



Environmental Audit Committee

Oral evidence: [Growing a circular economy](#), HC 1176

Wednesday 7 May 2014

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Written evidence from witnesses:

- [WRAP](#)
- [Green Alliance](#)
- [Ellen MacArthur Foundation](#)

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Members present: Joan Walley (Chair), Peter Aldous, Martin Caton, Katy Clark, Zac Goldsmith, Mike Kane, Mark Lazarowicz, Caroline Lucas, Dr Matthew Offord, Mrs Caroline Spelman, Dr Alan Whitehead, Simon Wright.

Questions 1–54

Witnesses: **Jamie Butterworth**, Chief Executive, Ellen MacArthur Foundation, **Sir Ian Cheshire**, Chief Executive, Kingfisher, **Liz Goodwin**, Chief Executive, WRAP, and **Dustin Benton**, Head of Resource Stewardship, Green Alliance, gave evidence.

Q1 Chair: On behalf of the Environmental Audit Select Committee, I thank each of you for coming along. I think it is our 17th report that we are about to commence this afternoon. I will say at the outset that we understand Jamie Butterworth has to leave at 3.30pm, so we shan't take offence if you leave before we have completed the session. We may have votes. We are not quite sure. We are aiming to finish by 4.00pm, just to give you some idea of how long we will be here.

I would like to start off by inviting Jamie Butterworth to give us some idea of what you mean by the circular economy. I think it is your organisation, the Ellen MacArthur Foundation, that has become so synonymous with this in many ways. It would be helpful at the start of our deliberations to get a sense of what you see the opportunities of the circular economy as being and we can take it from there.

Jamie Butterworth: Perhaps the easiest way to talk about the circular economy is to look at how the economy tends to work today. When we drive value in the economy we would tend to extract something from the ground, manufacture that into a sub-assembly or a material, turn that into a product and sell it into the market, all through that process using

large quantities of mainly fossil fuel-derived energy and, at the end of its life, that product would be thrown away. If you look at the scale of linearity, if you take fast-moving consumer goods, globally we put US\$3.2 trillion of value into the economy each year and 80% of that is lost as waste at the end of the day.

What many of the companies that we talk to, and quite a few investors and economists, are quite interested in is that between 1900 and 2002 we have seen a gradual price decline in the commodities that we use to fuel the economy, whether it is agriculture or metals, non-metals or energy. In about 2002 some kind of inflexion point wiped out that century's worth of, albeit jagged, price declines. What also is interesting to businesses is that this is before we see the demand from an additional 3 billion middle class consumers, most of whom will come from developing markets but they will still impact the global commodity supply chain.

As such, quite a few people are looking at what different models could exist to start to decouple future growth from those resource constraints. I think it is fair to say the circular economy is not a new idea and it is a generic term that brings together a number of disciplines, like Cradle to Cradle, Industrial Ecology, Industrial Symbiosis, and *The Performance Economy* by Walter Stahel. Many of these ideas have been around for quite some time, but it appears now they are more relevant than ever, partly because of the economics.

In terms of the opportunities, there are quite a few but I will focus on three. One is the economic competitiveness of the UK or of an individual business. If businesses are able to set up and effectively run more circular practices, they can begin to decouple their growth from resource constraints. An analysis that the foundation did, together with McKinsey, was able to demonstrate that for medium-lived compact goods in Europe—things like mobile phones, computers, televisions—if you were able to cycle just 20% more than we do today of the material and components in products by 2020 it would unlock US\$630 billion of additional growth in Europe and that is with half of manufacturing. It is like 3% to 4% of European GDP shifting by a very small amount towards circularity.

The second opportunity is around employment. It is obviously quite a difficult calculation to do in terms of how employment works, but, very broadly put, we tend to ship things from the east into the west, at which point those are used and then disposed of, whereas in more circular models we see more things happening: revalorisation of materials, remanufacturing. The European Commission, in a recent document, estimates that it could create between 1.4 million and 2.8 million jobs by shifting towards becoming more of a remanufacturing hub and that would also make Europe more secure, effectively.

Finally, if you can get this right, you also stand the chance of going beyond just using less and genuinely beginning to restore food and farming systems. The way a circular economy works with its technical and biological components is that if you get the biological part right you could start to begin to restore some of the degradations in the food and farming systems and build a truly restorative economy. Hopefully that is a good brief intro.

Q2 Chair: That is a broad introduction and I am sure that it will help. What I have taken from it is the phrase “decouple future growth from resource constraints”. I am just wondering about something that perhaps the other panellists might like to come in on. Presumably this is about behaviour change, but question is where the drive is coming from.

Should it be from DEFRA, from BIS or from incentives that would come from Treasury? I always base what I see on my own constituency experience. Sometimes businesses need to be convinced of a new way of doing things. How do you bring together all the different drivers to go down this new concept?

Liz Goodwin: I think it is something that is completely across Government. There need to be some financial mechanisms and financial drivers, but this is about how we do business in a way that is more sustainable because it is making a more sustainable use of resources. If you manage to keep the resources in the economy for longer, then it is just a better way of doing business. I come at it from the business point of view. Yes, there are some environmental gains because you are making better use of resources and you are saving carbon and materials, but it is primarily about business and, therefore, there is a huge opportunity for us in the UK in terms of jobs and growth to the economy.

It is a difficult argument to get across—and maybe Ian will respond from a business perspective—but certainly that is where we have been focusing our efforts in trying to make that business case and demonstrating how you can bring some of those large macro numbers that Jamie has talked about down to what it means for an individual business. I think there are a lots of barriers that individual businesses face—awareness, not sure what to do, the fact that it might not just be down to them to take action—so other people need to take action to help them to achieve the outcome. There are a number of barriers. It is fundamentally about behaviour change, but it is unlocking some of those barriers that that will make the difference.

Q3 Chair: Ian, do you want to come in on that? From your perspective and with your experience, how do we get businesses on board to drive this and to want to do it rather than it being some kind of abstract concept that is good for everybody?

Sir Ian Cheshire: That is exactly the right question. Echoing Jamie's point, a lot of thinking around the circular economy has been around for a while. This is not, in that sense, a new piece of thought leadership. The challenge is to go from the thought framework to exemplar projects of scale and I think there are three key steps in making this mainstream, which is the challenge now. I do not think we need to find new intellectual toolkits or things like that.

First, as you said, business needs to get it, in the sense that there are defensive reasons for doing this—we started looking at this because of concerns over raw materials, the sorts of things that Jamie has been mentioning; our timber supply in particular but then going much more broadly into other materials—and effectively making businesses aware that they might be dependent and might have an issue.

I think the more interesting bit is that we are now seeing business leaders being interested in the offensive opportunity. How might this be a new model for the economy? As new models and value disruption happens, there is a big shift between those that get it and get it earlier and win and those that do not. We are involved with Jamie and the foundation and Project Mainstream in trying this to broader business audiences to talk about why it is defensively and offensively a good thing.

That first step is critical, because unless people have an interest in doing it, unless business gets interested, frankly no amount of prodding by politicians or others is going to make a huge difference, but I think then the real challenge and why this has been difficult is that business has to redesign in some case whole business models and in other cases product

design. We talk about “take, make, dispose”. We could design a very different power tool that could be completely closed-loop—and thanks to technology we are about to try to do that—but you cannot just take an existing product and rub it a bit and hope it will turn into something circular. You have to go right back in, so the redesign of your supply chain and your products is there.

The final bit from me is the point you mentioned, Chair, which is the consumer dimension. I think this is something that, if we can engage customers in it, they will prefer to use. I know WRAP have done research on this, but what I think is very different about this stage is that you have the beginning of business interest in it. You have a lot of work going on with the foundation in terms of redesign and potentially a new generation of industrial designers coming out of colleges with this type of thinking.

The final bit is you have a huge opportunity courtesy of social media to make this become much more mainstream much more quickly than would have been possible 30 years ago. I think we are literally in the foothills at the moment. To finish on my example, B&Q has 40,000 products in the average store. We are busting it up trying to lead our way in this and we set a massive target of having 1,000 products that are truly circular by 2020 and, personally, I am now trying to work more on engaging my suppliers and my supply chain in collaboration to try to get this to become the new normal. It is not a question of persuading people once you have gone through the logic. It is how do you make it real? How do you make it scale? I think we are, very encouragingly, at the beginning of some early very positive signs of it.

Q4 Caroline Lucas: I just wanted to play devil’s advocate a little bit.

Sir Ian Cheshire: Excellent.

Caroline Lucas: I can see the business case very clearly because if you have a more efficient use of goods then you are probably spending less on them and so forth. Jamie, I think earlier you talked about decoupling future growth from resource constraints. I think everybody would probably acknowledge that we are not talking about an absolute decoupling. We are talking about a relative decoupling. If that is the case, then the fact is that there will be a rebound effect—in other words, if you are using things more efficiently then unfortunately what tends to happen is that people just use more of them because there are more resources out there. One example is widgets in your home; each widget probably uses less energy now and was made with less energy but you have 20 more of them than you had 20 years ago. What is to stop the gains that you make environmentally not just being spent on more stuff being made?

Jamie Butterworth: One thought on that would be setting up the right system conditions. At the moment in a linear economy the more you do the less good that does, so the more detrimental that becomes. I will take two examples. One is on the technical side of the economy, which is probably the hardest. There is a carpet company in the Netherlands called Desso and Desso has been working now for five years on designing a carpet tile that can become another carpet tile using 100% renewable energy. What they mean there is they work with the yarn manufactures and they work with DSM, which is a chemical company, to try to design the actual carpet tile so that when it comes to the end of its life it can be completely regenerated into new nylon sets, effectively, and throughout that process they would be able to use less energy.

Their aim is by 2025 to be able to run that process using renewable energy. They also have shifted the business model in some B2B applications. They do not sell the carpet anymore. They lease it, so you lease square metres of floor covering, which means that you cycle that. The question there is almost like a theoretical versus practical. If you could design a product that could be cycled with the right materials using 100% renewable energy, is there a problem with growth in that model?

Then on the biological side we see models like Ecovative. It was a Californian start-up. It is now quite big. They are designing packaging that is made using the grounds of coffee. It grows into mycelium and they have plants all down the west side of the US where they are manufacturing this product. It is price competitive with polystyrene and they are now selling it into Dell and into Electrolux. The more you generate of that product, depending on how you ship it obviously but the more that you create, that is completely restorative. Obviously in today's world there is a very long way to go, but the interesting thing about the circular economy is the more you align in that direction the faster you get there and the better you start to optimise the system conditions. So you start to do less bad and move towards going into a positive dimension.

Q5 Chair: May I just bring in Dustin to respond to the initial question about the context of the circular economy?

Dustin Benton: I want to pick up on the question of drive. Sir Ian has put a very eloquent case for businesses get this and big businesses certainly get this. The examples we have seen working with the Circular Economy Taskforce are that big businesses see the threats and see the opportunities and want to make a circular economy happen. Small businesses are much less open to it and this picks up on the point about supply chains. Where we have seen circular economies' systems occur is where a single company or a small number of companies have a lot of control over a physical system.

A lot of what we hear about new business models is about taking control over the physical thing and vesting it with a single company. Streetcar, for example, manages the cars. You just get the service of the car. I think businesses understand this but those businesses that want to act are not always able to. Thinking about carpet manufacturing and Desso, we have worked with Interface, which is a different company but doing similar sorts of things. The carpet industry is absolutely brilliant. They are all fighting on how to be more sustainable. I wish we could have more of that. When they looked on how they could get their carpets back they have the issue of, "How do I physically transport this stuff? Who do I get to reprocess the material and does one of my competitors have the intellectual property for the process? How do I get into the nylon market?" When they spoke to the petrochemical industry about getting a recycled source of nylon the industry said, "Well, you are 3% of the market so you are not big enough to completely change supply chains".

I think this is why we need some policy support and certainly the companies that I am working with are telling me, "Look, we can only do some much without some help from policy", and I see the clear lead needs to come in the industrial strategy. The sorts of challenges that we face in the future that the circular economy can help to address are the sorts of industrial challenges that Britain faces. We need to have industry and we need to continue to make things, but we need to do so in a way that does not damage the underlying environment, that gives us the stuff that we can use. I see it being very much led from that perspective.

Q6 Chair: Sorry, I think you want to come back, didn't you?

Sir Ian Cheshire: It was just in response to Caroline's comment about the rebound. There are two effects that I think will emerge on this and there is always a risk of rebound. It is the energy efficiency problem; you can save all the energy and people just turn up the thermostat and do the ironing in their underwear. I think in reality there are two things that will probably counteract this. One is we have seen the emergence of things like sharing the economy and different forms of more sustainable consumption become easier for customers to do. I think they become more normal and people begin to think about, "Do I have a sustainable consumption balance?" You can clearly see it in attitudinal surveys, younger versus older in terms of people beginning to think about their own personal responsibilities.

Equally, they are much more willing to try forms of participation in a circular economy if they have had one experience. A classic at the moment would be Airbnb, the room-swapping organisation. Again, some work we have done suggests that once you have tried something like that you will try other forms of a sharing economy experience. It is a bit like having done your first long-life light bulb. You are probably then more willing to do the next thing. I think cumulatively making this more normal for customers is a big win and the fact that Airbnb is now valued more than any other hotel group in the world suggests that the market will start to recognise it. If the market starts to recognise it then you start to get investment coming after this and then you start to scale the business model. I think we are starting from such a small base that you might have rebound effects towards the end but there is so much to go for in the early period.

Q7 Chair: You touched on it just now, Sir Ian, but you mentioned about supply chains. This perhaps might be the time to dispel the myth that this concept is not just about the large companies. It is about the whole supply chain and opportunities for smaller businesses as well.

Sir Ian Cheshire: Absolutely. I completely agree with that and I think it is easier for bigger businesses or ones that control a whole value chain to make some of these moves. Just to be very clear, we are a bigger retailer but our supply chain is thousands and thousands of all sizes of companies and what I have found very interesting is seeing the impact you can have. We have started calling to our suppliers for innovation around this area and there is a huge amount of interest bubbling up. Our job is almost to provide the way that some of this can get to market, but I think there are again two jobs here, one of which is an education job that says, "Please explain it".

If there was a responsibility for BIS to promote the circular economy as a new model of the economy, I think that would be a very helpful thing. Little things like the investment that has just been run by the Strategic Technology Board attract a lot of interest. There is a lot more we can do there. Education on one hand and then finding routes to market so that these things become real. We are talking about an 18-month redesign project to take a conventional power tool and turn it into something that we think could be not be 100% closed loop but quite good. That means you have to have commercial reality behind it. The big companies can play a role in helping that supply chain come through in the way that people like Walmart in the States have had an impact on their supply chain. That is where we are working on collaboration to try to make that more normal.

Q8 Chair: Just finally from me, I was hugely impressed by the way in which B&Q took on board the whole thing about sustainably logged timber and extended that to labelling so customers could exercise choice. You mentioned customers just now. Do you see opportunities for customers being able to vote with their feet and want to incorporate this concept into their purchasing habits?

Sir Ian Cheshire: Totally. I am slightly like a broken record on this. I do think there are opportunities at either EU or UK level to try to promote circular economy products by a differential in VAT, for example. You have less resource. You have more opportunity to make a shift. Why not? You could design it in a way that is fiscally neutral, just to keep the Treasury calm. I genuinely think that, with a bit of indication and information and a bit of financial incentive, you will start to get people looking for these types of products. Certainly in our experience when we have talked to people about it they say, “That is a great idea. I didn’t know about it,” and most people don’t.

Q9 Martin Caton: As you have indicated this afternoon, both WRAP and Kingfisher have adopted the circular economy concept in your approach to your work. Can you tell us a little bit more about what that means in practice? When you measure progress, what indicators do you use?

Liz Goodwin: I think WRAP has always talked about loops. We refer to it as a loop, but it is about making sure you are getting as little as possible going into the loop in the first place, keeping things in the loop as long as possible and making sure you are recovering as much as you can throughout the lifecycle. That has been a model we have been using because it feels responsible. I think the challenge in terms of engaging with businesses is to make sure there is a business case there and so trying to make sure that it fits with the way businesses work and the way businesses want to work.

One of the primary things that WRAP focused on in the early days in particular was creating markets, so creating a demand for some of those materials and a demand for some of those products made out of recycled materials. That is absolutely fundamental because if you just have loads of recycle or loads of products at the end of their life and you try to push them through a system and there is no demand at the end then you are doomed to failure.

If you can create a demand, which is something we did quite successfully with the retailers in particular around packaging, creating a demand for recycled content in the packaging meant there was suddenly an impetus and a reason for people to invest in reprocessing capacity in the UK. We now have three plants in the UK producing food-grade plastic to go back into packaging and that has created jobs and a vibrant bit of the economy. It is things like that. In terms of metrics, materials use and financial savings, I think it has to be the classic ones about things like that.

Sir Ian Cheshire: The answers are very different company by company because the relevance of how the circular economy might show up in your business model is quite specific. What we have looked at is: where does it start to impact us? I think we have identified one traditional area, which is timber, where we have been active for a very long time. In that sense, the circular economy concept confirms what we were going to do anyway, which was move to 100% responsibly sourced and sustainable timber, but then, to take Jamie’s point, we are going to go beyond that and look at net restorative because we think that is ultimately how we will best secure our longer-term future.

Where we are working through it is much more in the innovation space where we are trying to think about, “How might this change our business model?” Realistically, at the moment we are at a mix of exemplar projects, early research work and ambition to have these 1,000 products on sale by 2020. We have also been focusing in particular at the moment on trying to embed this in the business. Unless this is a new form of business as usual, it will not be truly sustainably, I don’t think.

My interest in it is going to our buyers and our commercial teams, who are the ones making decisions about what products we source and what we list, and that is a mixture of having to sheep dip them and tell them how this stuff works, encourage them, highlight success and a constant process of innovation, but very much owned by them. It is somebody in the sense of doing a circular economy. It is, “Your business is going to change. What opportunities might there be?” They are very different in France, say, to Spain and the UK and what has been great is that we are now seeing a few examples come through.

We have just launched this product that gets rid of a massive amount of polystyrene in all our bedding plants and replaces it with a kind of teabag, basically. Instead of these awful trays that no one could get rid of and clogged up our customers’ bins, you have a nice little recyclable, PET tray that you can also use as a seed tray. The whole thing for us works because we save a huge amount of waste through the system. The customers get a better product because it is more sustainable and it just pops straight into the ground. It is an easier product. It is a far more sustainable product and we sell over 70 million bedding plants. For us, that is a big impact we can have.

Where we are seeing it is it is beginning to show up almost product by product and I don’t think there is an easy way of getting that to happen, but we are then tracking and we are just about to publish a series of KPIs that will take us through the next five years to say, “Where can we make the progress?” We also have a vision for the future out to 2050 to what we would like to achieve. Every year we will report against it and try to make sure we come up with it, but I think the KPIs have to be quite business-specific to have any traction in an organisation. They cannot be too abstract.

Q10 Martin Caton: Can I ask a supplementary for the whole panel? What research is still needed to underpin the circular economy and what needs to happen to ensure the results of that research have an effective delivery path into business?

Dustin Benton: One of the areas where research is clearly needed is on the environment underpinning some of this stuff. We know that environmental indicators—picking up on your last point—are quite important in understanding the value of the circular economy. Let me give you an example. If we were to price carbon adequately to get real change to tackle climate change, so we are talking about €75 a ton here, the price of aluminium would jump by 70% because of the amount of energy that goes into its production. Recycled aluminium would only jump by about 7%, so that begins to give us a sense of the sort of opportunity, but there are lots of other risks that companies are facing that feed into some of the rationale behind the circular economy.

Water availability: how does that go into products? We know that the supermarkets are interested in this but we do not have a very good way of measuring or comparing that. Certainly when we have talked to the finance community, who are very interested in this because they see that supply constraints affect how businesses can be valued, they are not

yet sure about how to price this into deals, to shares, to “should we take this company over?” and that sort of stuff. That is definitely an area where we need additional work.

Just picking up on the point about what we already know, though, because we can do a lot, we know that value is a surprisingly good proxy for a lot of other benefits. Just very quickly, taking a look at something like an iPhone and showing how the environmental value and the economic value match quite nicely, the raw materials in an iPhone are worth about £1.50. That is gold, copper, glass, metal and all that sort of exciting stuff, but Apple will sell it to you, as some of you may know, for £600; so quite a good value uplift there. This is fairly obvious. We know this stuff, but what we do not think about is the back end of the supply chain. If you crush that iPhone and melt it back down you get about 72 pence.

So you have taken a £600 device and turned it into 72 pence. This is the way policy focuses us. This is the way everyone is thinking about the recycling circular economy. But if you sell that iPhone on eBay you will get almost half of its value back and even if it is broken you will still make £170. That gives you a real indicator and electronics are an extreme case but the pattern is true for a whole bunch of different products we have looked at: T-shirts, bread, cars, a whole manner of things. That remanufacturing and reuse, which is far better environmentally, is also where you see the value. That is where we should be aiming at least at the beginning.

Jamie Butterworth: My thought on that would be, on the actual underpinnings of the model, I think there is a lot of information out there already both within the disciplines of which the circular economy as a generic term makes up; things like Cradle to Cradle and Industrial Ecology that have been peer reviewed and are out there. There has also been a recent wave of reports from different players like McKinsey, the World Economic Forum and others on the topic. To some extent you could boil the ocean in terms of proving the model.

Let me take one example that I think shows the magnitude of the opportunity and almost how part of it is quite commonsense and of multiple benefit. Renault, which is not a UK company, has been involved in circular practices for quite some time and, to quote the chief operating officer, Carlos Taveres, who spoke in London last year, he said, “On average between Renault, Peugeot and Citroen, in one year between 2010 and 2011 those companies saw an average increase in their input costs of €500 million”. His point was we can’t continue to just design a product that goes into the market and we lose. They have a plant on the west coast of France that has been running for some time where they can take into it the end-of-life engine drive train or gearbox from a vehicle and it leaves the plant with exactly the same warranty in the same box as a new product and goes out into the market. When they go through that product they use 85% less energy than they would in a new product, because they are using all of the embodied material and stuff, and approximately 60% of the embedded material. They are using a different compound of energy in terms of how they are making it and they are using a lot of the materials again.

What I thought was very interesting as well was his point that out of all of the plants that Renault has, that is now the most profitable of all of them. Of any of their linear plants, that one is the most profitable. They could boil the ocean and they would have the data on that in terms of the carbon savings and the water. Basically you are using something again and you are using all those components: embedded labour, water, energy.

Just to follow on that, you can go so much further than that if there is a co-ordinated focus on this in that you could then join the design of new products to optimise those for disassembly and reconstruction, like Caterpillar have been doing for some time. You could start to put data tags on components or products such that you would have a product passport. You would know what was in something, which would make it easier to do that. As Ian says, you could say that you don't pay VAT the second time round because effectively most of those resources have already been used once before. You could make it attractive from an investment perspective in terms of those asset classes would be quite resilient.

From my perspective, maybe the research that would underpin it further could be more around things like materials innovation, tracking and tagging of assets in the economy, or some of those new business models. I think that would unlock a lot of growth.

Chair: I suspect we are going to run out of time very soon, but I will bring in Mark Lazarowicz very quickly.

Q11 Mark Lazarowicz: Just briefly it is always useful to know why it is a particular example has worked. You referred to an example relating to the French Renault plant. What were the motivations behind that initiative for that plant? Was it Government action, was it a wish for the company to be responsible or was it simply a cost factor? What made it happen?

Jamie Butterworth: We think there are two things. One is obviously the economics. At that scale and with that much input material, it is interesting to get that back and reuse it. The second part is some of the things that have happened in the automotive industry that have pushed that have been putting the manufacturers on the same playing field in terms of standardisation of some material and components. Just as Liz was saying, obviously if you can start to move towards some optimised pallets of material that the economy uses—so some materials that we have heard of like PET whereby the recycling rate of those is quite high because there is an industry standard. People know what it is, so you get the right volume and purity to have a value, whereas in some other industries there is less focus on that, so I think it has been harder. But I think partly economic and partly the system conditions.

Q12 Caroline Lucas: I think one of the most interesting things is about how we get people to change their behaviour and how we communicate with them. Already this afternoon there have been lots of different terms used for the same thing, whether it was the circular economy or cradle to grave or closed loop or resource efficiency. I wondered if you had learnt any lessons about the best way of communicating these ideas to different groups and if it is different words to different people to motivate different behaviours. It seems to me that that communication side of it does matter because people do not necessarily only act as a result of rational thought. It is about something much more emotional than that.

Liz Goodwin: I think we are still learning, just at the very basic level, that people don't distinguish between recycling and reuse. They use the words interchangeably, so we need to make sure we are able to adapt to that. It is a different message, a different communication to householders and to businesses. Certainly for businesses, you have to start with what the business is trying to achieve and how do you make a strong business case, but it is different for householders.

Sir Ian Cheshire: The circular economy is definitely a phrase that has helped get traction with business. I think that has changed from five, 10 years ago when we were first looking at some of this. The foundation's work with McKinsey has turned it into very much business innovation, so business can say "There is something interesting here". I think the business language is relatively straightforward.

The second point is about the customers, trying to explain what this means. Take a concept like recycling that gets abused and turned into all sorts of different things and we have not yet found the right vocabulary to talk to someone. If I talk to people who have used, for example, Airbnb they just think they have had a great apartment holiday. They don't think they have been part of a circular economy or an asset-sharing economy. If we can start to develop that language it will be one of the unlocks where we will need to get customers to say, "Yes, I recognise that and I prefer that product because it has been thought about in a circular way". Most customers, once they get the idea, are absolutely a potential force for good in this area, providing we can give them the right information and the right reason to prefer it something over something that is not. It is one of the big challenges right now.

Q13 Caroline Lucas: Do you think there is a danger in some of the language too, in the sense that if people get the idea that it is just about being a bit more efficient then it does not challenge things as ambitiously as we need to challenge them if we are going to be genuinely sustainable? It seems to me that a word that is never used is "sufficient". We all love efficiency; we don't much like sufficiency because it might mean that we don't just go on growing indefinitely, even if each unit of that growth is being produced more sustainably.

Dustin Benton: Yes, you are absolutely right. The circular economy is about greater efficiency within the economy. We have not talked about sufficiency. I imagine Sir Ian may want to back me up on this, perhaps not, but when you are a business leader saying, "We have got enough, guys, actually. You know those growth targets? Ease off," that is a really difficult language to get. The circular economy helps us to get more of the stuff that we want without the embedded environmental impact. When it comes to a sufficiency question, the language there, the environmental activism is still in the philosophical rather than in the practical.

Just on the point about comms though, I think we can learn a lesson from the remanufacturing industry, and that is that you do not, as a consumer, necessarily have to know all of the details. As Sir Ian said about Airbnb, people don't think about it as the circular economy. When automotive manufacturers or the aerospace industry use remanufactured components they don't talk about it because they don't want any of the potentially negative sides. People are quite happy to pay a bit less for that remanufactured component. A fascinating report was done by Asda a couple of years ago called *Green is Normal* and the lesson is really in the title. They surveyed all of their consumers—and they have a pretty broad spectrum—and their consumers said to them, "We want good green products. Green is a normal thing to buy. We don't want a choice between a bad product and a good product. Just give us the good product. Choose it for us and we will be happy to buy from you on that basis".

Sir Ian Cheshire: With the proviso that it has to be at the same price. There is a very interesting bit of work coming out of Davos last year, which is being led by Unilever, called Future Awesome, which is trying to put together the millenials and paint a lifestyle

picture of what a different form of sustainable consumption looks like. It is going to be a way into that that says people don't necessarily want lots of stuff. I think they do want a quality of life. We do want economic wellbeing and economic growth but does it have to come with that sort of price tag attached to it? Particularly millennials in Asia are going to be a very important shift force to not necessarily just repeat the American dream consumption model that we have seen in the last 20 years. I think there are increasing opportunities for companies large and small to sell to that type of consumer very differently. They don't want to be called a consumer, although user is fine.

You can say to people, "There is a future model. We haven't quite got it yet and we can't quite explain all of it but I can see two or three steps on the way and let's start going down that journey because innovation and creativity will probably get us there". It is some form of sustainable consumption, and I am not sure that is quite sufficiency but it is at least a step in the right direction. I think it will come.

Liz Goodwin: But it is also sufficiency in what? Sufficiency in materials is not necessarily the same thing as sufficiency in lifestyle and quality of life.

Q14 Caroline Lucas: No, exactly. The argument has to be that sufficiency in stuff does not mean that you are going to be happier and all that. What makes people happy is not necessarily consumption of stuff; it is a whole set of other things that you can—

Jamie Butterworth: I would argue that the circular economy is not being more efficient, it is a mixture of being efficient and effective. If we come back to the point on the polystyrene versus the Ecovative packaging solutions, being more efficient would be getting my Electrolux washing machine and using a bit less polystyrene or making that polystyrene a bit less around it to do less harm. The optimised balance of a system is to make the system conditions right, so if you were truly to become restorative or try to run a circular business model you would say, "Let's design it out of something completely different". In this instance it is waste from the food system. The challenging thing sometimes is if you did more of that, so if Ecovative sells more of that product and it works in the right way, is that a problem? That is a challenge in thinking of how you would get there, but it is an interesting concept.

Q15 Mrs Spelman: In what way could Government help you more with the confusion that reigns around the plethora of terms that are used and to deal with also some of the underlying prejudices that consumers have? They like to buy certain articles brand new; a brand new car has kudos, despite the fact that it massively loses value in road tax almost immediately and you have to deal with all the teething problems. There are some inbuilt prejudices that people have, and Caterpillar certainly have experienced some resistance and some doubt with their large remanufactured products. Are there specific things in terminology and in tackling underlying prejudices that Government could do to help you?

Liz Goodwin: I would have thought that there is a role in procurement because the Government is such a massive procurer, so sending clear signals that would help build some momentum in the manufacturing processes and in the businesses that gives them the ability to then have conversations with consumers.

Q16 Mrs Spelman: You will be aware that the Ministry of Defence entirely remanufactures all its machinery in theatre. Do you think Government could do more in other departments and also to promote examples of that?

Sir Ian Cheshire: I think Government acting as a promoter of the circular economy and a promoter of these types of behaviour and having an explicit role to champion this through BIS and others, talking about new models for businesses, is going to be incredibly important. If you can get the businesses to engage with it, they will probably figure out how to sell it to their consumers. There is no doubt that people are a little bit suspicious about remanufactured stuff. However, in our experience if you give them the right value equation they will get over that, which is why there is such a big second-hand car market. There are ways and means by which we can show people there is a real value to this. It has to be done, though, in a series of real world examples and it is quite tough to ask Government to stand up and make it a crusade.

There are lots of little unintended consequences of regulation, by the way, which I am not sure we have time to come back to, things like REACH and WEEE, which do cause a problem. Certainly in take-back chains there is a real problem. I can apparently sell a power tool all the way down the value chain to a customer but if I want to take it back and repair it I have to have a WEEE certificate and become a licensed waste carrier, and frankly the economics don't work. That is completely nuts and there are similar issues with recycling plastics on REACH. It is a classic inadvertent consequence because the regulation was done without any concept of circular economy in mind.

Q17 Martin Caton: Ms Goodwin, you mentioned public procurement as something that Government can contribute to. Do you have any examples of where that is already happening? Are there some Government departments that are taking this up more enthusiastically than others?

Jamie Butterworth: The Scottish Government is currently involved through the Circular Economy 100, which is a group of businesses and regions that are interested in creating test cases for this. They are offering to a group of healthcare and IT providers the opportunity to pilot a series of circular economy business models in Scotland, which is going ahead at the moment through Zero Waste Scotland and the Scottish Government. I believe it has already happened in some countries in Scandinavia.

Martin Caton: But no examples in the UK?

Jamie Butterworth: I am not aware of any.

Chair: I think we were rather hoping there would be.

Q18 Zac Goldsmith: Could I address this to Sir Ian first: do you think that population growth and, probably more importantly, urbanisation necessarily inevitably means that prices are going to continue to rise? If the answer is yes, what impact, broadly speaking, do you think that will have for UK business?

Sir Ian Cheshire: I think globally the level of population growth is going to create price pressure, given the nature of the demand likely to come through. Urbanisation is an interesting one because there are some odd counterarguments that that is more efficient in terms of ways of utilising resource as opposed to getting out to 6 billion people living in villages. I am personally convinced that resource prices are going one way because of the next 30 years and that if you have a planning assumption in your business model that that is not the case I think you are going to be unpleasantly surprised. There is opportunity always to substitute certain material prices and mitigate this, but I think the broader picture is a one-way bet at the moment.

Q19 Zac Goldsmith: I think the view of Jeremy Grantham, who is a legendary investor, is that we have already reached the crunch point, that if you look at the graph of collapsing commodity prices we are back where we were before the industrial revolution, effectively, in terms of the cost of commodities. Do you agree with that? Everybody seems to be nodding.

Dustin Benton: There are two things in play here. One is the demand growth and that will come from population but, more importantly, from the way people's lifestyles change. Across the world, in Brazil, India and China, just as a few countries, people want to live the way we do in this country and so their demand for materials and resources will go up. We can try to keep everyone from going after the most rapacious sorts of lifestyles but demand needs to rise to give some people anyway, particularly the poorest, a good quality of life. But it is also a physical question, certainly in some areas.

Copper is an area that we have looked at in some detail, because it is not very readily substitutable. There is copper in all of the wires in this room, in our smartphones, everywhere. We could not run a modern society without it. If you look at the mining industry, we have mined copper for about 7,000 years so we knew quite a lot about it, we have looked around quite a bit for it. When we started measuring back 150 years ago there was about 7% copper in every ton of ore that we got. Today it is about 0.6%. Mining is not rocket science. You lift up rocks, you crush them, you pour water through them, you apply acids and so on, and you come out with your metal. If there is more rock and less metal it costs more, and this has practical effects.

When we looked at Chile, which is the largest mining producer, right now, today, they are abstracting water from the Pacific Ocean, lifting it two and a half kilometres up into the mountains, 130 kilometres inland into a desert, desalinating it, pouring it through rocks and mining copper. This is a big part of the reason, not the only reason, why the capital cost of new mines in Chile has doubled from the 1990 to 2010 average to the way it is today because we are having to go further and further. There is plenty of copper in the earth's crust, don't worry, but getting to it, extracting it, is increasingly a challenge. You can see that in oil, nickel and a whole range of other commodities, so this is not something that is just going to disappear.

Q20 Zac Goldsmith: I am assuming everyone more or less agrees with Jeremy Grantham on that basis. As prices rise—and you have already hinted at this—opportunities arise alongside that, but presumably there are going to be winners and losers. It would be interesting to hear your reflections on who are likely to be the losers in this process. I am sorry to focus everything on Sir Ian, but it would be useful to hear from you in what areas of your work, as a result of your company pursuing something that looks like a circular economy, are you experiencing an obvious competitive disadvantage. Which are the bits that are setting you backwards from an economic point of view?

Sir Ian Cheshire: If I take the winners and losers piece, as commodity prices shift, unless government structures and frameworks and prices shift, the market will probably react and try to cope with it by a mixture of substitution, design and the rest of it. One of the reasons you are getting large companies very interested in the circular economy is that they can see that as a big way of adapting. Frankly, the winners are the most adaptive. It is not about whether you are quicker or bigger or slower; it is about can you adapt. I think the people that can find new ways of not being exposed to that will naturally want to go there. There are some business models that are more exposed than others. What is clear is that if

you have an assumption of infinite cheap commodities you have a very big problem with your business model, and those are the ones that the market and the financial markets should be maybe focusing on as potential losers.

What we have seen is two different types of areas in our business that are relevant here. One is where we have made the shift, and timber is probably the best example. It costs us roughly £30 million a year in the UK to sell kitchens with a more sustainable timber source than it would if we just went out and sourced it anyway. I think that is probably in the right balance at the moment, but one of the dangers is if there is a continued pressure on sustainable wood supplies it becomes very difficult to price justify or accept the margin. Where I have higher input costs I am thinking very hard about what I can do. On the flipside, things like the little bedding plant example just keep reminding me that anywhere we have big volumes that we can make material shifts—and there we also had the added benefit of getting rid of a large amount of peat—we can unlock some very big numbers.

What we are going back to now is saying, “Let’s look at the total business. Where might there be high value materials that we might be able to think about differently?” and look at the length and life of the loops in those areas. That is what we are using to map the product set at the moment and try to decide. On one level I could say, “I am feeling fairly happy. For nearly 30% of my product we have all sorts of timber and I am fully sustainable”. I could argue I already have a partly circular economy and I am putting stuff back in. For 70% I have not and I have particular horror spots, like cement, which is a total nightmare, where we need to redesign something quite radical. But for us it is about going through almost category by category and saying, “Where are the opportunities?” Generally, the people who think about this first are going to be the winners.

Q21 Zac Goldsmith: If I could push you, is there a particular initiative that you would like to do, for the reasons we are all discussing today, but which you have not yet done because it would put you at too much of a competitive disadvantage?

Sir Ian Cheshire: I don’t think there is anything at the moment where any of these solutions are going to put us at a massive competitive disadvantage. A bit like the point on the Asda comment, I am trying to find “normal product” that I can present that happens to be circular rather than a circular product that I want to charge a massive premium for.

Liz Goodwin: But I think you need to recognise that Sir Ian is one of the leaders and there is a plethora—

Zac Goldsmith: That is why he is here today.

Liz Goodwin: Yes, I know, but there is a whole plethora of business leaders out there who are not engaged in the same way as he is and not thinking about it, and those are the ones who are at risk.

Q22 Zac Goldsmith: Where do you think, broadly speaking, is the lower hanging fruit where UK manufacturers can put themselves at an economic advantage? I direct that to anyone.

Liz Goodwin: I think there is a huge potential in the whole reuse and remanufacture, because we have lots of skills and we just need to change the way in which they are

focused. There is the analogy of the cotton mills going out of business. There is potential here for us to create more manufacturing in the UK through doing some of that stuff.

Sir Ian Cheshire: I would echo that and say I think the other opportunity is in the whole design. This is going to be potentially a global market for designing products and services from a circular economy point of view. Outside maybe Denmark, I think the UK has probably got more thinking going on about this than anyone else. If we can really unlock the knowledge economy opportunity in this, I think there is something really interesting in that.

Jamie Butterworth: There is also one other area that is potentially low-hanging fruit because it is easier to get to the number of people, and sometimes the reason they buy products is more functional, would be the B2B space. There are a lot of the best examples where people are doing this and it is working from the economics. You had an example in the briefing note from Ricoh, which is a great example of a company making money from this and employing people in the UK. Those B2B instances are often where things happen. In the procurement question, that would be an interesting place to do some analysis.

Dustin Benton: One thing we need to think about with the circular economy is that there are a lot of innovation challenges and opportunities, and Britain is extraordinarily good at lab research, although somewhat less good at getting things out of the lab and into the market. In order to answer this question properly, you have to go into a sector quite deep. We have done a little of this and I will give you one example. It is the whisky industry.

We have done a bit of work with the Scottish Government on how Scotland could become more circular. We looked at what happens with the byproducts of the whisky industry; pot ale and draft are the main ones. At the moment these go either to animal feed or sometimes they are spread on land, but because these materials are wet they have to be either boiled or dehydrated and that is very energy intensive. Energy costs are high, it is carbon intensive, so it is not perhaps the best way of doing all things. We looked at what you could do if you linked up companies that could potentially get useful materials out of these byproducts. We spoke to some researchers at Napier University who are looking to pull the proteins out of the pot ale and use those as fishmeal. So they take a product that is worth about £50 per ton and extract a protein product that is worth about £1,500 per ton. This is a really valuable activity that they could do. Even better from an environmental perspective, these proteins look a lot like the proteins you get out of fishmeal, so you could feed these to the salmon farming industry in Scotland, displace fishmeal, which would be brilliant because we have already hit peak fish in terms of how much we can pull out of the ocean, and you end up getting a really valuable product. Linking this up would be an enormously valuable thing for the Scottish economy, certainly, and for the UK economy. There are plenty of people who want to eat farmed fish, for example. You can do the same thing with phytosterols, which are in the draft.

Q23 Mrs Spelman: Just a quick question on that, apart from the delightful prospect of whisky-flavoured smoked salmon, which is causing my mouth to water. There used to be a Government programme called NISP, I think, consciously linked up companies that had waste products for which they couldn't find a purpose with other companies who could make good use of them. I don't know if that programme is still ongoing. Do you think that is a role for Government?

Liz Goodwin: ISL still exists. The NISP programme itself does not, but the organisation that was behind it does still exist. The big issue was the fact that quite a lot of this was just one-offs and it was very difficult to replicate it. What would be fantastic is if you managed to find a model where there was a waste stream and somebody who could use it that you could then multiply across the rest of the UK, but it never happened. It was always one single, specific business's waste stream that had a single solution.

Sir Ian Cheshire: There is a related problem here that Government could try to fix, which is that we don't have any standardisation of the way the waste streams are done local authority by local authority. If you are going to get to scale in the UK, it should not be beyond the wit of man to standardise the way in which we organise and collate waste streams. At the moment it is absolutely subscale and suboptimal. I think it has been done in the cause of localism, which on one hand is a good thing. In this case I think it has inadvertently created a blockage to potentially a lot of valuable waste being accessed.

Dustin Benton: I have been speaking to investors in some of these companies. One of the biggest risks they face is feedstock risk. You can see it in anaerobic digestion, which is relatively tolerant of different sorts of inputs. We spoke to one AD provider that had 40 different contracts for feedstock. Just the feedstock management was a significant cost to that business. Simplification would make that business model take off.

Chair: I am going to bring in Dr Whitehead very briefly.

Q24 Dr Whitehead: Briefly? Okay, it is a clue.

Chair: I am just conscious that time is slipping by.

Dr Whitehead: Would you say that the known increase in recovery and reuse of materials that has taken place over the recent period is because of regulation or despite regulation? Are there barriers to increase reuse and recycling that, as we have already started to hear, may arise from ill-directed regulation or does regulation support that increase?

Liz Goodwin: A big driver has to have been the landfill tax in recent years. That has certainly been a big driver. There were other enablers that were necessary to get to the levels of recycling and recovery that we have already, but I think there are still some regulatory barriers that could be a problem. Definition of waste is clearly one of them because it provides a blocker to getting material back.

Sir Ian Cheshire: There are specific issues with REACH and WEEE that I think we could feed in as a comment. It is simply a blind spot. It is just that regulations were drawn up in a way that would never have anticipated that it would stop me from taking back a power tool, and it just happens to do it. I can see why.

Jamie Butterworth: There is another interesting thing as well that WRAP informed us of recently, which was that there may be some policies for zero waste that inhibit circularity. Zero waste is basically eradicating waste in the system. For example, if you put in large-scale incineration you compete in the market for feedstock. You create a suction effect for materials for burning, which then makes it quite difficult to get competitive prices for a recycle. There are some things where creating a zero waste economy is subtly but importantly different from a circular economy and to optimise that, those kind of things would need to be unpicked.

Dustin Benton: Regulation is not the panacea but it has been enormously important. We were speaking to some investors about precisely the challenge about incineration versus other more valuable circular economy options, and I have to say I was really surprised. I went in and said, “Look, guys, there is this great opportunity. You can do plastics reprocessing rather than incineration. It is worth way more”. The calculations we ran were that a ton of PET plastic is worth about £300 per ton prior to reprocessing and about £1,000 a ton afterwards. If you burn it, the value of the energy you get out you could get by burning £100 worth of gas, so there is a massive value differential. They turned to me and said, “Yes, we understand that. Of course we would prefer to do the more valuable thing, but look at it from our perspective as investors. Look at the risks. On the feedstock side, we can sign a deal with a local authority that will get us 80% of the feedstock we need for many years and that provides us certainty so the tap won’t stop running”. Even more surprisingly, they said, “On the back end, in terms of selling this stuff, we know the electricity market, we will buy all the electricity we can sell, and also we know that the ROCs that we will get for an advanced conversion process are steady”. We know that the value we will get from plastics is higher but it bounces all over the place, particularly if you look over the last five or six years, and that makes investors think, “Why should we go for this high value, high risk option when there is a pretty safe, pretty steady sort of option here?” I was shocked at how much it seemed that infrastructure investment followed policy design.

I know the German Government in particular has looked at some incentives for bioenergy versus the use of biomaterials, which is usually a more valuable option, and said, “We should perhaps start looking at the subsidies for bioenergy to see whether or not they might conflict with the feedstock you want for higher value, better uses for biomaterials”.

Q25 Dr Whitehead: Could I test you out on two and a half bits of regulation? The first one is that as rates of recycling and reuse have increased so have waste exports. In some instances, metals recycling for example, we would not be able to use the metals that come our way, but in a number of other instances we appear to be exporting one way and importing another way. Is that something that is a method of employing a safety valve in the light of insufficient demand for materials or is something that fundamentally undermines the circularity of materials within the UK economy, in your view?

Liz Goodwin: Some of the materials that are exported are globally traded and I think that is acceptable. The paper example is the obvious one where 50% of the paper is exported but then it gets reprocessed overseas and comes back around the electrical goods we buy. I think that is perfectly acceptable. There is huge potential, though, for more materials to be used in the UK if we could get the businesses going and get the market demand going for use of recyclates rather than wanting virgin materials, so it works both ways.

In terms of the regulatory things that are blocking those, ever since I started at WRAP, which was 12 years ago, people have always moaned about the Export Recovery Note system and the fact that is not fair compared to the PRN system. I know DEFRA is looking at it.

Q26 Dr Whitehead: You just anticipated my next question about PRNs and similar instruments that, as Sir Ian has said, appear to have been devised with perhaps some benevolent purposes in mind but not with a circular economy direction behind them. PRNs

actually dump stuff down at the end of the process and don't recycle within process, assuming you can understand what PRNs are about in the first place.

Liz Goodwin: They were created at a time when we were thinking about a waste management issue rather than a circularity issue.

Q27 Dr Whitehead: Is there a case or might there be a case for a generic overhaul of regulations so that they point in the right direction as opposed to introducing regulation by regulation by regulation?

Jamie Butterworth: This is an interesting point, because a lot of people look at Scandinavia as very advanced in many of these areas. One of the things that the central region of Denmark, who are involved in this project, has been saying to us is that, "In the UK you have less installed incineration, for example", which we think is one of our biggest barriers where we put so much of that in at a time when that was fashionable and the right thing to do. In the UK we potentially have an opportunity to leapfrog some of that and be in a very good position because not that much of that exists. So a reorientation at this point could be interesting.

Q28 Dr Whitehead: Specifically to Sir Ian in terms of what we have begun to discuss about the question of what a competitive advantage looks like and what it does not: what sort of case might there be in terms of an understanding of a level playing field as far as recycled and reused materials are concerned, for example, discussion on mandatory recycled contents for products whereby everybody understands that the rules are the same for everybody and that that in itself creates a market in a way that voluntary arrangements might not? Would that cause, in its whole pursuit, problems as far as business models are concerned?

Sir Ian Cheshire: I suppose I start from an instinctive concern about any time we reach for legislative levers we probably create two or three other problems we had not thought of the first time out. I would probably be more in the phase of encouragement and removal of unnecessary barriers at this stage, rather than any major obvious piece of legislative level playing field. If you could send some price messages into the market, either through the way, for example, procurement would work at the supply chain end or through the VAT treatment at the other end, that would probably stimulate the system more than some of those other interventions, because they have to be quite specific whereas those would be more generic messages that probably have a bigger total impact. I would be very open.

One thing I would stress, wearing a business hat, is I think landfill tax is an utterly brilliant idea. It is a fantastically well organised piece of structure, because we knew what it was going to cost us. We could tell what we were doing to impact it and it has created a whole set of industries around managing landfill that just did not exist before. I think there are pieces where we are not pricing the externality properly, where business can be told, "Right, you are going to price and now you have to figure out what to do" that should be encouraged. If there is something like that—and I have not come across something like that—businesses will be open to engaging with it because we know what to do with it.

Q29 Dr Whitehead: Except the Treasury does nick half the proceeds rather than recycle the proceeds of tax all by itself.

Sir Ian Cheshire: It is the Treasury version of the circular economy.

Chair: In an inquiry on the circular economy, we are getting quite circular and all our questions are coming back to the same one question, but before we move on from Dr

Whitehead's question, did you want to come in on the issue of regulation, Zac? I think we have inadvertently jumped ahead of ourselves.

Q30 Zac Goldsmith: It has kind of been answered. I think maybe I will tag this on to another question. I was going to talk about built-in obsolescence. To your point about regulation and legislation, it seems to me that there needs to be some kind of guidance there. If you talk to people in the plastics sector, there are so many different types of plastic that we use, it would surely make sense to minimise that choice in order to ensure that whatever plastic products are thrown away can necessarily be recycled and if they can't they can't be used. That kind of slightly heavy-handed, top-down approach I think is probably unavoidable, but I would be interested to hear your views on that as just one example.

Jamie Butterworth: If you take some analysis on plastics, for example, PET is the most recycled plastic globally and it is still not very recyclable. I think it is 37%, or something like that, recycling rates. If you take polypropylene, which is used in loads of applications from shampoo bottles to Hoovers, 98% of the polypropylene put into the economy can't be processed. It is exactly the point you came down to that there is not any optimisation or standardisation within that industry. A project that Ian is involved in called Mainstream, which runs with the World Economic Forum, is aiming to get the main players in the room. You could get 20% of the polypropylene industry around one table in a room and say, "How would we do that? How would you make that happen?" But obviously that kind of thing could have a really big impact if there was governmental alignment with it.

Dustin Benton: There are some technical solutions here. Some of the interesting things we have looked at when looking at plastics particularly are certain types of plastics may be depolymerisable. Polypropylene probably not because it is very energy intensive but polylactic acid might be depolymerisable, so you effectively get rid of the additives without too much of a challenge. The other thing is we know that there are companies who would be very willing to sell you additives to pull out some of the colours and what not in your processing plant, so it is technically doable. Whether or not they can do it as cheaply as virgin plastic is sometimes a bit of a challenge.

Just picking up on a point of legislation, I think there is a real opportunity for ecodesign legislation to enable a more circular economy to happen. It has been strikingly effective on energy, which is what it was originally intended to do. I think it would cut the costs to UK consumers by about £50 per year if they swapped normal light bulbs for LEDs, for example, and that was driven entirely by legislation. It is micro policy and it is very detailed when you go into it. It has to be micro-detailed, but we know that there is interest already in looking at material efficiency within the ecodesign directive. As McKinsey and the MacArthur Foundation's work has shown, there are huge opportunities here, a bit of a push, and ecodesign is about taking away the worst options, not making the best ones harder.

Q31 Zac Goldsmith: But the challenge is to find legislation that raises the floor in terms of the worst without in any way inhibiting the pioneers at the top, and I am not sure we always get that right. Just crudely speaking, do you think in a sustainable future it would be possible, legally, to produce products using materials that cannot be recycled but which are destined therefore to be thrown away? Do you imagine that we will reach a point where that would no longer happen?

Liz Goodwin: I would like to think so and I would like to think that it could happen without legislation, but you may need to send a signal to say, “By year X, everything that is put on the market is recyclable”.

Sir Ian Cheshire: Or use a version of the landfill tax that starts to penalise those products. A lot of these areas are questions where the exam question was never set that way. I was talking to our suppliers of power tools and I said, “First of all, can you tell me what chemicals are in the product?” and the answer was no, because the supply chain is about five years away from them. Then you say, “Could you design me a circular economy power tool?” and they say, “Yes, but you haven’t asked me to do that before, so why would I?” There is a slight chicken and egg here, which is that if we can get some groundswell of particularly some of these bigger businesses to send messages through the supply chain, I think it will become the new normal in a way. There probably are two or three critical plastics areas where there might be a case for some very targeted intervention to say, “Either we are just not going to let you use this stuff because it is impossible or we are going to make it so uneconomic that the market won’t want to use it.” That is one of the things we are looking at, maybe as a case example, to say, “Can we come up with a real world example of how that might work out?”

Q32 Zac Goldsmith: When you start looking at products as opposed to the materials, my understanding is that if you throw a computer away in Japan, about 80% of it ends up in a new computer and if you throw a computer away in this country it is the opposite. As I understand it, about 80% ends up in landfill. If you bring that down to more mundane things, toasters, radios or whatever, the trend today is that things are not built to last, that they don’t last very long at all and that they can’t be repaired. It is cheaper to buy a new one than to have them repaired. How do you shift things at that level? What are the levers that are available, do you think, from a Government point of view?

Dustin Benton: We are really into exciting territory here. Let me talk a little bit about Japan, which is a completely different context from the UK and I don’t think we can just swap across. The reason why that computer gets as much reuse and recycling as you say is that Japan has made it really easy to get that computer back to the manufacturer. If you are a Japanese person and you want to get rid of your computer, you can take it to the post office and just say, “I am done with this. Please send it back to the manufacturer” and it will get there. You can ring up your local authority and they will take it away. You can take it to a shop. It is really easy to be able to do that and that means that those devices that go back often work, because they haven’t been sat out on someone’s porch getting rained on. It means that they are probably going to get back the wires that go alongside them. Also there is a very strict form of individual producer responsibility in Japan such that the companies that manufacture things—and a lot of manufacturing of course still happens in the Japanese economy—must own a demanufacturing plant and because they are forced to own it and pay for it, they send their designers to the demanufacturing plant to look at, “Did this component work? When the guy is tearing apart, can you get it back usefully?” and they feed those lessons back into the design process. That is an example where the state has effectively created a whole system where the incentives are aligned. As I said before, some big businesses are able to do that. Rolls-Royce is a great example with its iridium-based superalloys. They control the whole system because it is so critical to their business. They can’t make their very exciting turbines without this material, so they have the whole system controlled.

The other alternative to creating a whole system control is to enable products to be disassembled and reused more easily and that is why I was interested in ecodesign particularly. You can either give businesses an opportunity and say, “Everything you make you have to demake and recapture”, and that might be a good way of doing things. But another way of doing things that might enable more opportunity for different companies is to say, “You have to make your products much easier to take apart and get things that are useful, both for reuse and in a material sense, back out of them” so then perhaps another company can get them out. A good example of this is printer cartridges where we saw that some of the business models had been set up on the basis that you sell the printer very cheaply, you sell the ink at great expense, so you have to get new ink cartridges out to consumers. Of course, this is a market opportunity so people started sticking syringes in the side and refilling them with ink. The computer manufacturers thought, “Oh god, somebody is eating our lunch so let’s stick a chip into this printer cartridge so it tells you that you can’t reuse it”. The EU stepped in and said, “Guys, this is insane. You can’t do this” and actually banned that practice from being possible. Now some of the big guys are thinking, “How do I adjust my business model to be able to not to have to—”

Q33 Chair: I am very conscious that Jamie does have to leave. Thank you, on behalf of the Committee, for coming along this afternoon and helping set the agenda.

Jamie Butterworth: Thank you very much, everybody. It was a great honour to speak to you.

Chair: Sir Ian, did you want to add something?

Sir Ian Cheshire: I was just going to echo the point in response to Zac. The two biggest levers that will make a difference are, first, redesigning products and services, because you can’t do this with just a little tweak. The second is getting the concept of take-back and remanufacture as absolutely standard. At the moment it is fire and forget out of the tube and you forget what happens to it and it is not your responsibility. If you create the responsibility—and it is a question about how far you can go versus Japan—essentially if you design and then create the take-back, I think you do sort of 80%.

Q34 Zac Goldsmith: Your highlight would be a take-back system of some sort that would require companies to engage in the kind of thinking that you are talking about, combined with long warranties and things like that, which would prevent built-in obsolescence?

Sir Ian Cheshire: Absolutely, and I think if you create those conditions the market can respond to it.

Chair: I am going to move slightly backwards now to an earlier point we wished to raise about international aspects of the supply chain and invite Peter Aldous to come in and perhaps pick up some other issues arising out of a later issue as well.

Q35 Peter Aldous: Given that goods are increasingly part of global supply chains, to what extent do you think it is possible and practical to be taking a country-by-country approach to a circular economy?

Liz Goodwin: I think that you are right that there are increasing global supply chains but the circularity can be at a number of different levels. Some circles have to be within a country and can be within a country, maybe even smaller, and some of them need to be bigger. It is going to be a mixture of approaches. We are doing some work with some of

the international supply chains on electrical products and because we are talking to businesses, they are looking after their supply chain and they work across all the countries. That is the important thing, I think.

Sir Ian Cheshire: Most large businesses run very global supply chains now so realistically, if you get a sector of people interested in it, they will cut across those boundaries. I think, however, going back to the point about regulation and legislation, there is a real role to make key interventions at certain levels. One of the opportunities is to look at some of the EU impacts because then you really would move the dial. It was very clear to me, talking about LEDs and incandescent light bulbs, that it was an EU call and the market shifted just like that. If we had tried to do that country by country it would have taken us for ever. On other ones, you have to have a very local approach and you just dial it up and dial it down, but the UK on its own is not going to be enough.

Dustin Benton: One thing that the UK can do on its own is the innovation side of things. There is no reason why we should not be capitalising on all of the brilliant research we have in the UK to invent some of the exciting circular economy technologies we might need, whether that is better metal alloy separation, which is quite geeky I admit but potentially very valuable—fun actually, when you get into it—or the bioeconomy and biorefining sort of things that I have been mentioning. Those are areas where the UK can do it on its own. I completely agree, though, that when we are talking about very complex products, particularly for large companies, doing things at the level of the single market is probably the best option.

Q36 Peter Aldous: Given that much of the additional pressure on global resources is coming from developing countries, what could be done to influence those countries to adopt a circular economy approach?

Sir Ian Cheshire: I have seen signs in the last three or four years that the Chinese Government are particularly interested in the whole concept of circular economy, so I think they get the economic logic of it. I think it is harder in some of the other emerging markets, for example Brazil, where there is a very agricultural and primary products focus. But selling it as “this is the future economy” is probably still the best way to get them engaged and if a large part of their economy is based on serving developed economies, it will be transmitted through the supply chain.

Q37 Peter Aldous: Is there any reason why the Chinese have embraced the circular economy more than, say, the Brazilians have?

Sir Ian Cheshire: I think they are the only country in the world that have a real 50-year plan and they have just said that is the way it is going.

Dustin Benton: Countries that take manufacturing very seriously have gone into this in much more detail. Germany, Japan, China, Korea, the United States all have resource risk-led circular economy plans, strategies, ideas that are technology funding because they are concerned about raw material access, the downside.

Q38 Peter Aldous: What do you think are the main forums for developing international action? You mentioned the EU. Are there any others that come to mind?

Liz Goodwin: The World Economic Forum is probably the other main one.

Sir Ian Cheshire: It is just worth saying that what is quite interesting about this topic is that I tried to get Ellen MacArthur invited to Davos four years ago and I couldn't get her in. We got her into a hotel in the corner at the edge of the whatever and tried to get a bunch of people to come and talk and about two people came. Each year she has got closer and this year she was finally inside the magic circle and suddenly this is something that WEF have really latched on to as, "This is a future model for the economy. This is our stuff. This is what we should be doing." We talked about Project Mainstream. This is going to become a very big push at Davos, definitely. There are other places but that is a very strong message to business. The EU is a very obvious level and I think there is interest in the topic.

Q39 Chair: Does that mean that perhaps we should be holding a hearing of this Committee in Davos?

Sir Ian Cheshire: Why not?

Q40 Peter Aldous: If I can move on and specifically ask some questions of Liz Goodwin and WRAP. WRAP has a long experience of voluntary agreements in different sectors, particularly with reducing waste. What role do you think there is for these in encouraging more use of the circular economy?

Liz Goodwin: I am a great fan of voluntary agreements because I think they allow you to get people together to work on a common problem where each individual person who has signed up to that voluntary agreement can come up with their own solutions. It is not putting a straitjacket on how they achieve it but they are all agreed about the overall objective you are trying to achieve. I think it allows businesses to move at the business's pace rather than something that is dictated from somebody else.

There is huge potential and we are currently working on the Product Sustainability Forum, which is looking primarily at grocery products and trying to reduce the environmental impact of those and create a collaborative framework around that where everybody who is interested in the milk supply chain can look at that supply chain and come up with some collective actions that will actually reduce the impact but it can be tailored to the specific projects where there are hotspots. So it is identifying where the hotspots are in the whole circular economy debate, which are the products that need to be tackled, and then trying to create some collective action around those.

Q41 Peter Aldous: Is it possible or practical to compel businesses to take a circular approach?

Liz Goodwin: I personally think they will die if they don't, so that is the way of having a sustainable future in the future.

Sir Ian Cheshire: There are probably certain interventions. We talked about certain types of plastic or certain areas where you would want to say, "You know what, there is no choice here, guys. This playing field will be changed." I think it is difficult in a more general way simply because the business models play out so differently. What I would prefer to see is promotion, encouragement and then let the market find out who can win and who can't. But the level of interest in this now is very different to where it was 10 years ago and this is the beginning of the commercialisation of the circular economy as opposed to the full leadership piece we discussed.

Q42 Mike Kane: Consumers are often inspired by the production model of a company that they buy their widgets from. I suppose what immediately comes to mind is something like the Body Shop or the Fair Trade movement. I am thinking Fair Trade is inspired by Christian social teaching that there should be fairness and solidarity in the production chain. I buy my teabags from Fair Trade but I still go to major coffee retailers who strip resources from the Far East, don't pay their workers who could never afford to buy the latte that I drink, turn it into a widget here and then we consume it. Fairness and solidarity cannot be concepts that drive the market sector and I don't think there is a massive Government solution to this. This is about subsidiarity, that the market should sort this out for itself. My question is: how does someone like Kingfisher maintain a competitive advantage when it is first out there doing this type of thing?

Sir Ian Cheshire: There is a reality of free riders in these markets, people who won't make the sort of investments or won't check their supply chain. I think you have two ways of dealing with that. One is that you need to tell your customers why this product is 10% more expensive than the stuff they see in a pure discount place where you don't know where it has come from, it is probably made with child labour and you couldn't equate the two. Some of the stuff that Justin has been doing at Sainsbury's about values and value does resonate with customers. That won't get you 100% of the customers but it will get you the right consideration. As businesses, we have to assert what we are doing there.

When you see it work, and I should declare I am a non-executive director of Costa Coffee, which I hope was not the one you were referring to—

Mike Kane: I didn't name one.

Sir Ian Cheshire: We saw a massive difference in the business when Starbucks was outed on its tax position. The brand preference scores for exactly the same cups of coffee in exactly the same shops have gone like this and the like-for-like for sales have gone like this and ours have gone like this. We are Rainforest Alliance certified coffee and we have a major foundation that works a lot in those areas. We started talking to customers about it and they responded. So I think trust your customers on one end but tell them about it. One of the biggest problems is green hush rather than green wash, which is that you don't tell enough people.

The second bit is that there are real problems with some practices, which I think probably can only be dealt with at a governmental level. The market has no way of dealing with these things. The power of the consumer voice to correct some of that is great. Some of the rest of it is if you want a licence to operate in this country you play by certain rules. That is a much tougher area to get involved with. From our point of view, when we talked about the level playing field, what does it cost us, are we constrained, I don't feel like we have a massive disadvantage. But it is interesting when an investor recently in a meeting showed me this really cheap little cast tool being sold in a discounter in a retail park in the UK for £1 and I was showing my £3 product and they were saying, "What are you going to do about this?" and the answer is, "I would never sell that product." I would not touch it for all sorts of reasons: quality, provenance, where it has come from. There will be some element of the market that probably will behave like that and, unless it is legislated or dealt with, I can't see easily how you deal with it.

Dustin Benton: Can I pick up on this point about reputation and markets? There are some examples where the market does price in reputation issues. Palm oil is a great one. It is a

very good crop. It is much more efficient in terms of output per hectare than other things, but if you ask Unilever or Boots or any of these big businesses that are involved in palm oil, reengineering your supply chains to get sustainable palm oil has been a huge issue. There are 3,500 hits on the FT website about sustainable palm oil and that has really reengineered businesses. Coal is another example. In Australia wind power is cheaper than coal, not because coal is an expensive thing—it is very cheap—but because of the risk premium that investors see on being able to run a coal plant for 40 years. They think, “We are not going to be able to do that so we would rather put our money into wind, which we think will last for 40 years rather than this coal plant.” Conflict minerals is a good example of where the state did have to step in because there is less than a tenth of a gram of conflict minerals in your mobile phone and no consumer is able to express any choice about that sort of issue.

Sir Ian Cheshire: Or illegal timber, for example, we effectively pushed for an EU-level ban because that is the only way you could stop that getting into the process. You end up with this problem of micro-intervention in certain areas and it is very difficult to do a generic sweep. I think if there are real problems, most responsible businesses would like to see a clean level playing field and would welcome it. It is a question of finding particular issues.

Q43 Mike Kane: As a new Member of Parliament, I often see great business people and great politicians as generally risk logs. They know what to look out for. As you, as a business, turn to a new business model, what is number one on the list of the risks?

Sir Ian Cheshire: If we turn towards the circular economy, the thing that I worry about is the cost of building the total model. It is, how do I go from what might be an interesting example to actually making it really work and this point about take-backs? For example, Desso had to build a great big take-back plant, put a lot of risk capital upfront, which then had to be utilised before it finally made money. Personally I think the risk is that that path is not clear enough and that we don’t then get the financial backing of my shareholders to do some of these things because they can’t see the certainty of return. There is a real “mind the gap” problem potentially for businesses trying to shift into a circular economy, which is, “Can I get the investments right or am I going to have to take a big punt to make this work?”

Chair: I think it might be helpful if I say that I need to bring the session to a close at 3.55pm, which leaves us time for the two remaining questions that we have. I turn to Simon Wright.

Q44 Simon Wright: I have a couple of questions about household recycling that may be best directed to Liz Goodwin. The current system is very much that different councils have very different schemes that can be confusing to households perhaps and could also stand in the way of national awareness raising campaigns. In your view, would it be sensible to have more of a national approach, in practical terms could that be delivered and would that be helpful?

Liz Goodwin: I think it would. We are where we are and we have 400 different schemes. I am sure there is far more we can do to get consistency about what is collected so that people do know what they can put in. We have done some research recently that suggests that only 25% of people are using their recycling services properly, so the vast majority of people do not use their systems properly because they are confused about what they can

put in and what they can't. If we had more simplicity about what can be recycled, that is one of the steps. Clearly, if we were starting from scratch we would not be doing what we are doing currently but it is how you move from where we are now to where we get to.

At the moment, with current budgetary pressures a lot of local authorities have cut back on communications and so there has not been the regular refreshing to householders on what they can do and what their local schemes are. That is another area where if you don't keep repeating the message, people move houses and they get confused about what they can do in their new house.

Q45 Simon Wright: What about the role of product labelling as well in that debate? Do you think that there is sufficient priority and consistency in labelling for recycling purposes?

Liz Goodwin: We run the on-pack labelling scheme and that is covering a large number of products, but again it comes back to the collection schemes because there are still too many products where it has a "check locally" symbol on it. There are three symbols: one is it is widely recycled, one is it is not recycled, and one is "check locally" because there is not a large enough proportion of the population covered by the recycling scheme. Once you get to 70% of people having access to it, it becomes widely recycled. For example, on mixed plastics we still need about 70 local authorities to start collecting mixed plastics for that to get a widely recycled label, and that will be a massive improvement. There is far more we can do on labelling.

Q46 Simon Wright: Do people understand that labelling system?

Liz Goodwin: Probably not enough but I think it is a lot clearer than the little triangles with 1, 2, 3, 4 and 5 in them. At least it is consistent and something we have found very important over the last 10 years is having a consistent message and information being provided to householders about what they can do with their recycling. We need to keep some consistency and don't just change tack because we have been doing it for three or four years and let's change because we are bored with that approach.

Q47 Simon Wright: Have you given any thought to the role of reuse targets that exist in France, Italy, Belgium, Scotland, Wales? Could there, should there be reuse targets in England? Would there be any disadvantages and are you aware of any experiences that perhaps we should be aware of where this has been tried?

Liz Goodwin: Setting targets can have the wrong outcome. At the moment, I think the Government is not very interested in setting targets as such. There must be other mechanisms for being able to improve, to promote reuse. Reuse makes good financial sense and makes much better use of resources, so I think it is getting the mechanism and the environment right rather than having some stringent target that, frankly, ends up forcing people to do something that does not make economic or environmental sense.

Chair: Perhaps our most important question last, so I will turn to Mark Lazarowicz.

Q48 Mark Lazarowicz: On the question of what Government can do, is it not the case that WRAP has had quite a substantial reduction in funding from DEFRA? What impact has this had on your ability to support the transition to a circular economy?

Liz Goodwin: We were not surprised at the budget cuts. We were involved in the discussions about the budget cuts.

Mark Lazarowicz: What was it again?

Liz Goodwin: 40%, but we had had a previous one of about 40% as well, so it was on top of a previous budget cut. What we are doing is we are trying to change the way in which we do things to leverage more out of some of the businesses that we work with so that we are minimising the amount of public money that is used. I still think there is a lot we can do and we are focusing on the things where we can make the biggest difference and have the biggest impact. That is not to say we were not doing the right things before but it has made us focus and prioritise. Clearly, if there was more money we would do more but we think it is important that we play our part in addressing the budget deficit.

Q49 Mark Lazarowicz: Specifically, what was the effect of a 40% cut on your work on a transition to a circular economy? 40% cuts normally have quite big impacts, so what was that?

Liz Goodwin: We have stopped work on the construction sector and the built environment. We are not promoting circularity in that sector at all at the moment, but we are still doing a lot of work on the circular economy and on business models, and some of it is not very expensive stuff to do. It is about trying to develop business cases and working with businesses so that they can make decisions for themselves as businesses. It is not about writing out large cheques.

Q50 Mark Lazarowicz: Besides the work on construction and building, what else was reduced?

Liz Goodwin: Some of our work across the patch. We have reduced our work on food waste, but I think it is more important that we have focused it down. We have focused things down. We have reduced the budgets across the board, but the work on the built environment is the main area that we stopped completely.

Q51 Mark Lazarowicz: Looking at one of the briefing papers, I understand that your funding comes from the UK Government and the devolved administrations. 50% of your funding comes from the Scottish Government and 40% from DEFRA, which is a bit odd. Is that correct?

Liz Goodwin: Yes, and the added complication is that we are in the process of separating off the Scottish organisation, so it will become a completely separate organisation as of 30 June this year. Around £25 million goes into the operation in Scotland.

Q52 Mark Lazarowicz: Does anyone else want to comment on that?

Sir Ian Cheshire: We have raised as a concern the level of funding cuts that were applied to WRAP. For the business community, WRAP is very highly valued as an expert partner and has been involved in a lot of different, very successful projects. It is one of the areas where we were alarmed to see the scale of the funding cuts. I think Liz and the team cope remarkably well, but I still think there is an opportunity to rebuild some of that in a more targeted way.

Dustin Benton: I certainly have not heard any business saying, “Gosh, why are we paying for WRAP?” I think most people have found it be enormously helpful. When I have been doing research into some of the innovations that have been required, particularly plastics recycling, WRAP is in there on each and every single one. It is incredible how much the importance of the convening role, giving companies the space to have pre-competitive collaboration, has been. In UK terms, it is a tiny amount of money to help fund some of

the early stage technologies, plastics reprocessing for example with foods, which probably would not have happened without a very small grant from WRAP. These are valuable things.

Q53 Mark Lazarowicz: I believe some have suggested that the responsibility for waste should shift from DEFRA to BIS. Is that something on which you have views or would there not really be much difference either way?

Sir Ian Cheshire: I heard Laura Sandys suggest that. I think it is quite an interesting idea, personally, but I would rather couch it as: could BIS take up the lead on the circular economy, of which one key element is waste and waste flows? I would make it a bit broader than that, but you are probably closer to this than I am.

Liz Goodwin: I think the circular economy does cross all of Government. I don't think it matters particularly where waste sits. The circular economy is about business and the economy, so there is clearly a role there. In the past we have played an informal role in providing that bridge across to different Government departments.

Q54 Mark Lazarowicz: Given I have three minutes left, I will have to leave that point. The last point is for Sir Ian. Given your experience of many different countries, are there any particular countries' governments that are particularly supportive of transition to a circular economy? You mentioned countries with a focus on manufacturing but is there anything you would particularly like to draw out for us in the two minutes we have left?

Sir Ian Cheshire: In probably one minute I would say the one country I have seen trying to think about this at a systemic level is Denmark, who are trying to push this as an agenda and are organising green growth agenda meetings and thinking about the totality of the economy. That is probably the most interesting bit of thought leadership. You then have individual areas, like we mentioned Japan who have certain bits of this, but I think the UK is doing some of the more interesting thinking. It is a classic example where, if we can get hold of this opportunity and help lead the transition, you can paint a future economy picture that is a big opportunity for the UK.

Chair: On that note, I will bring this session to a close because I know one of you at least has to leave at 3.55pm. Perhaps where Denmark leads, England will be a very close second. Thank you to all of you for coming along this afternoon and helping to set the agenda for what I think will be a very informative and interesting inquiry. Thank you very much indeed, and thanks also to the members of the Committee.