



Environmental Audit Committee

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

Tuesday 13 May 2014

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Written evidence from witnesses:

- [University of the Arts London](#)
- [The Great Recovery, RSA](#)
- [Caterpillar](#)
- [Marks and Spencer](#)

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Members present: Joan Walley (Chair), Zac Goldsmith, Mark Lazarowicz, Caroline Lucas, Caroline Nokes, Dr Matthew Offord, Mrs Caroline Spelman, Dr Alan Whitehead.

Questions 55–127

Witnesses: **Professor Rob Holdway**, Director, Giraffe Innovation Ltd, **Dr Kate Goldsworthy**, Design for Recyclability, Textile Futures Research Centre, University of the Arts, London, and **Sophie Thomas**, Director, The Great Recovery, RSA project gave evidence.

Q55 Chair: Thank you, all three of you, for coming along this afternoon. We have two sessions, starting with you and then a subsequent panel that we hope to move on to at about 3.00pm, if not slightly before. It might be helpful for you to know that. We started off our inquiry last week with a very interesting panel of witnesses and lots of discussion, and we want to zoom in and explore some of those issues in a little bit more depth.

I will start by asking all three of you how you feel design can link into this whole issue of the circular economy. Starting with Sophie, who we already know from work that you are doing at the RSA with remake, please introduce yourself and say how you think design is really important to this. Then we will go through our other panellists.

Sophie Thomas: Hello. I am Sophie Thomas. I am Co-Director of Design at the Royal Society for the Encouragement of Arts, Manufacture and Commerce. I run research projects specifically looking at design enterprise and manufacturing. My other role there is Project Director for The

Great Recovery programme, which has been running for the last two years. We have been investigating the role of design in the circular economy, partly spurred on by a lot of experience we have had through the last inquiry about resource security, which I was also giving evidence on, that was starting to think about how important the impact of design is in the process of creating products where the value can be kept within the system.

We have been running a process of mapping the industries and who should be involved in that design process, and also looking at the different models and the theory and the practice. It is very much taking the theory of circularity into: can it actually happen; how does it happen; how does business connect with design; are they connecting with designers; and how that influences where the value of the product ends up?

In terms of the question, the Design Council cite the statistic that 80% of the environmental impact is predetermined at the concept design stage. It means that designers have a huge role to play. We always see that statistic as a very positive thing because the way that we specify materials, influence the design brief, talk to our suppliers and contractors and specify our materials is really key. The way that we put things together, the way we design our products, is so key to some of the issues that are coming out at end of life. We have been taking designers to a lot of facilities at end of life and also looking at the issues that they are having with collecting materials, disassembling, dismantling and recycling. We can see that a lot of the issues that they are having to fix at that point could be fixed at the design concept point.

Professor Holdway: Thank you for inviting me to give evidence. I run a company called Giraffe Innovation, formed in 2001 and based in Brighton. We are a kind of triumvirate of skills: ecodesign, management and environmental science. I am also a professor associate at Brunel School of Engineering and Design where I studied. I have to say it is covering many of these issues and has done for years, but obviously I am not biased.

We are dealing with a circular economy, a whole new lexicon that has arrived. We are dealing with sustainability, which is also a very diffuse subject. Then we have the “d” word, design. What does this really mean? There are a number of issues and problems about these homogenous sorts of phrases that are lumped into terms that people find very difficult to grasp, not only corporates but also SMEs. Design is one of three things. It is seen as the artefact, the outcome, the discipline, of which service design is now a discipline taught at the Royal College—we have a whole load of disciplines in design—but what Sir Chris Frayling called “Design with a big D”, the process of design: how you gain insights, internalise those insights, innovate, commercially turn these ideas into something that people want to buy and make money from them. That is the real value of design, and that is about understanding the context, the ergonomics, the function, the cost, the supply chain and all these different issues.

I think that design has a big dilemma. It counts for perhaps 2% of our exports and it is a very powerful tool to be used. However, I think designers are not that well equipped—we can have an argument about this of course, and I hope we can—to understand the context and other disciplines. It seems that everyone is now an ersatz environmental scientist. They all understand this sustainability in design; but do they really? A lot of our work is giving an evidence-based approach, using a life cycle assessment to say that something is better than another thing and to make sure that people are informed by sound facts and environmental evidence and science that supports green claims. That is absolutely crucial.

The other point to make about the circular economy is that it is still okay to be resource efficient in a linear economy. Some of the things we might talk about today are whether companies are

lean and effective, do they manage their current paradigm of doing business well, and does design have a role in helping them transform their business and be more efficient, while at the same time helping them disrupt and be innovative as well?

Q56 Chair: I think the core of our inquiry is to see how we get that paradigm shift.

Professor Holdway: Absolutely, yes.

Chair: Thank you. Dr Goldsworthy.

Dr Goldsworthy: I am a senior research fellow at a research centre called the Textile Futures Research Centre, based at the University of the Arts, London. I agree with and echo the comments already made about the importance of design in designing out impacts right at the beginning of the process. Our work is very focused on the textile and materials-specific area of product design, fashion design and all other areas related to textile products. We see our design process very much as a problem-solving one, not a styling effort. One of the biggest things we do in our research projects and our teaching is to talk about textiles as systems not objects. We are very much looking both back to the material resource and forward to the end of life, and trying to connect those things up.

I think terminology is something that is problematic. When we started our research centre back in 1996 it was ecodesign, green design, sustainability, which became very problematic in terms of a positive sell. There is something about design for the circular economy that has a great logic and positive appeal for problem solving. I also think it is very important for designers to work right across industry when it comes to solving these kinds of problems. A lot of the work we do is very cross-disciplinary. We work with material scientists, political scientists and social scientists, because we think it is that kind of combination that is going to make a shift.

One thing that we pride ourselves on is making prototypes. Our ideas are all around making theory into products, and we think it is very difficult until you see and understand the product as a whole. I remember someone saying once, "Can't you just do an LCA at the beginning before you make the product?" I don't think you can in all cases if you are looking at systemic change and doing something very dramatic with a system. That combination of science and statistics and hard fact, but also making something to see if it is possible, is important and exciting in this field.

Q57 Chair: Thinking about British manufacturing and British industry, and perhaps the role of BIS as well, where do you think the low-hanging fruits are if you were to make design the prime mover or the basis of future manufacturing and so on? What could be done so much more easily and quickly than anywhere else or anything else?

Sophie Thomas: I would echo a lot of Rob's comments about the process and resource efficiency. What we are seeing with a lot of business, and the way that we are beginning to talk to them about case studying some ideas about how you take something from linear to circular, is that you can't jump straight to circularity. It is highly complex and often involves huge supply chains. There are lots of barriers along the way, so how you get to that point is about the efficiencies first, knowing where you want to go. The section in the middle is about where the R&D should be focused and how you pull in the right people to have those conversations.

In terms of low-hanging fruit, there are a number of big businesses playing in this field who are looking for help and the UK has great design expertise. We have a very strong creative economy. A lot of our designers don't know how to do this stuff; I absolutely agree with that. There is a huge need for education in this area. It is not particularly taught. There are great examples but they are very specific. The area that we should be focusing on is training people up to a point

where we can start to case study and roll out small examples that show that industry can push forward.

Q58 Chair: It is interesting that you put education first, because presumably you need to show that it is being done through doing, a kind of contradiction in terms.

Sophie Thomas: Yes. I suppose I am defining education not just in terms of our educational system but continual professional development. The design industry does not have continual professional development like architecture or engineering do. As soon as you get out of college you start practising and you don't continue learning. Our programme is about bringing together designers, anthropologists, manufacturers and so on and doing an educational process of teardown design up through their products.

Q59 Chair: Are there any low-hanging fruits and what are they?

Sophie Thomas: We have great case studies. The TSB has funded 60 projects that are currently pushing forward in this. We have great examples of design in engineering and automotive. There are some very good studies. I think it is more about finding the low-hanging fruit in the service industry and the knowledge economy as well and how that connects in. It is very complex.

Professor Holdway: It is complex. I get that with the knowledge economy, the design industry. There is not an ONS official database or dataset for describing the design industry in the UK because it is so diffuse. The Intellectual Property Office, when trying to work out what the benefit or disbenefit was of having a creative sector—obviously there was a huge benefit of £35 billion a year or thereabouts, employing 350,000 people—included florists in their analysis. There are industry clarifications to do with engineering and industrial design. It is quite a diffuse subject.

The manufacturing sector in the UK can't be lumped into one set. There is some very high tech, particularly in aerospace. The hi-fi sector is like the Formula One of that particular industry, with companies like Meridian in Huntingdon around Cambridgeshire, Bowers & Wilkins down on the south coast. These are world leading, high end, high technology companies. We have worked with them through WRAP where we took post-consumer recycled polycarbonate and high impact styrene, two post-consumer plastics, and embedded that into a high value, high status, very expensive piece of hi-fi. We did the LCA to qualify that there is a benefit. A number of people said, "This is green". "Where is the evidence?" "We don't have any." There was 24.6% cost saving and about 70% carbon saving, which also was a provocation for offshoring some of the manufacturing, although they are bringing it back to the UK but offshoring the materials to be manufactured for their supply chain. They would generally be classed as SMEs although they are parts of larger groups.

I have to say there is kind of a history here. The Government used to fund the Envirowise programme and in 2000 and 2001 we were one of the three on the panel. We used to swan into a company and bring in the WEEE directive and the ROS directive, and describe to them what these new pieces of legislation might mean, the acronyms, one on restriction of materials and one on the obligation for producer responsibility on electronics. We saw significant savings and it could be very diffuse from a metal basher with a bit of electronics in it right the way up to more sophisticated defence companies. A lot of SMEs are quite advanced. If they are still in business over the last 10 years they are quite advanced and also they will be supplying large corporations, either in the defence sector or Marks & Spencer, Sainsbury's or whoever it is. They obviously have that pressure from their major customers pushing this back down the supply chain.

It is very easy to swan in and say, "I am going to re-engineer your business model" when there is a whole typology of different models of the circular economy, and one of them includes—as I

have just described—using recyclate in your products. That is part of the circular economy. It is not system-level thinking and perhaps it is not disruptive or that innovative, but it certainly presents challenges and it forms part of this whole circular economy kind of terminology.

Q60 Chair: We have quite a few detailed questions, but just finally from me: we heard from Kingfisher last week about how they had changed some of their business practices, including bedding plant packaging. But overall we get the sense that business is being slow to change over to this concept of embedding ecodesign into what they produce. Could each of you give us one reason why businesses in the main are slow to move over to this new way of doing things?

Dr Goldsworthy: In answering that, could I also talk about the low-hanging fruit a little bit? In textiles it is a very specific fibre group that we are talking about here. If you think about the global textile fibre use, over 50% of it is one fibre and it is recyclable through chemical recycling endlessly if we do it in the right way. That seems to me an incredibly low-hanging fruit that is not being fully utilised in the UK. There are lots of people doing exciting work on the technology to bring that to the UK and in terms of products, whether it is sportswear, uniforms or contract furnishing, There is a lot of 100% polyester material that can be recycled today and kept into value and save a lot of energy and cost in the process. That feels like something that is such a win-win scenario that I am not sure why there is not more of it being used today.

Why businesses don't engage is all around economics. If this process is going to be expensive then it is a difficult sell to the consumers.

Q61 Chair: So you say the economics. Professor Holdway?

Professor Holdway: There are lots of examples of small companies starting up that are embracing it. I wouldn't like to say that all small manufacturing companies are resistant to this. I think there is this journey that they have to be taken on. We have to present it in a very human way and demonstrate the bottom-line benefits of it.

Q62 Chair: Who has to do that? You say "you". Who?

Professor Holdway: Of course my company does that, but from a Government point of view we have WRAP, the Waste Resource Action Programme. We used to have Envirowise that did target smaller companies a lot more. We have the Manufacturing Advisory Service, which I understand is part-Government funded as well. So there are a number of advisory schemes out there. Perhaps it is a bit disconnected. I am not an SME on that side of it, but there are a number of pots. Then you get all the EU funds coming in. Most small companies probably get a phone call once a day.

Q63 Chair: Are companies not taking up sufficient opportunities from EU funding?

Professor Holdway: I don't have evidence to support that, but what is being offered does seem quite diffuse. Now this whole thing of ecodesign seems to have transcended into the financial modelling of building circular business models, which is not just about design. That is about a broad mix of skills, not only internally in the supply chain but also your customer. You have to take the journey with the customer if you are going to do this sort of stuff. Then perhaps a new organisation needs to be established that does consider these issues more broadly, where designers are working with finance specialists, material specialists, and so on, thinking about these issues.

Q64 Chair: Sophie, why is it so slow to change?

Sophie Thomas: I think it is to do with that at the moment it is very theoretical, so it is very hard to take something that is a very big concept and then translate that into your product or your system or your service. There is a huge amount of complexity. Even for one product or one

leasing system there is a massive chain of people and contractors and suppliers and so on, and it is about information flow. We have very little information out there.

Q65 Mrs Spelman: Dr Goldsworthy said that there is a great logic to creating products where the materials are more circular, but I want to ask you is there such a clear distinction between the use of different materials to create a more circular product and just tweaking the design of existing products to minimise waste? Is there this sharp distinction or is it all on a continuum?

Dr Goldsworthy: I think they are all parts of the whole but they are fundamentally very different. You can tweak a system to draw efficiencies and produce less waste, but to me the idea of circularity is that it exactly mimics the natural systems of circularity and you have inputs and outputs that are equally useful. Sometimes that could just be a tweak; for example, if you take a polyester shirt with complicated fixings and zips and remove those components so that it is recyclable. I think the key is that you need attention at both ends of the cycle. As a designer, you need to understand what the end of life story is to design for it. Sometimes that is a tweak or a material choice, but sometimes it is redesigning a whole system and thinking about services or something in a completely revolutionary way.

Q66 Mrs Spelman: That is a good illustration. The other classic is mattresses, where it is very difficult to recover the textile when it is mixed up with metal and fillings. The illustration is useful. The Ellen MacArthur Foundation make a distinction between technical and biological materials that, in their view, should be managed as separate streams. To what extent do you think that distinction is feeding into product design?

Dr Goldsworthy: That is a very old concept that traces back decades, a long time ago, and it is fantastic because it talks to me about this logic of natural systems. If you start thinking about it, it is not quite so easily divided. There are lots of materials that creep into both sets, but I think fundamentally there is a different route to recycling at the end of material that could be composted than there is for one that is oil-based and needs technical recycling. That is very helpful as a fundamental way of designing products.

Q67 Mrs Spelman: There now comes quite a broadening of this question, which is: where is further research needed to facilitate a circular economy? It is very much to all of you. Where should the focus be?

Dr Goldsworthy: To me, we have to solve a lot of the technology barriers that are happening at end of life, and I think there is a bit of a race to the finish on that already. We need to solve this problem of how to recycle blended materials—which, let's face it, are not going to go away anytime soon because we need the functionality and the benefits that that quite often offers environmentally—if we can embrace that and also look at industry that bolts on to that kind of thinking. An example of a project that we are involved with is an amazing company, which I am sure you have heard about, called Worn Again who have been looking at how to recycle blended polyester-cotton fabrics. They have been doing it with funding from industry, unfortunately not UK industry, but they very much want to bring it locally to Europe and to the UK to get these local recycling hubs going.

We are also looking at how production can change to fit that system. If that is going to be possible, how does that change your production methods? We are looking at some quite exciting digitally-driven technologies that bring the economies of scale of digital printing or something like 3D printing, where you can send a file, get it produced close to market with a certain set of materials and all the transformation and the added value in the manufacture happens. Perhaps every plant could be different, every object could be different, or it could happen en masse. We have to think about big business and not forget the power of all the small businesses that add up together and make such a big impact in UK industry certainly.

Q68 Mrs Spelman: How about the other two of you? That was clearly about developing processes and materials. Where do you think research focus should be?

Professor Holdway: There are some quite nice developments. We have seen what Samsung and LG are doing on their smart electronics and augmented reality and there is some nice stuff going on there. It is a very broad subject and I can supply more information on that. Also there is what Motorola are doing with their low-cost modular phone. You have this most sophisticated piece of equipment we have ever owned becoming more modular. That might drive more consumption, of course—there is a potential dichotomy there—but there are platform designs that might be a nice provocation for how we engage, consume and use products.

The work we have been doing on critical raw materials recovery from electronics is a major issue, not only for resource security but also resource scarcity. We have been looking at recovering printer circuit boards in the UK and also looking at novel engineering technologies, which are UK-based, to try to recover not only the platinum metal groups where the cash is but the critical raw materials that are often overlooked and very small. Two examples are palladium and iridium, which are two platinum group metals. In WEEE, Waste Electrical and Electronic Equipment, by 2020 there will probably be about £1.3 billion worth of value in those materials and they are used in electronics.

From a resource security and scarcity point of view, we need some cost-effective enabling technologies. There are some barriers at the moment, including the working capital of running these plants. At the moment what tends to happen is you get the electronics, you do an assay on it, get some kind of average value, send it to a smelter or refinery in Belgium, and two months later you get a cheque. We are losing £5 billion or thereabouts of value to the UK economy. Just in the electronics we buy each year, there is about £350 million in value of gold. So we need the infrastructure, we need the legislation to support that and we need the enabling technologies of which there are some in the UK. We have been running a trial recently with WRAP on this and there is some quite exciting stuff there.

Accompanying that is that there are also some new novel technologies at Brunel University, which has a long history in novel research on additive electronics, circuit board manufacture and production, new types of solder, lower melt, lower and easier to recover. So it is not only about the recovery at end of life; it is about new technologies both for the recovery but also in the design and manufacture of circuit boards, and the UK has some great expertise in that.

Sophie Thomas: I think there is a piece of work that needs to be done on how you take the business case, looking at how you would take a business that wants to go into leasing, away from producing a product, and how you step them through that. There is quite a lot of work to be done there and there are a lot of legislative and regulatory barriers as well.

Mrs Spelman: I think we are going to be teasing those out in subsequent questions.

Chair: Could I put in a request for slightly shorter answers, because we have a lot of questions to get through?

Q69 Caroline Nokes: I want to ask about the potential strengths and weaknesses of the UK design sector. What design skills do you feel are needed to contribute to a circular economy?

Sophie Thomas: We definitely need more system designers, system thinkers. Designers are very good. I remember having a discussion with someone about the fact that designers are taught how to go into something that is a very complex challenge. They relish the opportunity to pick it apart and put it back together again in some kind of order or new way of thinking about it. We

are perfectly placed. What we need to do is to train them up in a way that they actually use that, and for businesses to understand that when they get designers in it is not just about the product. It is about thinking on a molecular, a system and a product level, so if we can start looking at how designers become more adaptable and flexible. A design team does not just have designers in it anymore. We advocate having end of life specialists, reprocessing people on your design team, and that is quite hard for businesses to consider. It is not redefining who a designer is but expanding the team so that you have the right expertise so that, if a designer asks a question, there is somebody they can turn to and find the answer from or get some help from.

Professor Holdway: I come back to what I said at the beginning. There are two things: one is analysis and one is synthesis. One thing designers are very good at is feeling good with ambiguity and the unknown and dealing with it, so the synthesis is a core skill. That is not necessarily the domain of designers. Designers think they are the most creative. Well, I think they are following, to be frank. The scientists, politicians and legislators have led the way more than designers have in thinking about these issues, and I am saying that as a designer. I don't want to get hit by the people either side of me. There is this thing about synthesis. I can only talk about Brunel, and perhaps even at the Royal College now, mixing with different disciplines, bringing in other people to work on projects, including management specialists, collaborating with MBA courses and so on. There is certainly much more of that going on, but there is this whole notion of being able to synthesise between disparate elements to bring that together. There are very few people who can do that: Ray Anderson from Interface is a designer; Steve Jobs; Dyson is great example of that in my opinion; Sir Ian Cheshire perhaps; people like that. Are they designers? Not classically trained perhaps—well, Dyson is—but it is that skill set that is important.

Dr Goldsworthy: I do think designers are natural systems thinkers, good designers in the way you have mentioned. In our experience over the last 20 years, teaching systems thinking to textile students is not difficult in itself. It is giving them the tools in a way and almost permission. We are not judging them on just strict aesthetic qualities in their work. We are asking them to look more broadly. Also this idea that we have all talked about of mixed teamwork is so important. More and more within the courses at UAL we teach across textiles, architecture, and product design, and bring the students together right at the beginning of the process. I have seen such an increase in the knowledge and understanding of the students over the last, say, 10 years. I don't think we have to teach it in a traditional sense. There is so much of a bottom-up kind of understanding that is coming from the students and it is impressive.

Q70 Caroline Nokes: From what you have said, I am guessing that I am going to get a very positive answer to the next question from all of you. Do you think that design courses in the UK are giving students the skills that they need? How are we comparing with the rest of the world?

Dr Goldsworthy: I think the UK probably does well compared to the rest of the world. I have experience of the courses that I am very involved in so obviously I have a positive idea around those, but I think there needs to be more. I am not sure all courses, certainly not all textile courses, are teaching systems thinking around product design.

Sophie Thomas: There is more of a myth busting. I judge a lot of the student design awards at the RSA, and we have 90 years of awards going through all about social benefit. You see circularity coming into the briefs in the past five years. It is incredibly complex. I am sure you are gathering that from this inquiry. You can go from the complexity of a whole house right down to a piece of packaging or a plastic cup. It is a system; it is a product. Everything changes; scale changes. It is very hard for us to demand that students understand all this, but there is a fundamental need for them to understand where the materials come from for their products and

where they go. Currently there is a gap in people really understanding how to get that information, because obviously they won't have it, who to ask and therefore how to quantify it.

Professor Holdway: I think without doubt we have world-leading university courses. I am not going to mention Brunel. Have I mentioned Brunel yet? We genuinely do have some very good courses at Loughborough, Brunel, South Bank, the Royal College of Art, the only wholly postgraduate university in the world focusing on this stuff. But then you can look at Tsinghua and Tongji in China. I visited Tongji in the year 2000 to teach them about these things and now I see their name appearing. Tsinghua is starting to talk about these things as well. There is also the Hong Kong Polytechnic University where I have worked. There are some very talented people. Of course the dilemma for the UK is that they can vertically integrate these skills because they have the manufacturing base in the Pearl River delta. I have even worked in Thailand with guys who have had no formal training who I can tell you are very competent and good. So we cannot be complacent. We have to keep doing the stem subjects. Professor John Perkins' *Review of Engineering Skills* highlights a number of things. The *Ingenious Britain* report from Dyson also highlights that 4% of women students would like to be engineers and 35% want to be models. Both reports highlight some of the challenges that we have, but at the moment we do have very strong education in this subject.

Dr Goldsworthy: Can I add one little point to that? I worry about the future where the stem subjects eradicate or don't allow design to come up with them. Time and time again we see designers imagining the applications in the future for these amazing scientific or technical—

Chair: I know it is frustrating not to have the amount of time that we really need, but we have three very specific questions still to come.

Q71 Caroline Nokes: Can I just finish off? You mentioned the manufacturing base. How do we create the right conditions to attract the best designers to the UK?

Professor Holdway: That is a good question. If you want evidence that UK design has the best skills, you have the classic cliché of Jonathan Ive. You also have people like Andy Caine who is a VP at Nike. You have David Waterman at VTech in Hong Kong. If you start going through the list of some of the companies I have worked with, they all tend to be British designers. Look at the automotive sector as well. It is not necessarily that you have to attract them to the UK. You have to keep educating them and they can work wherever in the world. It is not necessarily about working in the UK. I don't know if that answers your question really.

Dr Goldsworthy: I think it is more support for that period between leaving these incredible universities that we have producing world-leading designers and them setting up perhaps their own businesses, which then either propel them into other industries or those businesses grow. There is a big gap between how they do that. So many designers have to start businesses with no money and no income. They are almost doing it as a passion. There could be more support at that stage. Perhaps funding like the TSB could be expanded and offer smaller grants to a broader range of people. The work that we have done on one particular project that has just gone in as a €6 million EU bid was started with a £5,000 Spark award. It is absolutely that work that has now been magnified into that context, so I think seed funding is really important. It pays dividends in the end.

Q72 Dr Whitehead: If you are a designer—not that I am a designer but if you are—I understand you can get a commission to produce something that will have a high recycle content in it or that something itself can be the process by which the recycle can be produced by making it reusable, recyclable and designing that into it. How do we get the market for both recycle and the

design for recycling matched up together in terms of that closed loop? Is it through regulation or specification of content or specification of content in design, or a combination of those things?

Dr Goldsworthy: Are you talking about raising the market value of the products made with recycled materials?

Dr Whitehead: I am asking about how the role of design and supply, and then moving on of reusable and recycled materials, comes together in a closed loop economy. Is it that Government may specify there should be X% of recyclates in whatever material you are using for certain products? Is it that the products themselves need to be designed so that they are reusable and recyclable? Is it a combination of those things? Clearly it has to be something like that in terms of making that closed loop work effectively. What would be your levers on that process?

Sophie Thomas: From our investigations, it has been very obvious that you start with the product, so it depends on the brief on the product. But if you want to think about the materials that go in, and what kind of loop you take it on it could be about longevity, reuse in manufacturing, service or very fast, rapid recovery of material. You have to look at all of the LCAs, the use, user, all the different complex supply chain and extended supply chain. There are some things that could drive it, for instance getting the quality of the feedstock right. Say if you are thinking about a piece of packaging, there are certain things that will stop you putting in more recycled stock. It could be about the fact that you can't get enough quantity; you can't get enough of the material back into the system. It could be that you are not getting the right quality, so we are not thinking about how we recover it.

A lot of companies who are working on this now, in the beverage industry for instance, are looking at how behaviour change and the design of recycling systems in households can affect the quality of the system. This is what we were talking about, the complexity of the issue. It is not just about redesigning the actual product itself. It is thinking about all the different ways that connect to get that material back into the system and back into the product. What is interesting is that when you look at some of the bigger companies that are working on it, who do control quite a lot of their supply chain, you would think, "Why are they looking into that particular consumer behaviour change?" The reason why is because they want to do something further around the system.

Q73 Dr Whitehead: Could I briefly give you a little example? If you simply recycle plastic, full stop, you can design park benches and that is about it because of the degradation of the plastic in the recycle chain, whereas if you have designed in particular levels of plastic into particular products, which can then be recycled at that particular level, you have a different series of options for design. Is that the sort of thing you might be thinking about or are there factors that perhaps drive that, say legislation or standards or agreements?

Sophie Thomas: There is a definite role for standards. If you want to encourage recycled feedstock into your packaging, for instance, or your tooling is the same, you can set standards. Rob probably is in a better position to talk about this with the plastics work that he has done. If you are a business and you want to use a recycled feedstock but you are too scared, if there is no standard there for quality you might get too frightened to use it, but you might find that you can add a certain percentage of recycled feedstock. It doesn't need to be down-cycled into a park bench if it is collected properly in the first place and you have purer feedstocks. It gets very technical very quickly.

Professor Holdway: The recycling infrastructure in the UK has improved massively over the last few years, particularly with PET and HDPE. Recycling relies on two things: yield, the amount, and quality of that yield. Through better segregation, avoidance of sending stuff to landfill, we now

have some very good recycling businesses that can stimulate designers to think about these issues for milk bottles, water bottles and so on. Coke are using a bioethanol from Brazil as a feedstock that can be recycled in the PET chain. It is not only UK recycle, there are other materials from around the world that do offer good value.

As a designer, it is very important to be aware of what the options are. We know that the PH levels of some cleaning chemicals don't lend themselves that well to using some recycled materials. In other sectors like healthcare there are complete restrictions on using recycled material, even though I would argue that we could challenge that on certain products. It is about understanding the infrastructure, the supply chain and also the enabling technologies and, as a designer, synthesising that. In my view, the people who have led the way are the major retailers in specifying and driving the change, both at a local authority level in better segregation and also specifying recycled content in their fruit juices or water bottles or whatever it might be. The designer is part of that chain, but if the infrastructure is not there, there is not much you can do as a designer to influence it.

Dr Goldsworthy: Could I add a quick point to that, which is the idea of producer responsibility? If the take-back systems are looked at alongside the design you see some really interesting things happening. If a company knows that their product is coming back full circle to them, it is in their interest to design it in such a way that they can get the maximum value from it. You see that in all kinds of other industries. In textiles the example everyone always uses is Patagonia who designed products for a very specific recycling system and they took them back. There are problems with a system like that but the more it is explored the better we get at it.

Professor Holdway: I have brought this along. I won't show the name, hopefully, but this is a biodegradable cup, so it is PLA material. The company we are working with is a huge organisation that buys perhaps millions of these, hundreds of thousands certainly. They go into the food waste chain, but when they get to the AD plant the first thing they do is remove them and send them to a landfill or energy from waste. It is either about the way the AD plant is run—as a designer I am interested in that of course—but also it is about is this green washing and what demonstrable benefits does this biomaterial bring when you consider the whole supply chain? It contaminates the plastic chain.

Chair: We will be having a division very shortly and we have two more very specific questions to get through.

Q74 Zac Goldsmith: Very quickly, the landfill tax is a blunt instrument, but most people who have given us evidence accept that it has been a very effective mechanism for encouraging businesses to design waste out of the way they do business. I assume you agree with that. Beyond that, what other instruments do you think we should be recommending that the Government look at as disincentives, as sticks as opposed to carrots, which I will come to in a second?

Sophie Thomas: We put a list together for the evidence of all the different things that we had come across. A thing like producer responsibility is a big one for us.

Q75 Zac Goldsmith: Specifically you are talking about warranties, take-back, that sort of stuff?

Sophie Thomas: Yes, warranties and take-back. Actually manuals for electronics would be a good thing. Having manufacturing manuals for things that could be potentially in the reuse and fixability market would be really useful. I cracked the screen on my iPhone and it cost me £120 to replace it. Had I wanted to do it myself I would have spent £5 but I would have lost my warranty.

So there are all these different elements that cascade from trying to fix something myself. Access to operating manuals would help designers to understand how to design things for fixing.

We have things around the credit licence agreement. If you are going from something that is about a linear model to a leasing model, there are different laws about how you are allowed to have a licence for leasing. There is also one about the Trades Description Act. If you have a remanufactured part in a new product, you can't sell it as a new product in the UK. There are all these things, but also VAT on fixing things, repair shops, is something we could look at. Where is the incentive to go and fix something if you have to pay VAT on it?

Q76 Zac Goldsmith: How do you create the clear distinction between manufacturers of products that cannot be recycled or repaired easily, that are cheaper just to throw away rather than have them sent back, and those producers of products that are built to last or be repaired easily or be recycled?

Sophie Thomas: It goes back to looking at the products in the system product by product, looking at the business case: where is the value in this product? You will probably hear more about this in the second session I would imagine. If the value is in the product, you want to keep it. That is where individual producer responsibility is, and therefore the company itself wants to fix it because they can do it best.

Q77 Zac Goldsmith: While you are speaking, can I come on to the incentives? You put a lot of emphasis in your submission on producer responsibility and your thesis is that we need to find better incentives for businesses to invest in ecodesign. I am assuming, therefore, that you don't think the incentives are strong enough. What then should the Government do? What should our message to the Government be?

Sophie Thomas: I do think that the landfill tax has been a massive incentive and I would want to see it going up.

Q78 Zac Goldsmith: I agree with you. Indirectly it is an incentive but on paper it is a disincentive. It is a stick rather than a carrot, even if the effect is the same. What would you think are the most powerful positive initiatives the Government could pursue?

Sophie Thomas: We are doing work with BIS and the Technology Strategy Board with the competition investments. They have invested £15 million since 2012 on specific issues that manufacturing and businesses have brought to the table. They have helped about 60 businesses, in small chunks and big chunks. There is incentive there. The next round of competitions, for instance, is looking specifically at drawing the end of life waste manufacturers into the conversation. For us, from a design point of view, that is very interesting because that incentivises them to come and work with us to look collaboratively at the whole circular economy. It is a push-pull.

Q79 Zac Goldsmith: I am going to jump in with one last quick question, because I am worried about the time. If you were to look at the issue of warranties, how would that work? Take a toaster, for example. Nowadays it would not last as long as toasters built a few generations ago. What would you do with a warranty to ensure that people who produce and sell toasters build them in a way that they can last or be recycled, as an example?

Sophie Thomas: I personally would look at models like that in terms of not a leasing model but a service model. I have a Dualit toaster that I have fixed myself. If you take a toaster apart, they are basically a bit of plastic, lots of crumbs of bread and a few bits of electronics. With the idea that you can make them and it costs £5 to build something that is so cheap, of course it is not going to last 20 years, but we can design things and we can make things to last that long. The incentive must be in the business model on how you do that economically.

Q80 Zac Goldsmith: Is that not simply a matter of guaranteeing a very long warranty that exceeds the average lifespan of a toaster, so that if manufacturers are required, effectively, to build one that is going to last six months and the warranty is five years, they are going to have to keep on providing free toasters.

Professor Holdway: It is a massive issue because of your cash flow. If you are relying on selling 20 million of these a year and suddenly you are not, there are issues there.

Can I answer one thing? Landfill tax was introduced by John Gummer, as you are obviously fully aware of, so were the Packaging Waste Regulations, and you can argue those have done a good job as well. The recent WEEE directive, which we have not mentioned yet of course, was very timid until 2016 about the incorporation of any reused targets in there. I think that would be a good instrument, to beef the WEEE directive up to include and give credit for reuse and perhaps inclusion of recycle. The ERP directive, or the so-called ecodesign directive, has intimated that you mark plastics now and all that sort of stuff. That is fine as long as you can get them back and recover them at end of life. I think there are some policy instruments that could be less timid and beefed up. They are going in the right direction and that is certainly the way forward. Everyone mentions VAT. What about cap-and-trade mechanisms for carbon tax on products? Dare I suggest an EU ETS type mechanism for products?

Zac Goldsmith: Please don't.

Professor Holdway: No, I am just highlighting it as a potential. Perhaps greater R&D tax credits for research into the circular economy, particularly for SMEs as well. There are a whole load of things. I challenge this notion that we are going to suddenly make everyone fix your own. It is like a manufacturer's public liability nightmare, thinking that everyone is going to start fixing their toaster and then they are cooking with it again.

Dr Goldsworthy: It could involve disassembly as well, couldn't it?

Sophie Thomas: There is a place for everything, Rob, and that is the thing. Some things are fixable and there is a growing wave of people who are fixing.

Professor Holdway: Surely it is better if the retailer choice edits those products out of the range, gives an extended warranty and has perhaps a different model.

Sophie Thomas: That is absolutely right. The other incentive I would say is intellectual property. How do we create incentives through a model where designers are incentivised to design something where, if it gets into the right material flow, then they get the royalties back from it? Looking at different models, so it does not have to just be about stick.

Q81 Dr Offord: From where should ecostandards that promote good design for the circular economy emerge? Should it come through Government regulation or should it be left to the market?

Sophie Thomas: I think it is from both. That is a bit of a non-answer, but we are seeing a lot of interest and enthusiasm from business who are driving it because there is very little else. They are asking us, "Come on, can we do something about this because there is nothing going on?" We are not hearing a strong voice from Government about circularity, which would be great. It could help incentivise businesses, education sessions and so on. I see that there is a push-pull from both sides and I want to see it more equal.

Q82 Dr Offord: Do you feel that Government regulations could be a barrier to innovation, for example?

Professor Holdway: I think the opposite. If you look at smart organisations, look at the ERP directive, BT took that on board, including WEEE, and my colleague helped manage that. They were looking at power supplies two years ahead because they realised that most of them were X% efficient, so there was the 80 PLUS voluntary standard. I am a great fan of voluntary standards before legislation. Look at the Courtauld commitment that WRAP had. Signatories are doing great things there because it is part of the community and of expression. There are some nice voluntary standards that could be more rigorously promoted, but then again if there is a chance to revise some of the legislation, particularly ones that are already entrenched in their business activity, like the WEEE directive and the ERP—I am not going to mention ROS, although I just did—I think there is an opportunity there to perhaps think about these broader circular economy targets.

I think business is a bit beleaguered. It does not need more seeming green taxes and more regulation, but it needs to be stimulated and made to understand there is a commercial benefit from doing this. Most of these companies that take on the green agenda save money or increase the market acceptability of what they do.

Q83 Dr Offord: What is your view on the EU ecodesign directive?

Professor Holdway: It has been judged to be very successful. In the American version they invested a huge amount more in trying to implement it and extend it on power supplies, standby, TVs, washing machines, fridges, and vacuum cleaners. The report from the EU says it has been very successful. There may be a bit of timidity in the speed at which it is being implemented and the investment in getting the research out there, but it has certainly saved business and the consumer quite a lot of on their energy bills.

Q84 Dr Offord: That was a governmental directive rather than an industry-led development.

Sophie Thomas: What I don't see with it is that a lot of designers know about it.

Professor Holdway: They should.

Sophie Thomas: I know they should, but they don't know about it and I think also it is quite narrow.

Professor Holdway: Brunel students know about it. I don't know why designers sometimes say, "We don't know about this stuff". I read an early draft of the WEEE directive. Are you saying we are not up to it?

Sophie Thomas: I am not saying they shouldn't. I am just saying they don't and they should.

Chair: One of the issues we need to look at is who has the responsibility for finding out what is there that they need to know about.

Q85 Dr Offord: When you are thinking about the EU directive, that is set at a European level. What impact does that have on UK innovation?

Professor Holdway: I just mentioned the BT example where they took it on board early on. It does tend to be larger companies. I don't have any statistics. There are some out there but I have not committed them to memory. I can supply the report from the EU to show what the investment cost was and also what the cost saving was at a UK level as well. We are looking at hundreds of millions of pounds, potentially, in energy saving and benefit, but I will make sure you get the report that I am referring to.

Sophie Thomas: The recasting of the ecodesign directive is quite interesting because it is broadening it out of very specific product ranges. That should have more of an impact on UK business.

Dr Goldsworthy: From a textile point of view, the French extended producer responsibility system seems to be very interesting. My understanding is that you can't opt out of it unless you put money into a system of your own that you deem to be better, that everyone has to contribute financially into it, which then means it is a focused effort. The profit from that is going into new research and recycling technologies, and it feels like a very joined-up system that everyone is part of unless someone really feels they have a better idea. It gives you the freedom to push against the system, but equally you can't just opt out and carry on like it does not matter.

Chair: I think we need to leave it there because we do have another panel of witnesses. I am sorry to have rushed you, but thank you for the time that you have given us.

Examination of Witnesses

Witnesses: **Ramon Arratia**, Sustainability Director, Interface Carpets, **Matthew Bulley**, Managing Director, Caterpillar Remanufacturing, and **Mike Barry**, Director of Sustainable Business, Marks & Spencer, gave evidence.

Q86 Chair: I would like to welcome the three of you to our session this afternoon, and to what I think is a very frustrating session in the sense that there are a lot of questions and a lot of issues and insufficient time. Just to compound matters, any minute now we are going to have at least one division in the House of Commons so the session is going to get even more frustrating.

Thank you for coming along this afternoon. I know that you have sat in for the previous panel. We have had a panel of experts who have been talking about this issue but, from your own business experience and the responsibilities you have, how do you feel this aspect of innovation in design is taken up within business? You all have examples of best practice that you have done. What have you learnt about how we need to make the changes on the ground and how to have the positive environmental benefits that we are looking for? We have three panellists. I think for each set of questions we could almost do with having one lead answer and then very quick supplementaries so that we can be a bit more focused. Who would like to start?

No one is going to start because we do have a vote in the House of Commons. I am so sorry. I will have to temporarily suspend the proceedings and we will resume straight afterwards. Thank you very much indeed.

Sitting suspended for a Division in the House.

On resuming-

Q87 Chair: I can announce that we are, thankfully, quorate following the division in the House of Commons. We do expect more divisions but hopefully not immediately. We will just push on, if we may. Without repeating the question, it was the experience that you have within your own company business of innovation, design and lessons learnt from how you have introduced it.

Matthew Bulley: If I can lead off, I am Matthew Bulley from Caterpillar based in Shrewsbury in the UK. We employ about 350 people. From our business model where we are operating heavy pieces of construction equipment, engines, generators, our remanufacturing business in Europe, we are looking to bring product back in from Europe, Africa and the Middle East. I think the key is on the definition of "remanufacturing". We bring product back in. We are trying to retain the

form of the product in its current state. If I take an engine block or a head, we are trying to retain the value in that, the energy that has been put into it, the machining content that has gone in, the design, and trying to retain that form as opposed to taking it down a level and smelt it down or recycle it. In doing that, with the volume we get and the take-back, we are able to see the high value of components that come in. It is a mindset then in terms of innovation: how do we get everybody in the organisation, from the machinists and the assemblers through to the engineers? It is a really good environment then for providing innovation, not only in terms of how we feed that back to the design at the start to design for disassembly and reassembly, but also in terms of cleaning processes. Our salvage technologies: how do I apply metal spray or metal deposition or some welding to a particular area on a component, to be able to do that cost effectively but still retain the value of the original? From a design and innovation point of view, I think it is an excellent practice.

Q88 Chair: You mentioned it being a mindset. That is presumably very important.

Matthew Bulley: Absolutely. It is a way of thinking around the end of life and every pound I save is a pound I save that goes back in to support the customer.

Q89 Chair: Mr Barry, do you want to give us an example from Marks & Spencer next?

Mike Barry: Yes, sure. We sell food and clothing through 1,200 stores around the world, selling about 2.9 billion items; an item being a piece of food, a piece of clothing. A few examples; I will not talk about them in detail. We have closed the loop on all our coat hangers around the world; 160 million coat hangers now do a closed loop. Store construction: we are specifying the use of recycled aluminium, plasterboard and so on, repurposing trolleys and signs in stores. Packaging: we are working with Somerset County Council now to collect plastic back from the kerbside, the consumer's home, to take back into our supply chain to make new packaging. Food waste: we have taken out M&S food waste into anaerobic digestion and then buying the electricity back from the renewables site. Clothing: 350 million items of clothing we sell each year. We are now working with Oxfam to bring 4 million of those items back in a closed loop with us. They are just the examples that we are drawing on.

The key piece of wording for us: this is not necessarily just about design in the classical sense. This is about business process innovation. If we want to make Marks & Spencer a sustainable business, we have to close the loop on all 350 million items. I can ask 200 individual designers to design things differently, but it is the core business model by which we sell and take back that is the big innovation.

Q90 Chair: Can I go back to what you said about kerbside collections? In a previous inquiry that we did, particularly talking about food waste and kerbside collections, it was put to us that different local authorities all over the country have different procedures in place for kerbside collection. How much does that feature or how much is that an obstacle, that lack of consistency across the whole of the country, in terms of trying to move towards this new method of operating?

Mike Barry: You asked the question a little bit earlier as to whose responsibility this is, Government or business. I believe that 80% of it is my responsibility as a business leader to do this, but the 20% that Government can do, the number one thing that it can do to help us is to simplify the collection of waste in the consumer's home. I will make it as simple as possible. We have reduced from 11 packaging materials to three, but I now need 400 local authorities across the British Isles to consistently collect it, segregate it and give it back to the materials recycling or reuse industry. That is absolutely the heart of the challenge we have.

Q91 Chair: Given that our Committee is a cross-cutting committee and able to look across at different Government departments, how much would you say DCLG and the Secretary of State's policy in respect of waste is assisting this innovation that we are seeking?

Mike Barry: That is a leading question. I will not jump into the politics of this, but I think there are several parts of Government that can join up to work together. It is partly with BIS; it is partly taxation; it is partly DEFRA; it is partly DCLG. This is about creating a horizontal economy rather than a vertical siloed economy. I live in a vertical silo. You lead me in terms of policy in vertical silos. We all need to arrange ourselves a little bit more horizontally. I would ask all parts of Government to participate in a more joined-up approach.

Q92 Chair: Thank you. Mr Arratia, did you wish to comment about the business lessons that have been learnt?

Ramon Arratia: We are the company who invented this idea of cutting carpet into tiles, into squares, in the 1970s, which was an advantage to install the floor very, very quickly but also is an advantage to recycle the tiles back. This is the key thing, modularity. We think modularity is key for circularity. For example, how can you recycle this carpet? It is very difficult. It is clunky. Many things in buildings and products are not modular. So modularity is key and we have had an advantage in our product because of that. But then also modularity at the recyclability of the different materials is where we have not been that lucky because we have designed our product to last for a long time. That means that the raw materials are compressed so it is very difficult to separate them. This is what we are looking at, at the product design level.

Again, the problem is there are no incentives for product designers or for companies to design those products in a way that they are more recyclable, especially when you don't get those raw materials back. What is the incentive if this product is then going to end up somewhere and then other parts of the industry are going to reap the benefits? That is why we need standardisation in certain products and that is why we need rules. This is some first analysis from our company.

Q93 Zac Goldsmith: Just on that point, my understanding of your own company's business model is that you got around that problem by becoming a service company as opposed to just selling tiles. Is that right? In other words, everything does come back to you?

Ramon Arratia: This is what we wanted to do in the 1990s and we failed miserably for several reasons. We wanted to become a leasing company. You need to be at the right part of the supply chain in order to take advantage of leasing. Who is going to make the money from leasing a drill? Is it going to be Black & Decker or is it going to be B&Q? Perhaps it is B&Q cannibalising Black & Decker's business. Being in the right part of the supply chain or the value chain owning the relationship with the customer is key.

The other thing is in the carpet industry it has little residual value. When you lease a car, you have some residual value at the end of the cycle, but for carpet it is almost negative. Thus there is little incentive for leasing, but we are doing other services, for example, helping with concept design and offering this service to recycle back. We are charging for that service. Now, if there is no landfill tax, if there are no landfill bans, we cannot compete from throwing away carpet relatively cheaply.

Q94 Zac Goldsmith: Initially, I was going to ask Mike. I think you were right there at the beginning when Plan A was launched—because there was no plan B, I think was the phrase—and it was a very radical plan that the company took on. In your submission, Ramon Arratia, you emphasised the radical nature of your own business approach to dealing with these issues. I just have a simple question. What was the driver? Was it PR? Was it CSR? Was it commercial? What was the thing that made that process happen? Let us start with Mike.

Mike Barry: Okay. Two or three drivers for this; first, the resource challenge. We are very clear that resource will become an increasingly precious asset for business to control in the future. We have grown up in a 20th century business model where commodities have been cheap. The cotton, the polyester, the wool that we use, we have always had the whip hand in terms of negotiation in the supply chain. As China and India start to boom in terms of consumption, they will want the wool, the cotton, the polyester we take for granted. It will drive the price up. Extreme weather events are disrupting supply chains, making it more difficult to get hold of materials. There are lots of reasons why we have to be on our toes in terms of resources.

There is another big emerging issue for us as an incumbent business and that is the sharing economy and collaborative economy that is emerging, the circular economy. There is an incredible amount of disruption being injected potentially into the economy where small, upstart businesses can now come online, with none of the infrastructure that we have, and just rent clothing and take it back and bring the consumer back with them at the same time rather than the consumer coming to me. There are lots of reasons why Marks & Spencer decided seven years ago to crack on with keeping ahead of this wave of expectation.

Consumers are challenging as well. They are not going to pay a premium for greener products but they do expect big business to be taking a lead. We saw last year with horse meat, and also with the tragedy in Bangladesh at the factory, that transparency and expectation of business behaviour is growing. Those pressures are accelerating. I think what is exciting at the moment is that business needs to be ahead of not just Government and regulation that might emerge but competition that will eat it alive if it does not move quickly.

Q95 Zac Goldsmith: In terms of your first response—so moving aside consumer attitudes—presumably, given that you were preparing the company in anticipation of trends that would accelerate, i.e. the rising pressure on resources and rising price of commodities and so on, does that mean that initially you did not put yourself at a competitive advantage, that the goal was to be at a competitive advantage later on in the company's development? Is that correct?

Mike Barry: It is a good challenge—there is a reason I sit here with grey hair—that I have to find a way of marrying the short-term world with the long-term world. We are preparing for a very different business model, a circular business model in the future, but right here and now we are delivering £135 million of net benefit to the Marks & Spencer business model each year from less waste, less energy, less packaging. That is carrier bags and so on. There is a short-term benefit that we invest into today but also use to prepare for tomorrow. You cannot just keep preparing on the promise of tomorrow. You will go out of business.

Q96 Zac Goldsmith: From a consumer point of view, have you had a measurable positive impact in terms of consumer response to Plan A and your position?

Mike Barry: Yes, absolutely. M&S is now one of the most trusted brands in the UK. We want that trust in the M&S brand to be even clearer; the customers to be even clearer about our difference. Plan A has helped us retain a huge degree of consumer confidence in a very challenging marketplace. Bangladeshi factory? Not to do with us. Horse meat? Not to do with us. That is a powerful driver and incentive for people to shop with us in challenging economic times.

Q97 Zac Goldsmith: Just before I come to Mr Arratia, can you tell me then, in terms of going forward, what further profound changes you anticipate happening in the way you do business?

Mike Barry: M&S has one of the leading sustainability programmes certainly in retail in the world, 180 commitments. We have done 20% of the journey to be sustainable; there is 80% that lies ahead. We have perfected a way of reducing the impact of today's model: better factories,

better farms, better raw materials, better lorries, better stores, and so on. We now need to join it all up into a loop. Each individual bit of the M&S value chain is getting better but it is each individual bit. It needs to be designed differently, and this is my opening point about design. It is not about designing a shirt with cotton or polyester, it is about designing the business differently. That is the next big battleground for us.

Q98 Zac Goldsmith: Sorry, I said I would move on but one more question for you. In terms of your business activities today, the shape of the business today, in what area do you say you are least sustainable? Which is the area that causes you most problems in terms of planning?

Mike Barry: I think consistently across the whole package it is this inability at the moment to join everything up. I am pleased that each individual bit is improving at the right pace. Have we made the whole thing tick into a new business model as opposed to a less bad existing model? Not yet, and that is what keeps me awake.

Q99 Zac Goldsmith: Can I ask you to respond to the original question?

Ramon Arratia: Yes. For us it was two things. First of all, it was the drive from our founder, who understood that we were doing a “take, make, waste” and for him it was a shock. Ray Anderson understood that we were just filling the landfills all over the world and he challenged us. You know how these Americans are, “Let us go for mission zero, yoo-hoo, yeah”. This seeming naivety of the Americans forced us to look for radical options and think big, and things emerged. We went to the inventors of nylon who told us it was impossible to recycle nylon. Now we have 100% recycled nylon, not only across our company but also across all of our competitors.

Q100 Zac Goldsmith: You only use recycled nylon now?

Ramon Arratia: We use 100% recycled nylon in most of our products. In the next few years our suppliers will increase capacity, not only to give us 100% of our products but also for most of the industry. In closing the loop with nylon we were successful. This was the driver. This seemingly naive goal that had been driven by our founder, but also decoupling from the rising costs of raw materials, which is driven by scarcity and also from oligopolies in raw material. If you look at the manufacturing industry, there are rising costs of raw materials and the margins are getting smaller and smaller. It is all about price, price, price. The idea was: how can we break that circle? How can we scavenge raw materials from other industries that perhaps are not that clever at recycling, and then we access those raw materials? That was another original thing. Today we recycle fishing nets into nylon for carpet, for example. Thanks to the EU directive for end of life of cars, now we can access some components that are in the windscreens of the cars. We are taking that raw material and we are substituting latex in our carpet. We have created a raw material without knowing it just by having producer regulation.

Q101 Zac Goldsmith: Can I ask you how far you have got in terms of meeting that original aspiration by your boss 20 or 30 years ago? How much have you achieved now and how much is left to achieve?

Ramon Arratia: We have reduced 90% of our own carbon footprint, scope 1, and scope 2, 90%. It seems a lot but when you look—

Zac Goldsmith: Sorry, say that again?

Ramon Arratia: A 90% reduction of scope 1 and 2 carbon, but when you look at the overall lifecycle of the products, that is only 10%. That is why we need the product designers and that is what we discussed before in the earlier session. Product design is key, because in the physical products most of the impact is embodied through product design. By changing your raw

materials to alternative raw materials, recycled raw materials, you can slash carbon. If you look at from 2008 to now, we would have cut around 30% of carbon in our portfolio also by shifting—

Zac Goldsmith: Since when?

Ramon Arratia: Since 2008.

Q102 Zac Goldsmith: What about things like water and energy?

Ramon Arratia: It is not that big a thing in our company. For example, now we do not use water. It is virtually zero water. Carpet is not a big consumer of water like it is for potatoes or tomatoes. The other thing where we are struggling is redesigning our products so that they can be easily separable, the different materials. I think this idea of purity of materials is absolutely key. But again we need to design systems where the cost of getting the logistics back, the cost of these recycling processes, competes with the cost of, for example, landfill or throwing away for free.

Q103 Zac Goldsmith: If you achieve that, if you manage to create a situation where you can separate and reuse all the materials that go into the tiled carpets, would that then enable you to return to your original aspiration of being a service company? Would that make it work financially?

Ramon Arratia: It would help a lot. That would help a lot, but we are a carpet manufacturer. We cannot think—as we started to think in the 1990s—that a manufacturer could be good at service because you have different skills. Thinking back on the drill, Black & Decker will never be able to serve you as a need and rent that drill to you. It is going to be the retailer.

Q104 Zac Goldsmith: If you do not manage that then you are always going to be a business effectively that uses resources, produces a product, and that product eventually—some of it at least—is going to end up in landfill. Unless you create the service approach, it is hard to imagine you ever being a circular company. Unless I have misunderstood something.

Ramon Arratia: There are many ways that you can offer services. You do not necessarily need to own the product in order for the product to come back. If you impose a ban on the landfill of carpet across Europe—as it is in Germany and in other countries—effectively the carpet will go back to the best technology. If we have the best technology to recycle, it will come back to us. There are other ways. Ownership of the actual product across the whole life is not absolutely critical.

Q105 Zac Goldsmith: Since I am being greedy here, I want to ask you what the driver was that led you to put all your emphasis on remanufacturing. What was the trigger there?

Matthew Bulley: Thank you for stating “remanufacturing” because that is good, we are getting there. Our driver is around supporting the customer. Typically, we are selling large pieces of equipment and we need them to last for many, many years as they are working, and how do we understand how our customers use those products for them to make money? In remanufacturing products, we design products to last as long as they possibly can, but in doing that there is obviously a residual value in those. It was a demand from our customers: how do we take this piece of equipment that has done what it is supposed to have done but through material properties, arduous work conditions, extremes of temperature, very dusty environments; how do we look at ways that we can do that? From the customer point of view, we started to bring product back. We have an extensive dealer network, so slightly different to these gentlemen in terms of their business models. We don’t own the product that is being used by the customer in all circumstances. In certain cases we do use fleet management, and we look to try to increase that as we go through our sustainability goals. But the customer comes back and instead of saying, “Don’t throw that away or we are going to impose a ban” we try to look at a financial incentive. For example, we sell our remanufactured product at the same price as we offer new.

Say that is £8,000 for an engine, at the point you bring back your old engine of the same type we will give you what we term a core deposit back. That may be £2,000, £3,000, £4,000. There is a financial incentive for the consumer, the customer, to bring the product back and then we are able to capture 96% or 97% of the products we have available in remanufacture back into our system.

Q106 Zac Goldsmith: Does this happen across the whole range of products?

Matthew Bulley: That is the aspiration. When we are servicing some small 1.5 litre engines that is a very different concept to servicing some of the products we have in large mining trucks. There is a scale; there is not a one-size-fits-all. The challenge then is how we look at the economics of the salvage technology on the smaller-scale products where typically there is higher volume. How do we bring those salvage costs down to make that an economic case to be able to provide that to the customer?

Q107 Zac Goldsmith: On the smaller engines, is the problem that you are not able to offer a big enough incentive?

Matthew Bulley: We are able to offer an incentive but obviously the less the selling price then the financial difference is challenged, but it is not impossible. The challenge becomes the actual initial sale value of those. By the time I have spent X number of hours disassembling the product and then the energy to wash it and then apply a particular technology, you get into the economics then of, "I can buy a new one more cost effectively than a remanufactured one". If we can bring the cost of the salvage technology down, make the investment in the research and development there, then potentially we have other avenues to do more.

Q108 Zac Goldsmith: The last question from me: how much of that is about the original design? If you were to redesign those smaller engines in a way that they lend themselves more to being remanufactured at the end of their life, is that a big part of this or not?

Matthew Bulley: Yes, although we stand as a separate business unit within a remanufacturing business, we have very close relationships with the original product designers. Probably originally the business model 40 years ago was borne out of safe engineering, so I am going to design something for the worst application in the world. As you went through the cycle we have reached the point of making things as resource efficient to start off with as the initial sale value, but that may only give you one or two lifetimes in a vehicle. We are now at the point of designing things with a slightly larger surface area on an engine block that allows us then to remanufacture.

Zac Goldsmith: I am done. Thank you.

Q109 Mrs Spelman: It has been a very interesting line of enquiry, in what has been the Zac Goldsmith Select Committee I think in the last half hour. What Zac's line of questioning has brought out—which I think is very important for our inquiry—is the subtle differences between the retail-facing company with, what did you say, over a billion products or something scary?

Mike Barry: 2.9 billion items a year.

Q110 Mrs Spelman: So a huge challenge. My question was going to be whether enough of your customers value what you do. You said very clearly they will not pay more for it, but where the common question comes to all three very different types of business, is the question of how your customers view these products that are completely recycled or remanufactured or partially more circular in their concept. Do you honestly feel that you are doing enough to bring across to those customers what it is you are actually delivering? How do the customers regard these benefits?

Mike Barry: A good question. If I can answer on behalf of the consumer first and then we will talk about different models. Let me turn your question on its head and say, “Why should a consumer pay more for a product that has not exploited the planet and people?” If I am a Marks & Spencer person I would expect that to be the norm. Customers are clever. They turn around to us with arms folded and say, “That is what I expect off you, M&S, and, to a degree, those that regulate you. If you want to extract a premium from me, you have to make that product aspirational quality. I already pay more for Marks & Spencer food because it is desirable food. If you can make what you sell me desirable”—let us just use the word “sexy” for now—“that is why I pay a premium. I do not pay a premium for core compliance and standards”.

That is where I think there has been a mistake in the marketplace. Some businesses have been lazy. We have always said there will be no additional costs for sustainability. If better costs us more money, we will use our energy savings to pay for it; no impact on you.

Q111 Mrs Spelman: That is a very pithy reply. To Caterpillar particularly, in a way your model, because of the sheer value of your equipment, is subtly different for your dealerships the more you can extend the life of that product. I know when I visited your factory I learnt that you have extended by seven times the lifecycle of those diesel engines that splutter away underneath the two-car carriages.

Matthew Bulley: The sprinter trains, yes.

Mrs Spelman: Do you think you are doing enough to make customers aware of that kind of achievement?

Matthew Bulley: I do not think we are doing enough and that is part of the reason for coming to talk to people like you. It is an area we are actively looking to do more in. Certainly, at an enterprise level, sustainability has been embedded within that. That has now been raised to one of our core values alongside integrity, teamwork, commitment and excellence. There is then a whole set of targets across the enterprise globally, not just for remanufacturing but around what we are going to do right across the piece in terms of energy efficiency and new building design. Remanufacturing is a key part of that and it is not just the engines and components. We have a certified rebuild programme. We have power generation, locomotives and freight trains again that we are doing a significant amount of work on. There is always more we can do.

Q112 Mrs Spelman: Are there explicit barriers to the remanufactured product?

Matthew Bulley: There are. I think it was touched on a little bit in the previous session. Within the UK no, but remanufactured from our terminology would be exactly the same performance of the product as new with the same warranty as new but at a fraction of the cost. In terms of imports in certain countries, that is deemed as a used product and then attracts different taxation and import. We think the performance and the price and the warranty is exactly the same so it should not be treated any differently from a new product but it is. Equally then, for our business model to work, getting the core, the old product, out is also a challenge in certain countries around the world. Therefore, some support in terms of that free trade agreement would be extremely helpful.

Q113 Mrs Spelman: Yes, I have stumbled on this. Particularly America, I believe. Is it true that if there is any part of a British compound product that contains an American component that you bring back to remanufacture, you have to apply for another licence from America?

Matthew Bulley: Yes, the EPA legislation means that we have to have traceability and control to demonstrate that overall the population of engines at a particular standard has not increased within North America. If we are going to bring product out or product that happens to operate

within Europe, Africa and the Middle East that we choose economically to remanufacture in Europe but then want to sell back into North America, there are some additional steps that we need to go through.

Q114 Mrs Spelman: I am glad you mentioned that because I think that is an important fact that we need to bring out in the inquiry. Zac wanted to ask you about warranties. You have touched on warranties. With international standards, we have not mentioned the dreadful discussion about how this should operate within the single European market, but is there more the UK Government could do to help the standing of remanufactured products and their acceptance round the globe?

Matthew Bulley: From our perspective, within Europe it is not necessarily a problem in terms of being able to trade remanufactured product. I think the support is around education of the European population and consumers. In terms of Europe that is not an issue for us, but it is as we go more broadly into Russia, as we look at developing nations. Perhaps they do not have the skill set to do a full service item for our customer in those regions and, therefore, a remanufactured product would be a good, cost-effective way but equally balance the skills gap as those nations develop. We also believe that would be beneficial, but the tariffs at the moment are driving a different behaviour.

Q115 Mrs Spelman: Anybody else? Is there anything the Government could do to help raise awareness? It is really more of a Caterpillar example, but I know from your evidence that one of your principal customers is the Ministry of Defence. An awful lot of people do not realise that all the Ministry of Defence kit from the theatre of war is remanufactured in this country.

Matthew Bulley: That is right; in Shrewsbury, yes.

Ramon Arratia: Just going back to the question about whether customers pay a premium, I think it is a totally different question whether it is business to consumer and business to business. An Aldi supermarket is not going to be the one self-flagellating for the others to take their free ride. Also, you buy 20 or 200 things in a day and you cannot have the physical time to go through all of that. When people are paid to make a purchasing decision, because it is either public procurement or you are buying big amounts of something for a company, then there is sometimes a premium attached to that. We have seen some of our products achieving more premium because they had more recycled content or lower CO2.

That is still not enough and I think we need to look at products in the circular economy at product level with two different lenses. One is: how can we incentivise product with more recycled content, so something that has happened before? We have products today with 5 kilograms of CO2, with 100% recycled nylon, and there are products in the market with 20 kilograms of CO2 with high-pile virgin nylon. Both pay the same VAT. Both pay the same tax. What are the signals that we are giving to the market? I think this is obviously the elephant in the room. Nobody wants to talk about product taxes, but I think that is something that has to be addressed.

The other lens is how you incentivise redesign of the product in the first place and how you redesign logistics and business models that make money out of recycling and providing that service. That is where we talk about landfill bans of specific materials as we have seen in other countries. When you talk about landfill, tax escalation was a blunt instrument. I think that is not that bad compared to a landfill ban, which is happening today in Scandinavia. It is happening today in Holland. It is happening in Germany. More and more we are moving into that.

Q116 Caroline Lucas: You have talked a little bit already about disruption, and circular approaches can be disruptive to existing businesses. Those businesses often have already invested significant amounts in brands and distribution channels and so forth and might not look all that

fondly upon this disruption. How can circular companies compete with that and deal with that problem of disruption?

Mike Barry: I think there are two bits of it. One is in any discussion we have here we have to put the consumer at the heart of this. This is not about the 10% of consumers who are probably a little like you in this room, informed, self-motivated, self-driven. If we are going to get 90% of British consumers to want to participate in this, we have to understand how the product we offer them from a circular model gives them benefits. If you look at the best examples from the circular economy or the sharing economy today—the Zipcars, the Airbnbs of this world—they have dramatically less social environmental impact but that is not what the consumer sees. They see a product that is better for me. It is cheaper; it is quicker; it is more social; why would I not want to do it? Oh, you have lifecycle assessment that says it better? Double win. We are very fixated on how we put the consumer, all consumers, at the heart of this and show them the benefits. That is where you are going to win from fundamentally.

There is a degree of disbenefit, as we have just spoken about, about the freeloaders. There are people out there doing nothing, absolutely nothing. I am not looking for some draconian piece of Government legislation—I have already said it is 80% our responsibility—but there are a couple of smart interventions. We have heard about a landfill ban or tax on carpets. You could do the same on textiles and then you would leave it to the marketplace to compete to find the best innovative route not to put clothing into landfill.

To me, the consumer, I have to sort that out. I have to sort out what to do with all the material I might bring back because the value creation for me is not just to keep on selling the service or product to the consumer. It is keeping the consumer loyal to me. The single biggest battlefield in the 21st century for business is customer loyalty. In the past, it was utterly driven by: M&S was my nearest store; Tesco was my nearest store. Those days are gone. You can buy anything from anywhere at any price. What makes people want to keep on participating with your business model? Trust, transparency, a model that I keep coming back and participating in. So, 80% me, 20% some degree of support and incentivisation from Government as well.

Ramon Arratia: I think you said there the key word, disruption. If we want change, we need disruption. Disruption is not necessarily a bad thing. We have seen how technology has disrupted, how we have many advantages because that happened. We are seeing disruption with electric cars disrupting the existing market, and perhaps they are the same brands who sell them but under the supply chain they are a huge disruption. There are people with different technologies and there is a big war going on. With the sharing economy there is a disruption already. We are disrupting and in our market we want to have disruption. We invented this idea of cutting into squares because we wanted to disrupt the broadloom carpet, but tomorrow perhaps there is a cleverer way to install a textile floor with something else and we will be disrupted. That is part of the market. We just need to define what we want for the market to deliver and let the market see who wins.

We also need to look at disruption of the bigger system because if we look at products, sometimes we look with a very narrow lens. For a circular economy, it is the circular economy that is the service economy. It is creating disruption so that we consume fewer products and we buy and sell less physical products. It is more a service. We spend more money on services and less on product. It is not about just substituting the same product for a service that gives you the same. It is substituting a human need with a service and it might be a different thing than the product. Let me give you an example. I deal with anxiety perhaps by buying another Kit Kat. Perhaps another person deals with anxiety by smoking a cigarette. Perhaps another person deals with anxiety by having a drink. Now, if someone else could come with a service that helps you

deal with anxiety, that is the local economy; that is the sharing economy. That is the most disruptive and we need to think at that big system level how we create an economy based on more hairdressers, more history lessons, more music lessons, where we trade on knowledge and where we trade on intangibles.

Q117 Caroline Lucas: Can I ask you one specific follow-up? From what you have said, I think you are saying that competition does lead to innovation. We had some evidence from Desso, which I think is a competitor company to your own. Looking at that in particular, would you say that that competition has helped you to innovate or does it get in the way of collaboration, which might be more effective in terms of leading to a more effective circular economy?

Ramon Arratia: I think innovation is good for business and we have—

Caroline Lucas: At the price of collaboration, though.

Ramon Arratia: We are collaborating at different parts of the supply chain and we are competing on who has the product with the lowest CO₂, with the highest recycled content, and at the same time we share suppliers. I think it is a good thing but I do not think we are incentivising the market enough in order to make that competition better and more aggressive.

Mike Barry: Just to extend the very good point, the business leader of the future has to be able to deal with a nuanced world of one day you are competing with a company and one day you are collaborating with them and then back into the different rooms. I fundamentally believe that step change will come from competition. I want to see my clothing competitors do more in this marketplace. I need to see more of it so my customers just see it as normal on the high street, and I will help them bring things up. We work very, very closely with the Consumer Goods Forum round the world to lift food standards, the World Economic Forum to lift general business standards. But step change to deliver the sustainable world that we aspire to will only come from breakthroughs—as these guys have spoken about—where they have sought competitive advantage in the short term from being there first. We have to work together but we also have to want to win.

Matthew Bulley: In certain aspects of remanufacturing we do collaborate today, not to the scale perhaps we do within our own business, but certainly in Poland I remanufacture gearboxes for Renault. In France I remanufacture engines for Scania. Now, I will go back to the mindset question again. We have the thinking that allows us to do that. We have some of the technology already proven from our own Cat Yellow products to do that. In terms of a barrier to entry, for a company to suddenly decide, “I am now going to set up my full remanufacturing business” it is quite a heavy capital investment on the engineering side. The reverse logistics loop is key. Therefore, if we can work with that company to help to start that process but we are able to offer the service, it supports our business because it allows me to offset some of my factory overheads in terms of the customer being at the end base and having a beneficial product. But equally we start to help some of those companies get into remanufacturing as well. We get into then the IP debate of how much of their technology they want to share with us, which is absolutely fundamental to have a good, solid remanufactured product. There are challenges there.

Mike Barry: I am sorry, Chair, it is such an important point, just one final example. Business is very good now at collaborating on core standards. A lot of the world’s biggest clothing retailers are working together on the Better Cotton Initiative to produce cotton better in India and round the world. We then compete to get the biggest volume to the marketplace in the most desirable way at the most desirable price point for the customer. There is collaboration behind the scenes and there is competition front of house, and I think you will see more and more of that.

Q118 Caroline Lucas: I think you have almost answered the next question, but it was about whether in a formal way under competition law collaboration to set product standards is allowable.

Mike Barry: I chair the Consumer Goods Forum's work globally on sustainability. It brings together Coca-Cola and Pepsi, Unilever and Procter & Gamble, Marks & Spencer and Tesco. Normally, we try to knock six bells out of each other, but we suspend that to come into the room. Every conversation starts with a lawyer reading out a statement to say, "We will not infringe the market. We will not do anything that is anti-competitive". I think it is very tightly controlled. You can work within it with the lawyers there to keep an eye on you good and honest. Do we need to find a way of taking it even further? Probably. I am no legal expert but I do sense that if we need to get to the level of broad collaboration in the circular marketplace we might need to revisit that and solve it a little bit better.

Ramon Arratia: I do not believe that we are achieving a huge amount of progress by industry collaborating. When we talk across industry, we always take the minimum standard, the minimum common denominator, which is the performance of the laggards. That is where the Government has to step in to have tough choices, which also means that some of the low-performing parts of the market will be out of the market. We have seen that in the car industry and the market has evolved. If we let just industry collaborate it is very difficult to have really transformative standards.

Q119 Chair: Isn't there a tendency to always go for the lowest common denominator?

Ramon Arratia: I think so. There is a tendency to go for a standard of the lowest common denominator and narrow transformative. What I am arguing is that we can come up with legislation that is also like a Gaussian curve, a bell curve. There are some parts of products in the market we just need to abandon. No industry forum will do that when that part of the industry is present. Then there is about switching the other products towards the higher performing. We have done that with grams of CO2 per kilometre in the car industry, we have done that with REACH, and it requires leadership at policy level.

Q120 Dr Whitehead: I am getting a view of almost a platonic product that continues to exist regardless of what is in it or has gone out of it or who owns it, and it carries on. That seems to me to give rise to a number of very difficult business propositions, such as: how you track your product when it is out there, at what stage does it come back to you and how do you deal with your production and remanufacturing arrangements on the basis that that is a different way of doing it, rather than producing a load of stuff you hope you are going to sell and forgetting it. How do you manage to work those different kinds of business models into that different kind of manufacturing and remanufacturing and, obviously, leasing within the service economy?

Matthew Bulley: Typically, with our dealers in territory, we have 180-190 dealers across the globe and their role in life is to be the touch point with the customers. They have a good set of data on what population of vehicles they have sold and they are servicing within region. A slight variance on that is when you have ships and marine craft that tend to go around and arrive at various ports, but that is a small percentage.

Historically, we have relied on the dealer knowing what information is there. Because we get a high percentage of our remanufactured product back once it has come to the end of its life, we tend to have a core pile, a stockpile, of old end-of-life engines for us to work through. Therefore, as we are remanufacturing those, we put remanufactured products on the shelf. But if a dealer requires one of those fairly well within 24 hours they can order that part, the same as you would on a normal distribution model, and that part can be available for the customer. The customer is not getting their specific unit back because that then has a long lead time and that is not

acceptable in the marketplace, but they get a like for like. Because we warrant the same, and the quality standards and the testing that we run through are all exactly the same as new, and in some cases improved, they then get a very reliable product at the end of it at very short notice. We are able to manage the remanufactured element of supply through our parts distribution side and the stocking.

In terms of moving forward and how we further optimise that, we have a product called Product Link, which has telematics on the equipment. That is feeding data back into the dealership and Caterpillar centrally to give us conditions of heat of the engine, emissions, hours of use and how the vehicle is being used. Therefore, we are able to offer servicing and training as well to educate the driver to use the vehicle more appropriately to burn less fuel, but also we have a better indication to optimise our entire system as to when that unit is likely to need a service and/or then a remanufacture at the end of its life.

Q121 Dr Whitehead: How does that sort of process take account of innovation within the product itself? If you have a platonic product existing outside of its particular contents or its owner, in principle that then looks like the same product, but presumably that will have to change over a period of time and its design will have to take account of the fact that it can be both remanufactured and innovative at the same time.

Matthew Bulley: At certain points, certainly, a machine that was designed 50 years ago, with advances in hydraulic design control systems, is not applicable today in certain markets. That said, in other parts of the world that technology is absolutely appropriate. Some of our remanufactured products go into a certified rebuild and they get sold on elsewhere. The other piece that plays into that, particularly on engines, is around emissions around the world. There are certain emission standards and a product that was in existence 15 to 20 years ago, because of the emissions now, if we remanufacture it, we cannot resell that because it does not comply with the emission standards. But we can sell that product elsewhere in the world.

Q122 Dr Whitehead: Does the collaborative and competitive nature of this new economy extend to either taking back other manufacturers' products or incorporating part of another manufacturer's product into your remanufactured product, or does it have its own ecology of protecting what you have? I do not suggest for a moment that you or anybody are in the business of changing the lead on your recharging devices in order to make sure that you have to buy the new one. I do not mention any names here, but that sort of issue as far as how you protect a competitive advantage against a collaborative environment in which increasingly, presumably, the existence of remanufactured modules of products means that those are also, in principle, interchangeable in terms of what a company may make as far as its leased or remanufactured offer is concerned.

Matthew Bulley: Yes, and ultimately I think it will. The technology piece on: are we going to start bringing back other competitors' engines? At the moment, no, because the platforms and the design of those today is very different. If the economics were such, and it has been the case on certain vehicles that we do not have a Caterpillar engine in those units, we then work with a supplier at that point to look at the opportunity of, if we were to put another manufacturer's engine into one of our pieces of equipment, do we have the supply agreements in place that will allow us access to the IP to then look at remanufacturing those units? I would not say that our direct competitors have any view at the moment that that is ever going to happen, but certainly as we work through our supply base—similar to Marks & Spencer, where they have suppliers looking at multiple customers in their retail space—we have opportunities there where we can look at sharing the technology and how the scale allows that to be more competitive.

Mike Barry: If I could just add from a very different business model perspective, our shopping model with Oxfam. We will take clothing back from anybody. Oxfam can extract value by selling it

in their shops, donating it ethically in Africa or turning it into new fibre for reuse from anybody's clothing. It is a very different business model from Caterpillar; it is bound to be a little bit easier.

The thing that will be the glue for all of us, for UK plc, is the Internet of Things. I talked about M&S selling 2.9 billion items. Walmart is 25 times bigger than M&S, 100 billion items, probably. There are 100 billion items of clothing sold in the world. If we want to make maximum value from the fibre and the ability to bring products back and reuse them, this has to be able to scan that to say, "Sir, you have finished with it. The optimum way to do it is to take it to an M&S store or to here, to there. You will get £1.50 if you return it in this form". If UK plc is going to innovate on one thing, the Internet of Things will enable a circular economy.

Mrs Spelman: There is a new app in the making.

Q123 Dr Whitehead: Does that go for carpets as well?

Ramon Arratia: The same. For us it would be a bit easier because we know where the carpet is installed because we have perhaps installed it or there is a building. You know where it is, but it would also help.

Chair: Okay, our final question is back to Caroline Lucas.

Q124 Caroline Lucas: We have touched on this several times already through the afternoon, but just in case there are other examples you could give. We have talked about a landfill ban, for example, but basically what other tax and regulatory changes could Government make to promote the circular economy in your experience that we have not already touched on?

Mike Barry: Just to bullet point it in the interests of time, first is innovation. We have talked about the Internet of Things. I think WRAP and TSB do a very good job on your behalf so I would encourage them to be supported. Finding new use for materials: if I get 6,000 tonnes of wool backing on my suits, who else can use it? It can be turned into compost for use in the agriculture sector. So, innovation. Legislation: we have waste legislation; we need resource legislation. That would be my second point. The third point is simplification of collection of recycling across the British Isles and all these different councils. The fourth thing is landfill bans, so making sure that we ban specific materials. We talked about textiles and carpets. Taxation system is number 5, ensuring we have reduced VAT on recycled materials to encourage their uptake. We have not talked about packaging levies. We pay a packaging levy on all the packaging we produce and put into the marketplace; right thing to do. It disappears into an opaque bucket. When we work directly with Somerset County Council with that money, we have innovated, we have created a great scheme to close the loop and bring plastic back into the M&S supply chain. I cannot do without the noble opaque bucket—

Q125 Mrs Spelman: Just pause on that button for a second. Did you do that with Somerset Council with a view to rolling that out across other local authorities? Have you had any wider discussions with the LGA about doing that in other parts of the country?

Mike Barry: M&S, 4% market share on foods. We are not going to do all of the British Isles but we are having conversations with other local authorities to take us towards a point that for every tonne that we put into the marketplace we are able to say we have helped a tonne out back into recycling and reuse. I would hope other supermarkets would then step in and do the equivalent for them.

Q126 Chair: That goes back to my point earlier, doesn't it, that there is not the consistency across the country in terms of collections and waste management policies at local authority level?

Mike Barry: Yes, absolutely. I know how complex it is for you as politicians to deal with decentralisation and support for local authorities, I understand that, but it would help enormously to have consistency across counties.

Q127 Caroline Lucas: Were there any others? Those were wonderful bullet points; anything to add?

Matthew Bulley: From our perspective it is just around the treatment of remanufactured goods, that they ought to be treated the same as new across the globe. Equally, just on the work the TSB are doing in terms of the research and development of how we look to get more out of the materials and the form of the materials that we have today, then that is excellent work and please continue to do that. That link between the support there and the universities and academia is a real plus.

Ramon Arratia: At product level we touched on taxes, but I would like to reiterate the link between carbon and recyclability. If today you say that you are going to make decisions based on recycled content, for example, for our products or for this product, higher recycled content will not give you the higher value because perhaps you can have much more volume of the thing that is less value. I think linked with carbon lower embodied carbon sometimes works much better because usually the things that have higher embodied carbon have higher value. If we want to do taxation for the circular economy, it is better to tax carbon at product level.

The other one is public procurement. We all talk about public procurement, but it is very difficult for a person buying carpet in a local council to know which is the best. We have the transparency in the car industry because of grams of CO₂ per kilometre it is clear which car you buy. You say, “In our local council, you do not buy cars with more than 120 grams of CO₂ per kilometre”. For other types of things it is more difficult. That is why we need to increase the transparency for those industries to provide the EPDs, the environmental product declarations.

The other one I think is also interesting is performance standards. As we have seen from the EU comment for energy-using products, performance standards can also be applied for embodied carbon products such as whatever, cement or steel or wood, and so on.

Then I think the big one—which is where we would make the biggest change, but is also the trickiest—is moving taxation from labour to resources. I think why the circular economy is not making sense is because repair is more expensive than importing resources from China or from Asia. The thing is if we want to create that new circular economy of people who repair, people who remanufacture, sometimes it takes labour and we are taxing labour.

Chair: Fortunately, despite the interruptions, we have managed to get through the questions that we wanted to ask you. We recognise that in the case of each of you, in respect of Caterpillar Remanufacturing, Interface Carpets and Marks & Spencer, you are each giving evidence because you believe in the whole paradigm shift that needs to take place. We would like to thank you for what your companies are doing to promote awareness on this most important agenda. We very much hope that, with the two evidence sessions that we have had this afternoon, there will be an opportunity for us to come up with some recommendations that might help to press Government on the way we go forward on this most important agenda. Thank you all, and to our previous panel—I did not have the chance to thank you previously before the division vote. Thank you very much indeed.