, positive growth and the opportunity for people to get involved in it. When we talk about the circular economy, those are the messages that we always want to get across.

I completely agree with many of Lucy Chamberlin's points about how to develop a designer culture. In Scotland there is MAKLab, which is a facility where people can repair goods or even design some themselves. That is launching in five cities across Scotland and it will certainly help with the design culture. I spoke recently with CodeBase, which I believe does something similar in information technology. There are certainly the seeds of things happening in Scotland to help with design for the next generation.

Iain Gulland: I will pick up on Alison McInnes's point about supporting new business models in Scottish businesses, but first I want to emphasise from Zero Waste Scotland's point of view the importance for the future of investment in skills. That really is fundamental in this shift. This point is selfish in that, when we engage with businesses, particularly small and medium-sized enterprises, there is an absence of knowledge and awareness of many of the things that we are talking about—not just the circular economy, but resource efficiency and waste and energy issues. Others round the table will have the same issue. Getting everybody in schools throughout the curriculum and everybody in universities, regardless of their career choices, to have more of an understanding of what the approach is all about will build a

foundation going forward. Investing in the future is absolutely paramount.

On the business models issue, which I think Ewan Mearns can pick up on, too, what we are talking about is different from going into a business to speak to its environmental officer about how to change the light bulbs or put some insulation in a building, with all due respect to such measures. It is about going into a boardroom and having a conversation about the business model and the fact that the company is, in a set way, selling stuff to the market, taking a product to the market or making a product from specific materials.

We are talking about asking the company to change that business model. Obviously, companies will need to have a credible business case for doing that. They will need to be confident and see signals from the marketplace on things such as procurement and materials that show that it is the right thing to do. They will also need to see that the approach is happening elsewhere in their sector. We need to highlight other businesses that are leading on the approach in Scotland, the UK and Europe so that businesses, chief executives and the boards of companies think, "Yes—this is the direction of travel." A lot of engagement needs to happen at boardroom level.

We need to give people confidence, but we also need to send out signals. We have touched on fiscal incentives to encourage the approach. One of the challenges is that, for many businesses, making the decision to change the business model is a leap of faith. That is particularly true for SMEs, so I think that they will look for some support through the transition. It is easy for bigger companies to make a product that does not really interfere with their main business and float it in the market to see how it goes. However, for SMEs in the supply chain in Scotland—

The Convener: I think that we will go back to fiscal and regulatory levers in a while.

Iain Gulland: We are working directly with Scottish Enterprise on that. We are collaborating with Europe to look at how we promote particular business models and with Scottish Enterprise account managers on how to support businesses that are thinking about changing their business model or are looking to move forward. Support is available. We need to work directly with the business sector and raise confidence.

We have talked about procurement. Signals from the public sector about the direction of procurement and how these products and services might be the future will give people in Scotland confidence that there will be a market for them. There is a bit of work to be done on that. Work has started, but we really need to build confidence in our business community.

The Convener: I know that we are talking about a circular economy and that a circular set of issues will make it work, but it is difficult to keep to themes. Some of us want to ask questions and some of us want to answer them. I ask James Curran to respond on skills—I think that that is the issue that we were going around. Were you going to throw in a comment on that, James?

11:15

James Curran: No. I actually wanted to pick up on Iain Gulland's point about the business model for the circular economy and on some earlier comments. Part of the business model for the circular economy must be about developing the consumer. Consumers want the service, not a particular product. For example, they want chilled food, not a fridge. Already, one of the most sustainable companies in the world is providing carpets that companies can rent rather than buy for their offices. That is the model that we need in the future. When the provider of the carpet takes it back, they either refurbish it or recycle it into a new carpet. That is part of the circular economy business model.

Elements of that model are already embedded within our regulatory framework because the waste electrical and electronic equipment directive and the end of life vehicles directive both require the provider of the product to take it back at the end of its life. We could go much further, but there is an incentive there for providers to make products in such a way that they do not have to take them back as often. If they take a product back, they may either refurbish it or maintain it and then reissue it—or, at the very least, they can completely disassemble it and use all the embedded materials.

The Convener: Indeed. Nigel Don is next.

Nigel Don: Thank you. That is very useful because it covers a point that I want to pick up on. Lucy Chamberlin also said something about the right to repair. I am hoping that, by the time we finish, we will have a few clues as to what we, as legislators, might want to do eventually.

In relation to James Curran's point about fridges, my second industrial experience was with washing machines and I remember thinking that nobody wants to buy a washing machine; they want a machine that will wash their clothes. People would much rather rent a machine that is supplied by somebody who simply comes and repairs it when it breaks down or, if they cannot repair it, takes it away and replaces it with another one. That seems to be a very good business model. It has some consequences: it encourages

providers to make the machines last for a while because, as James Curran said, they do not want to have to come and repair them so they want them to work; it may also do something for standardisation.

The last time that our washing machine broke down, the man said, "I think I have one of those seals in the van—I'll go and look," and, mercifully, he did. Surely if all washing machines were rented out with a promise to keep them running, providers would standardise everything pretty quickly. They have already standardised the size. It would pretty quickly get to the point where the machine just became a commodity—which is what it should be, frankly. Some of the branding might disappear and we might get more functional goods. That would be a good thing, and that is part of the model. Is that where we should be going?

Lucy Chamberlin: I believe that that already happens in Germany—with Miele, I think. It provides high-class washing machines along with a service. Essentially, people buy a machine for life and it lasts for many years.

Nigel Don: Miele always did make the best washing machines. That was well known in the industry. It is not at all surprising that it is the company that has developed that model, because it was clearly in a class of its own 25 years ago.

The Convener: After that short advertising break, Ewan Mearns is next.

Ewan Mearns: We have been talking about design, business model innovation and skills. From a company perspective, it is about innovation. That is what the circular economy is really about—doing new things or doing things differently—but we need to position innovation within the context of the business's strategy.

As has been mentioned, the circular economy is about an economic opportunity for Scotland that also has environmental benefits. It is important to look at it as an economic opportunity and then take it down to a practical level by working with companies, as Scottish Enterprise and Highlands and Islands Enterprise do. It is about working with our account managers to enable them to understand where the opportunities lie and so that they can then best advise companies.

Starting with that demand-led approach, we need to think about how we can best support companies to take that leap of faith—as Iain Gulland said—and about how to reduce the risks around innovation so that companies can do things in new ways. There are also other, more practical benefits for companies. We have talked about resource efficiency and the scale of the savings—potentially 50 to 80 per cent—that could be made through remanufacturing. That takes us into the realm of radical savings.

Business model innovation might seem like a big step, but companies are already doing it. Aggreko, which is the global leader in heating and temperature control solutions, leases out its equipment globally, and Mainetti, in the Borders, has changed from being a manufacturer of plastics and coat hangers to being a logistics and recycling company. It has completely changed its business model and it now supplies almost half of the coat hangers that are used by high-street retailers up and down the UK. There are such good examples, and we need to promote that type of approach.

In addition, there are benefits in collaboration for companies up and down the supply chain, especially with customers. We touched on that issue earlier. The old linear model was about throughput, turnover and volume, but in the future, value will perhaps be created by the depth and quality of customer relationships so that companies can gain customer loyalty. That is what creates the value if companies have a product that is upgradable rather than just disposable.

Part of the challenge involves saying to companies that there is a different way for them to operate their business. We are taking an evidence-based approach. James Curran described the work that is under way to promote understanding of all those issues, including business model innovation and design, and the opportunities in different sectors. We want to be clear about where we think the greatest economic benefits for Scotland lie, and we then want to pilot projects. We hope that they will work—we can refine them if they do not—and we can then scale them up to give us the benefits that we are seeking.

The Convener: Graeme Dey has a practical point that relates to the work that you are doing just now.

Graeme Dey: Zero Waste Scotland and Scottish Enterprise are jointly managing a £3.8 million loan fund. Can you give us any examples of the sort of demand that the fund is attracting, and where investment is being made?

I was interested in James Curran's earlier point about the possibility of mining plastics from landfill sites. Is there any sign of somebody wanting to do that?

Ewan Mearns: I am looking at Iain Gulland, as he may have more current information. The loan fund, which previously focused on plastics, was relaunched at the beginning of this year as a broader fund to cover a much wider range of materials as well as remanufacturing. I am not aware of any awards that have been made from that fund since it has been relaunched. Iain Gulland may have some more information.

Iain Gulland: I do not think there have been any awards since the fund was launched at the beginning of the year, around February. We have a number of projects in the pipeline—there are obviously still some plastics projects in there. We need to get the message out to businesses about the expansion of the fund and the fact that there is a mechanism to support the shift to or development of infrastructure and even business models. It is still a bit early to report on any successes from the fund, but there is a lot of interest. There is a promotional task for us and Scottish Enterprise to ensure that businesses understand that the fund has shifted away from plastics.

Zero Waste Scotland produced a report last year on landfill mining—as it is technically called—not just for plastics but for a whole host of materials, particularly precious metals. The idea is that there is more gold in landfill than one could bear to think about in terms of its value. There are some practical and social issues with getting that stuff out, as the committee can probably imagine. Unfortunately, there are challenges as all the precious materials are scattered about the landfill, so we would end up with a lot of other stuff that potentially has no value. However, we are interested in looking at how the technology might take this forward from a Scottish perspective, as are others throughout Europe. I do not think that landfill mining is practical at present in terms of cost versus benefit, but as the technology expands and the price of those materials goes up, it will be reconsidered.

Graeme Dey: I take it that, with a fund of £3.8 million, it is fairly small-scale projects that will be supported, by and large.

Iain Gulland: Yes. For instance, we could be looking at a facility with 10,000 or 20,000 tonnes of plastics, depending on the type. That is the type of scale. That is the sort of intervention that we are looking at with the loan fund. The fund is specifically aimed at the work that we do, but, more broadly, Scottish Enterprise has access to other funds of a more considerable scale to support business development in Scotland. We are trying to use the fund as a way to bring people to the table and get things started, but there are bigger prizes and there are other mechanisms in the Scottish Enterprise budget to support that work.

Graeme Dey: Are you getting a good geographical spread of interest across Scotland the more you take account of some of the challenges that my colleague Dave Thompson highlighted in areas such as the Highlands?

Iain Gulland: I would have to come back with that. I know the number of types of projects, but I do not have the information on geographical spread.

The Convener: It would be interesting for us if you could find that out.

Iain Gulland: One of the key things that my team, in conjunction with Scottish Enterprise, is doing is promoting the fund. It is not just about saying, "It's there," and sticking it on the website. I know that we have been working with Highlands and Islands Enterprise to promote the fund so that businesses up there are aware of it, but I will get back to you on the geographical spread.

The Convener: I will come back to some governance issues in a minute or two, but first I will bring in Ian Menzies and Dustin Benton on this section.

Ian Menzies: We have a role in the skills agenda. Gordon McGuinness mentioned the importance of the Wood commission agenda and developing Scotland's young workforce. Lots of exciting opportunities are coming through, particularly in relation to science, technology, engineering and maths. We now have a much more flexible approach to the senior phase in secondary school, which could include things such as modern apprenticeships in the circular economy for young people. There are some exciting opportunities.

There is much closer working between schools, colleges and universities. Young people are developing higher national certificates in some of the relevant areas before they leave schools. There is potential there.

The other big challenge for us is teachers' skills, because teachers have responsibility for developing the skills of our future generation. From all our evidence, we know that teachers across Scotland need a lot of support in the primary sector and other sectors. We are looking at building their confidence in science, technology, engineering and maths. Through the partnership with the Ellen MacArthur Foundation, we have reached out to about 64 per cent of secondary schools in Scotland and engaged with about 700 teachers. Our early discussions were very much about scaling up. That is the challenge that we face, given that there are 51,000 teachers in Scotland.

We have engaged in and supported a lot of professional learning events for teachers and, as I mentioned, we are currently trying to establish a practitioner network. One of the early things that we did in partnership with the Ellen MacArthur Foundation was take a group of teachers on an international study visit to the Netherlands, to see Desso carpets, which James Curran mentioned, which is doing world-leading work in this area.

We need to think deeply about teachers' skills and how we build them. The exciting opportunity that we have just now, particularly with the team Scotland approach and what has been discussed around the table today, is that a lot of innovation emerges from Scotland. We hear about small companies all over Scotland and other companies engaging with the agenda, such as Dryden Aqua. How can we provide opportunities for teachers to engage with those industries and get into them to see what they are doing, and for young people to get into the boardrooms to share ideas? One of the premises of curriculum for excellence is to make learning relevant. Learning becomes relevant when people get the chance to see things on their own doorstep, in their own area, and see the impact that things have on their own communities. I was pleased to hear about the Scottish Leather Group, which is doing good work in Renfrewshire.

One of the big challenges is how we extend that and how we develop partnerships so that industry takes responsibility for ensuring that the future generation and our teachers develop the necessary skills.

Dustin Benton: I want to return to the idea of built-in obsolescence. We struck on something important when the comment was made that it goes against the grain to get rid of things. There is something quite important in that about what consumers want. I am thinking about the drivers behind some of the things that a circular economy might be able to do, and I come back to the question of what legislators can do—I am slightly anticipating where we are likely to go. I do not have a clear-cut policy recommendation, but it is useful for legislators to understand why businesses might be interested and possibly to enable some experimentation.

The Green Alliance is running a project with Google on how we get more circular electronics devices, including mobile phones. Consumers want certain things out of them—they want battery time, they want the phones to look attractive and they want them to load web pages in a certain time. There is really no reason why we could not design a business model that, for a fee—perhaps part of their network fee—gives the user a phone that guarantees eight hours of talk time, guarantees webpage loads within, perhaps, 10 seconds and enables enough modularity that the user can change the way that it looks to suit whatever fashion they choose.

11:30

That sort of thing is interesting to businesses because they ask themselves how they can maintain value in a mobile market that is shifting from expensive devices such as £600 iPhones down to the latest one, the Moto E, which will sell for less than £100. As we have seen over the past decade, there is a remorseless drive to the cheap with such devices and there is a challenge for manufacturers who are asking themselves how they can keep their profit margins on a device that is worth £100 versus a device that is worth £600. However, if a business can disconnect what goes on with the physical device from the service that it sells, that is an opportunity for value.

That is pretty radical stuff. Nobody is really doing it at the moment, which raises the question how we get the testing to happen. How do we enable Scotland to be a test bed for such activities? It might not be in mobile phones; it might be in something else. Part of the answer is to have the skills base to enable people who can think of such things to be in Scotland. It is also to do with enabling experimentation and creating the necessary institutions.

As I said, I do not have an answer on what policy will make that happen. However, it is important that, when legislators think about the interactions and the things that they can do, they are informed by the idea of future opportunity in a decoupled resource world.

The Convener: That leads us on to thinking about what the Scottish Government's role should be in the next few years in supporting the move to the circular economy. What do you think about that? As James Curran mentioned earlier, Government has fiscal, regulatory and procurement levers. Those seem to be something that we politicians can report on as well as some of the details. However, we have to have governance in mind. How do we lead towards the circular economy, track progress and apply the levers? What levers should we apply?

Iain Gulland: Another aspect of the question is leadership from Government. We all welcome not only the Government's support but the cross-party support for Scotland's zero waste ambitions. That is writ large in bringing people to the table not only in Scotland but throughout the UK and Europe. People are well aware of the direction of travel. There is a point about the Government saying, "The circular economy—that's for us." We are going in that direction. The Scottish Government has signed up to the Ellen MacArthur Foundation CE100 initiative. We are the first country to be involved in that, which demonstrates leadership.

When I am asked that question, I always come back to procurement. Some of us around the table were involved in considering how the Procurement Reform (Scotland) Bill could shape resource efficiency, zero waste ambitions and the circular economy of reuse and repair. For me, that is where we could really make a difference. How can we ensure that that bill encourages and facilitates

smarter procurement so that we can see some of the things that we have talked about—different service types such as leasing, lending, repair and remanufacturing—coming through the system? That will create a market not only for Scottish businesses but for other businesses from throughout Europe to come to Scotland to sell their wares and their new business models because they will see that it is a serious place to do business.

The question is how we do that. I go back to the point about piloting things. How do we stimulate innovation? There are things that we can do. I am sorry to labour the point, because people will have heard me talk about this before, but the example that I give is street lighting. We have a huge opportunity, as we are about to refurbish nearly all the street lights in Scotland over a set period of time in conjunction with the local authorities. As we know, LED lights will replace the sulphur ones. Obviously, there will be a huge economic saving on the cost of electricity. That is a massive infrastructure project. There are recycling opportunities in the lamp-stands that will come down. What will we do with that material? What metals and alloys will the new lamp-stands be made of?

More fundamentally, the issue goes back to Colin Webster's point about business models. Philips is one of the companies that are now not just selling and renting lamps but selling light—lux. That is its business model. It wants to move to a point at which we want not lamps but light, and so much of it that we can see what we are doing. It is therefore developing a business model around the selling of lux. Is there an opportunity with the refurbishment of street lights in Scotland to pilot some of that thinking and get local authorities to carve out a bit of it—perhaps not all the infrastructure—and say, "How can we work with these companies to develop a new business model?"

That creates innovation. Ewan Mearns made that point. If Philips sells the light at a fixed cost to the local authority or whoever and then works out that it could do it cheaper if it started to innovate the infrastructure, it will do that. It will start to innovate. It is not just a matter of having the thing for 15 years; Philips will constantly innovate to ensure that people get the light that they want at a cheaper rate for both its business and the customer. There are real opportunities if we could use public procurement and if we could shape the Procurement Reform (Scotland) Bill to enable such thinking across the piece.

The Convener: Marilyn Wakefield, you have an innovative process. How can the Government focus its attention on firms such as yours, which are developing something that is innovative?

Marilyn Wakefield: We have always been very focused on R and D. We have developed AFM and are looking at developing it further and targeting what we activate it with so that we can target certain minerals, such as arsenic, and take them out of the water. However, we need the raw materials. That is really important.

The City of Edinburgh Council currently separates its glass, but I have heard that it is going to mix it. That creates a problem. We do not want mixed glass, so it is vital that we look at how we collect the glass. There are only six colour sorters in the United Kingdom, which is not enough. We need clean material. Many remelt companies need clear glass materials, as well. What is the point of mixing glass when it is collected and buying a machine that will cost a fortune to separate it all again? It would cost our company a fortune to do that. Putting a colour-sorting machine into our company would not be viable, so we are looking at ways in which councils can work together. We talked about the fact that there are 32 councils; perhaps they could formulate a plan. Dumfries and Galloway Council has a colour-sorting machine. We have tendered for its glass. If we get the tender, there will be 1,000 tonnes of glass a year, going up to 10,000 tonnes. That is great, but it is not enough for us. We need other councils to get together and buy a machine or to collaborate and formulate a way of collecting and colour sorting the glass. Doing that might be too expensive for one council, but if a few councils get together, they can share their resources.

The Convener: That is a very interesting point and a good one for us. Thank you very much.

James Curran: Iain Gulland made some very good points earlier, which I will take a little bit further.

As we said earlier, it is sensible for us to use the tools that are already available to us before we look at being more radical in the future in legislation in Scotland. As I am a regulator, people would expect me to talk up the value of regulation, but one of its main values is that interventions through it can stimulate very rapid change. We know that China, Japan and Germany have actions in place to try to move them rapidly towards more circular economies. As I said earlier, we are in such an advantageous position in Scotland in having significant amounts of renewable energy that we should move as fast as we can towards a more circular economy.

We need to use the tools that we have, including the regulatory tools, in a clever way. As we said earlier, we need a good evidence base in order to make regulatory interventions. They should deliver multiple benefits. From the business perspective, they should stimulate creativity and

innovation, but they should also remove business risk. I will give you a tangible example of that—I am not claiming that it is the right way to go, but it will give you a feel for how it might be used.

Recently, I was in San Francisco, which has a byelaw—that is not quite the right technical word—that states that any takeaway packaging needs to be compostable. That made me wonder whether we could insist that all takeaway packaging in Scotland should be made of recycled material and/or be compostable. It so happens that we have an award-winning company in Scotland that is absolutely ready and, I would imagine, willing to supply that market. Using section 82 of the Climate Change (Scotland) Act 2009, which is ready and waiting, we could easily put that sort of regulation in place. It would stimulate other businesses to be creative, no doubt, but we already have a business that would increase its home market, and it could build on that in a way that would enable it to be more internationally competitive.

Clever regulation could deliver multiple benefits.

Colin Webster: James Curran has made some of the points that I was going to make.

When we speak to legislators, we make a few key points. One is that they need to thoroughly understand what the circular economy is. That seems a rather obvious point, but we have seen examples where legislators have rushed in a little bit too quickly. The second point is that rushing to legislate too quickly might be a mistake, so finding mechanisms to foster pilot projects to learn from is a good start. Given what Ewan Mearns has said, we can see that that is precisely what is going on through Scottish Enterprise. The third point concerns listening to business partners and getting them on board; obviously, having Dryden Aqua here today is a demonstration of the Government's desire to do that. The final point concerns carefully reviewing policy review documents. James Curran referred to China, Japan and Germany and the directions that they are moving in, but the European resource efficiency document that I referred to is also important. It will be seen as a driver for the legislation in the circular economy across Europe.

The Convener: That has given us a great deal of food for thought. Most of you have had a good input into our thinking. We are keen to ensure that we can lead, track and encourage, and use the levers that we have. Obviously, the Climate Change (Scotland) Act 2009 is one of the areas of responsibility of this committee, and it would be useful to examine that carefully.

It would be a good idea to stop the conversation at the moment. If any of you wishes to follow up any of your points in writing, that would be welcome. We will write to the minister in due course and will try to capture some of the issues that have been raised.

Working with the different parts of government that are already engaged, we have to try to get the idea out there by talking about the circular economy. We can see a clearer picture of the situation in the fields that you mentioned—business, skills, economic development and research—than we could when we came in this morning. I thank you all for that.

At the committee's next meeting, which is on 21 May, we will take evidence from the Cabinet Secretary for Rural Affairs and the Environment on a Scottish statutory instrument concerning single-use carrier bags; and from the chair of the Scottish Government's wild fisheries review.

Meeting closed at 11:44.

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