I: My first question is, how would you briefly define circular economy and sustainable consumption in one sentence each?

P: One sentence each?

I: One sentence each, so one sentence circular economy and one sentence sustainable consumption.

P: Well, that’s a tricky one actually. Usually I am afforded the luxury to ramble for a bit. It’s quite hard to pin it down to one sentence. I mean, start with, sustainable consumption. I quite like the standard definition about, sorry I can’t even remember it now, but each ensuring that the needs of a person are met without hampering the needs of the future, if you like. Including impact environment, as well as just demand on products and services. I quite like that definition, I think in terms of sustainable consumption is really what it is about. So I am starting to ramble about, but yeah.

I: But that’s actually the breadline definition of sustainable development. Could you break that maybe a little to you understanding of sustainable consumption?

P: How do you mean? Personally the two fit quite well together, I think if you wanted to differentiate the two, I suppose consumption as it got another element to it, in that it is about behavior of people. How you influence that, I suppose kind of like you said in the introduction, what can we do to kind of help people behaviors, to adjust it to our business models. I would stick with the definition, perhaps add an element about behavior, and supporting changes in behavior, making changes in behavior support more sustainable consumption as well.

I: Okay, and circular economy?

P: Circular economy. That’s another tricky one, I’m not really sure too much, about how to, concisely define it in a sentence, but it’s… I think just, rambling, dense it down…

I: We can start the other way around, because my next question would be, how do you explain the key characteristics of the future of circular economy to others, so friends and family? So people who don’t know, and then we go back to the one sentence definition. How do you explain the key characteristics of the future circular economy to other, so friends or family?

P: Okay. To me, when I’m talking about. I see circular economy as a sustainable practice, a more sustainable way of living. When I talk to it to my two young children in particular, we start with kind of the very high level, so the stuff… This is really about their future, I really like the, I don’t know where it came from, but the idea that we’re not, we don’t inherit the resources or whatever, we’re borrowing it from our children. I really like that definition. It a nice way of condensing it in a single sentence, this idea that’s not our right to kind of just consume and do what we want to do, we have to take into account how of each generation are going to live and survive. It’s, a part of it is, at the end of the day, it doesn’t matter really, it doesn’t matter if it’s a hollowed out husk and a devidable resource in life , the air will still exist and it’s certain, in that way, you know, it’s in our interest if we want to survive as a species, to ensure that we’re not just using resources, having this linear approach to consumption where we’re taking stuff and turning it into something, using it and then tucking it away, but that’s not in our interest as a species, because it’s very linear, it’s finite system, you mention you going to run out, not run out but certainly get to the point where, of course, so much harm is done it’s no longer able to support you at a basic level, I’m rambling now. When I talk about to family and friends it’s about that idea of we’re borrowing the earth and resources from future generations, and we have to life with that philosophy. Every time we use something that’s wasteful, every time we buy something that has packaging that we just chuck away, you have got to think about how much resources went into making that, extracting that material, turning it into something of value, putting it on a shelf, someone buying it and transporting it home, and then all you’re going to do is throw it away. Really, try to hammer out that element of the effort resource energy and costs that went into making something, if you like, or changing something, or giving you some kind of capability. We need to respect that in terms of how long you use it for, how you treat it, and I think in terms of circularity, it’s not just about something that indefinitely, but it’s embracing these concepts of repair and maintenance and remanufacturing to some extent. I mean, my youngest is quite clumsy, toys what have you, we spend a lot of time when something gets broken, she gets very upset, but it’s a good opportunity to take as an example, to teach these lessons. Firstly, it’s about care, you need to be a bit more careful, not just because it costs money, but because it costs resources and it took time and it took energy to make these things, but also look at how we can repair it, let’s look what else we can do with it, let’s see what else we can use it for. It’s not just complicated things, toys even. Drawing and things she’s made, she doesn’t turn out the way she wants it, she might put a big cross on it, but it’s about opportunity to kind of teach that lesson about let’s see what else we can do with it. So, I think when I talk to people about that, about circularity. That’s what I tend to focus on.

I: (08:48) Let’s try to go back to the first question, sorry, so how, based on that, how would you define it, like, your idea of circular economy in one sentence. How would you define it?

P: It’s so many aspects to it, it’s very difficult to condense. If I have a go.

It’s about behavior, a lot of it is about perception of things and stuff, and circular business model is that shift in behavior and culture to recognize the effort, the energy, the resources that go into creating things and giving that the respect that’s due for about balance, the level of impact, so that you can maximize utilization of resources. Actually that might be a better way to put it.

An oversimplification and ignoring some aspects. Maximizing utilization and efficiency, it’s really what I think, it’s the main part I take away from circularity and circular business models. Then there’s all the other levels of that. There is stuff that you can’t repair, you have to use, maintain, we should be looking at ways to make, remanufacture stuff, recycle stuff if you have to. For me the primary thing that I try to hit home is that the life cycle aspect, to maximize the life cycle of something.

I: (10:54) Very nice. Let’s think about circular economy, if all this will or would have been achieved, how would consumption change, and why? It’s really about your opinion or your thoughts around that.

P: Repeat the question please

I: Imagine a truly circular economy, really circularity has been fully implemented, how do you think would consumption change, and why would it change in that way?

P: Consumption, I think it would disappear, certainly in its current form. When I imagine a system that is truly circular the idea of ownership changes totally, I think. I think there’s some elements that are always going to remain, again it’s human behavior, human culture, is always going to, is always going to be an element of ownership for certain things. If you think about the length of time we have been a functioning society, it’s not been that long. I think we’re still carrying some of the traits we had when we were running around, hunting animals and in caves. It takes a long time before we get rid of that change indefinitely. The idea of ownership certainty would change. Big things like properties and vehicles, infrastructure, that kind of stuff. The idea of someone owning it, or an individual owning it would change totally. I think going to be the main thing.

I: (13:00) Let’s move on to the next block. This is based on the sustainable business model. There are three elements to the business model; the value proposition, the value creation and delivery and the value capture. Each of these aspects has sub elements, we’ll just talk about them one after the other, if you haven’t covered one of the elements I will simply ask about home.

The first one is the value proposition, that is the value the firm offers to specific target customers. The question is: how should companies shape their value proposition when implementing circularity. You already talked about product/service offering, what do you think for example about customer segments and relationships, how should they be changed in this transition?

P: This is the most detailed, in-depth discussion I’ve had on this topic, you’re really making me think. Good.

If I take our business as an example, maybe an oversimplification. We talk about this triple wind in terms of value. The idea that a business has to add value to our customers, we have to add value to us. If we don’t do those two things we’re not going to be around for long enough to do anything. Generally, what I tend to find, if we can do those two things, we get a third one, which is adding (value) to society, the broader elements of community. That’s generally we’re we start off with business models. Particularly circular business models. When we talk to other companies, they say ah, circular business model, which is going to, can we just do that in our business? We end up having a discussion, is what we do directly appropriate to what you want to do, what you do? Our products are very complicated, very long lifecycle. They got very clear, basic requirements in actuality. They are very focused on functionality. Because of the nature of our business. For us, a circular business model that we’ve adopted where we’re not ownership but stewardship of the product, and align our business model such that it delivers this value to us and to them, that works very well for us, and because the nature of the product, business, we get this broader environmental benefit because the customer wants things to be available. Maximize utilization of the asset, which is why I think about that in terms of circular business models. That’s what they want to do, so when we align our business to do that, then we’re getting a value, they’re getting a value but also we’re giving a value to society. Because we’re not using, minimizing resources, certainly using them more efficiently and reducing impact that way.

I: What would the value be that is offered to society, for the environment of course the reduction of resource, the reduction of negative output, and what would the value proposition for the society?

P: I suppose you’re getting into a bit more of a subjective discussion. On one hand, we could say that is of value to society, the products we provide, the products we provide are providing value, they facilitate goods and products. Which is the backbone of modern society, it facilitates a lot of other things that people want. It’s one of those things that’s right, or correct in the long term. Should people be going on holidays to the other side of the world, twice a year? Should people want products from China? There is probably a discussion to be had, but that’s what people want. And that is how society is structured. That’s what they value. Certainly in the western world. One one hands we could say there’s an element there, but in a higher ground think, we can talk about what this does to providing jobs and support innovation. Perhaps innovation is another area that is perhaps difficult to define in terms of its value that it provides, maybe it’s not. OF all the things we do, aligning the business model to what the customer wants, recognizing what we’ve got to do to maximize our successes at business and how that’s aligned to reducing emission and efficiency, the only way we can do that is through innovation and technologically development. Which benefits society generally. If we develop the capability to generate power in an efficient way, that technology is very easily transferred across to other forms of transport, or whatever it is that you need power for. I think that alignment of business models and recognition with the link to environment and the link of efficiency, and the resulting drive of innovation is another big element of adding value to society. It’s an interesting question. We’ve often looked at the social purpose or social value of what we do, we’ve looked to rye to quantify, try to understand it, our obsession has always followed a similar route of what we’ve had here. On the one hand there is this element of providing a service, is that right? Can you stand up and say that’s what we do, and the resulting impact is justified because of this? We always struggle with. We always try to look a bit more broadly, where the value for society is delivered. A lot of it now, recently we’ve been looking at innovation and think with the end goal, statement, being because of the way we work and we do, we’re very well placed as a company to deliver a sustainable future through technological advancement. We want to part of the solution, that’s what we want to do.

I: So technological advancement, in the sense of innovation, improving your current product or?

P: Yes. But in terms of providing other services and products to society. We’re not a gas turbine company. We class ourselves as a power systems provider. Basic level, we’re interested in providing power to people and business, and society. There will always be demand for that, however you utilize it, there’s always going to be demand for that. Our interest, providing that, because we’ve gone through that process of aligning business models, customer models and recognizing how our social benefits to some extend can be delivered. We’re quite keen to do that. Deliver that power. In a sustainable way if possible. So, I think we’ve got the right mindset. Every technological advancement we go through is with that in mind. To drive us towards more sustainable energy. Maybe we want more sustainable power, maybe that’s not always how it’s phrased, basically that’s what we’re trying to do.

I: So it’s the objective sustainability or circularity? I mean they can go hand in hand strategy wise

P: It’s not circularity, no, it’s sustainable. In terms of circularity we’ve found, they do go hand in hand. Circularity is one element of delivering sustainable power, if you like. I don’t think it’s always necessary to always have circular approaches to business. When you’re talking about the type of products we manufacture, they’re very resources intensive, they’re very complicated a lot of fancy materials. Obviously circularity comes in to that if you consider circularity being efficient and maximizing utilization and resources, because. Generally, a sustainable approach is what we’re doing. Sustainable can we continue to do this, without causing excessive, is it within the planetary boundaries? Is it within the earths current capacity, to keep? If you look at what we do no, you have to say no it’s not. The products that we deliver today they’re not sustainable. And so we need to move on. But, it’s a very steady process and, I was talking to someone the other day, it’s sometimes the step forwards it may not seem like a massive step forward, but it is a step forward. The case was nuclear actually, it’s a small modular reactor, which is a technology we’re looking at now, we’re taking the reactors we design for submarines and apply them in a similar application, like that kind of technology. It’s a really interesting technology. Nuclear in its current format is not sustainable. Generate aster that’s difficult to manage and handle. It comes from this journey to more sustainable power production. It’s probably quite a useful step to start developing this technology, see what we learn from it, take us away from more fossil based energy generation. Perhaps, one of the main benefits is its impact on behavior and perception, nuclear does have a quite negative perception in a lot of parts of society. It’s perhaps a bit of a stretch, you get a similar thing with some of the renewables. Some of the arguments against wind turbines and solar arrays, is they’re very odd. If that’s how society thinks, if there are people who object to these things because of how they look or what they do, then you have, we have to understand, take these approaches, try new things, and see how, get, public society to try these new things, to be accepting of new ways of doing this. Ultimately that’s what it’s going to come down to. You talk about sustainable future, circular economy. It’s not going to be like the economy we have now, at all. It’s going to require people to change a lot.

I: Talk a little more about those changes

P: Okay

I: (27:16 Also value creation and delivery. Talking about the business model, it’s for example about the activities of companies that you slightly touched upon, and also about technological features, distribution channels. Maybe let’s start about the technology and product features, because you already talked a lot about the technology. What do you think to achieve circular economy, how would companies need to shape their technology, or utilize technology, to change product features? You also talked a little bit about in the first part when we talked about remanufacturing and so on. Do you have any more ideas?

P: Okay. Traditionally, when people talk about this people talk about things like remanufacture, repair, warranty, modularity, etc. I think that’s fine, we do all that kind of stuff, but only because it lends itself to our definition and understanding of value, and how we can add value to ourselves, customers and society. So, it works for us, the thing can, when we talk about this to other companies, that say just do what you’re doing, is design is a compromise. There’s always competing requirements, competing expectation, competing factors to do with the design. People want safety, performance, cost, all these kinds of things. If you throw in it’s got to be repairable, it’s got to be modular designed, robust, infinite warranty, you’re going to have to compromise somewhere. If reparability, modularity and robustness, you might not get the most efficient product, or certainly the most pretty. Apple and Samsung they’re making phones and tablets where they’re gluing things together now, they’re gluing screens to LED screens, batteries in, and all this kind of stuff, because of this kind of stuff. You can’t have the modularity and reparability that perhaps circular sustainable economy would demand, something like phones and tablets, and also satisfy the customer desire for small form factor, slim, light, design. It’s a compromise. It comes out to behaviors and perceptions of people. I think generally that is the main stumbling block at the minute. If there was one thing I could change to help us get towards a more sustainable more circular economy, it is almost like we need to evolve another 1000 years in the space of 12 months. Because we’re still stuck in this very selfish, very materialistic mindset. It drives what we want, it drives how we want it delivered and it drives our expectations. So, there are a lot of features in a product that is available technology that would double circularity, if you could put a metric ton circularity it would double we could do all of this. Reparability, it’s not a problem, modularity it’s not a problem, robust materials, that do last you can maximize resource efficiency, you can do all that, but in order to do that you’re going to have to sacrifice something else, I give you an example for us. We get asked, we’re always comment on circularity and material flows, some people are talking about; what we need to do is we need to put minimum recyclability on products like ours and maybe on aerospace products, and say we have to recycle 90% of an engine of an aircraft. That’s fine, we could do that. You can’t have that and have improved efficiency. Improved efficiency this minute means using composites, and composites can’t be recycled. If you want recyclability we just have to use aluminum like we have done in the past, but you won’t get the weight saving. It’s that compromise of design requirements, we will get there eventually, we will develop the technology to re-use composites, but we are not there. This brings us on to what are the other problems, and the balancing axe that society has to understand and make, and that is whether technology drives regulation or technology. From my perspective it’s the form the technology needs to drive the regulation. It’s all well and good being, have your requirement slightly ahead of where you are, but the understanding, the feasibility, has to exist. It has to be within the realm of possibility before it becomes a regulation. If you just force technology down a route because of regulation, you get situation that I mentioned that are 95% recycled from now on, you going to get conflict, you going to have to reduce your expectations in efficiency and fuel savings or something else is going to happen. It happens to be that anyone would ever propose a compromise on safety, but if you choose that, we need to compromise. You can’t have all of those things, and that worries me, because if you don’t have that kind of approach. You don’t say, don’t have an acceptance how this is going to affect that, it’s just going to create problem. We’re not at peace to this.

I: I think it’s going back to for example developing new technologies, innovating in order to be able to achieve circularity. To for example then be able to recycle composites and not have these trait offs. To overcome these barriers

P: We will certainly get there eventually, like I said, it’s part in the technology drive that’s really important. But we have to do it in a managed controlled way, things like safety don’t get compromised and other expectations other requirements like the need to reduce emissions and climate change are still honored and respected.

I: (34:45) So talking about how the product is designed, partners and suppliers are also very important because you need the materials, how do you think the role of partners and suppliers, or should the role of partners and suppliers in the transition into the circular economy change?

P: Again, it’s a traditional standpoint they’re not that involved with what you do, or how you operate. That’s a bit different to us. We’re quite vertically integrated with our suppliers and customers, and aligned to what we’re doing. We have that rebirth program I mentioned before, where we return materials to material suppliers so that we can try and use it again. And it’s that kind of relationship that I think is where, the direction we need to go in. This, I’m in danger in going off, on a tangent. In terms innovation and technology, collaboration is a very important of that, important aspect of doing that correctly. We have to look at where your influence, control is. A lot of times our control is very limited to within the factory gate, we can’t control what our suppliers do, can’t control what our customer does. But we can influence and recognize where that influence is, and align it more to this overarching drive to be more efficient. You saw, be more sustainable and find ways to do this. So the rebirth model is, it recognizes their input, how they can get value, how we can get value. And we’re putting it together and creating a new way of doing business with our supplier. To generate an overall advantage and an overall value. Reporting is an issue in this area I think, where the drive and demand for reporting, everybody is reporting and big company report and emissions and what they use, this kind of stuff. It’s fine, we should be monitoring this, measuring is important, but doing it on an individual company level, I don’t think is always helpful. A systems perspective, looking at the whole supply chain, value chain, understanding how changes at one-part influence other parts of it, the overall impact and value of the whole value chain, is perhaps a more productive way of doing. Some people argue that we do that through emission scope reporting and all, but I think it is the way to do it. Looking at control and influence, for us, emissions from use of products are quite significant, but are out of our control. We influence, and recognize how we influence them, because we are all constantly driving to increase fuel efficiency and reduce emissions. But at the end of the day the customer uses the product, we can’t control how they use the product. Asking us to quantify that emission is never going to work, 1) we don’t know, 2) even if we did we couldn’t tell you because it’s commercially not our right to tell you how much our customer is using our product. It’s their business. Ultimately, any figure we give you is going to be a stab in the dark and perhaps meaningless, but if you look to it as a system and say aviation or aircraft that’s doing this and having this emission from the mine all the way to the scrapyard, that would, and asking the relevant parties in that group, or designing reporting systems so the own partners in that value chain can collaborate and form a measure of interpretation, that’s how that should be done. I think that extend, that model extends to just general relationships with suppliers and customers. In terms of resource use, in terms of, generally, I think, there needs to be much more integration. We started to do that, but it only really works where there is a triple wind, where there’s a value for everyone, if someone is not getting value, they’re not going to do it.

I: You are monitoring the engines in order to see when maintenance is necessary again, right? Do some companies ask for feedback on how they can fuel efficiency? Flying behavior? I don’t know if it’s like driving behavior where there’s a lot of ways you can reduce fuel consumption through drive

P: Good question. It is something we start to look at more and more. I’m not sure. I can tell you why we probably not done it. So much in the past. Generally, in the past the data is not been live, the data has been downloaded after the aircraft has landed. The problem there has always been bandwidth, it’s incredibly there is a lot of data generated, to transmit that live during flight is expensive. Was very expensive. Some customers were willing to pay for it, they had live data and analytics, most didn’t, just wanted the data afterwards. There has been a lot of developments in technology technology being a key part of how we move forward, bandwidth is cheaper and more available. The idea of live data, live analytics, live suggestions is now a lot more of a reality. I think that kind of advancements to start realistically considering course correction, live update of how you can be more efficient with the engine. Generally, in the past the information has focused on maintenance and repair. We have not generally looked too much at efficiency. It’s probably been limited in the data we’ve been able to gather, we’ve only been able to gather data from the engine, again, limited analytics behind that. But going back to your previous question, how you work together in a more integrated way with your suppliers. If we collect data on our engines, combine that with data on the weather and data the operator is gathering, from the flight data or whatever, put all that together, then you can get a really good idea of how flying behavior is affecting efficiency, and get some real step changes in behavior and therefore efficiency from that. It’s only fairly recently that’s become a possibility. Limits on sensor tech, bandwidth in particular, has always prevented or made is not very realistic to get that integration of data. It’s more off a reality now. The next challenge is going to be ownership, who owns that data, who has the right to use it? I think it’s going to be some interesting discussion around that, if we keep the mindset at there is a greater good here and there is a proposition for everyone, then we hopefully can get past that.

I: Ideally that would be collaboration with partners and suppliers and maybe providing an additional service that, of which all parties benefit right?

P: Exactly. When, we recently partnered with Microsoft to look at this technology, internet of things and big data, this is very important to do, our core competence is power generation, provision, gas turbine technology, nuclear technology. Big data is something we’ve got experience with, but we’re now moving into the realms of it being a much bigger product and service. The best way to look at that is collaboration ad work with people with more experience in that area, and see how we can maximize by using their experience, rather than trying to gain new experience ourselves.

I: (45:13) One thing that is also often, I don’t know how it is at \*company\*, but also a lot of collaboration is in place is in distribution channels, so how do you get the product to the market? Or to your customers. How do you think should companies shape this element in the transition to the circular economy?

P: Generally, in terms of products generally, this idea of ownership would have to change in a circular economy, and the idea of service provision rather than product ownership is perhaps going to be one of the big changes. But it’s how people, behavior, the desire for immediacy, what they want and having access to things that they want, that’s going to be the big driver in how you deliver products, or how you make them available to customers or users. I mean, this idea you don’t need a car, you can just use one of these car share schemes, or use a taxi, it doesn’t really work for a lot of people because it doesn’t satisfy that immediacy, that I got to get a bus to where the car share is parked, get the car, got to park it back there and I’m going to walk home. Whereas if I lease a car, I walk out and it’s there. I think, it’s really stretching our imagination. The idea of physical products is going to change a lot, or the focus on physical products. This idea of 3D printing, you don’t buy physical products, you buy the schematic that allows it to be printed at home in some way, what you’re actually buying is the design element of it, the capability to get it. This certainly, people desire for having something immediately, having access immediately, on a whim is going to be a major factor in determining the best way to deliver things to customers, I do think that’s going to change.

I: So, also didn’t change for \*company\* since it was then powered by the hour, so that didn’t, it was still the same partners, still the same distribution.

P: It’s a general partner. There were some slight changes with the care models, it’s all about availability, recognizing that immediacy, that people have for products or functionality anyway. We guarantee the engine is always available whenever they need and most of the time they have got engines on wings and we’re doing predictive maintenance on wings, so they’re being maintained, used always there, customers don’t have to worry about it. You have to be able to manage things that don’t go according to plan, unscheduled maintenance, then we have to be able to deliver spare engines, or spare capacity or capability to that customer very quickly, so that it doesn’t cause any disruptions to their business. We’ve had to look at, we’ve had to change the way we do stuff slightly. Inventory management is a big issue now, the availability of spares, spare components, modules, engineers has certainly changes as we move to that business model and it’s something we have to provide, I think it’s difficult to do that, you can end up with a lot of cash or capital in spares. In order to be able to provide products and capabilities and the immediate way customers demand.

I: Just imagine that, if one engine really needs major maintenance can you take that off the wing? Or deliver a new one? One that needs maintenance? One that has unexpectedly been taken of, you attach the new one, or?

P: Yeah that’s basically what happens. The structure of the maintenance program, it’s designed so that there shouldn’t be any disruption. Occasionally you are going to get that disruption where there is like a bird strike or something, if it’s planned it there is a sort of activity, mitigation and plans in place to prevent that from happening, but sometimes it does happen. You have to make sure there is usually engines on sight, at major airport hubs we have a presence and there are engines there and we go along with that, whether that engine comes off and the new one goes on. In those situation where there is a disruption, the disruption has already occurred, and it’s outside of everyone’s control, your kind of have to live with the role that we play to minimize that, everything is nearby and delivered quickly. Depending on the severity of the case, the whole engine is taken off and a new engine is put on on, or a modular canal, or whatever is quicker, but the damaged part has to go through the repair shop.

I: The airline does not defector really own it; they really pay per hour? Or own the access to an engine or? How does that…

P: They’re charged on a fixed dollar per flying hour, they own the F-set still, they buy the engine but generally buy it at cost and then pay per flying hour to ensure availability

I: So that means they buy an engine and not the engine, so for example if you have to totally switch the engine, it doesn’t matter even though it was engine 1 that belongs to that airline and now it is engine 2, but that is just more like the access fitting engine of certain engines they buy

P: No, they do actually own that engine, this is where behavior comes in. Customers are very particular about their engines that they use. You can’t for example, when that engine comes in for repair, scheduled maintenance and major overhaul, and it goes through our repair process, the bit is repaired and the bits that’s taken off the engine are the same bits that go back on the engine. We don’t put them in a pool of parts. Repair them all, put new parts on the engine. Customers are very particular, they don’t want parts from someone else’s engine, even if they’ve been repaired recertified back on their engine, they want their parts back on the engine. This is all about safety and perceptive safety in particular. So, when there is a massive problem, not massive, an unscheduled, and that engine has to come off in an unscheduled way, we give them a loan engine. It’s like a loan car when your car goes in for service. But you give that engine back and you get your engine back. But it’s funny why, there’s all kinds of boring things that dictate, there’s all kinds of things, how aircraft are financed, how engines are financed, it very difficult to lend itself to us, leasing a product. That is changing though, as we move towards these kinds of business models, the realization that there are more efficient ways of operating, \*company\* lease assets and maintain ownership, that’s becoming more and more reality, and we are moving that way, but traditionally the total care packages customer buy engines and own that engine, but then we maintain stewardship of that product because they’re buying from us, paying dollar per flight basically. As I say, we’re moving more towards the leasing model, but there’s all kinds of exceptions and behaviors that we have to overcome.

I: (54:53) That is exactly also interesting, so what the barriers are and I mean I’m usually looking at the B2C context, but also in the B2B context, sometimes things are not actually that different

Then what do you think about the growth strategy, how is that, how does the company, I mean growth traditionally has been about gaining more market share and improving financial indicators, do you think that should change in the transition the circular economy and have you seen many also what growth means at \*company\*?

P That’s a really timely question, we’ve very recently been discussing this and have been trying to, can talk too much about it. This idea of growth and value, and what is it, how do you actually measure it? Is it by profit? Turnover? Number of engines sold? Power delivered? Number or people moved? Mass of goods moved? Or what is it? And what should we be using in order to be able to monitor our journey towards being more sustainable. Ideally you want to get to this position, where, you want to decouple growth, whatever you define that, from your impact. All businesses want to grow and need to keep growing, but what you need, we still need to define growth in an inclusive way, it’s not just financial measures, it’s environmental measures it’s social measures, sustainability are all in measure of growth. We’ve been talking about this and are looking to doing some work in this are to get a better definition of growth, it’s very early days, it’s something that businesses need to do, they really want to take this seriously, they’ve got to look at what they mean with growth. And, impact as well, they need to understand what they mean by impact. How they measure it.

I: (57:01) That is already leading to the next question. How do you capture value for other, how is value captured in the end for the environment and society, and how do you measure that, how would be a good idea to measure and how does \*company\* do that at the moment?

P: As I say, it’s an area that’s expanding, right now we have KPI that talk about sustainability Key Performance Indicators, they measure certain things like emissions, energy use, waste generated, stem outreach, TRA, RI-rate and all this kind of stuff. That’s how we defined. The things we want to measure to show positive growth. I think that was something a while ago. As we move forward we’re going to be looking at that again and say trying to understand what things we need to measure, how you need to measure them, if you want to set this mindset of being more sustainable as a business and really make positive strides towards that goal, it’s a bit of a woolly answer. You really need to look at it as a business, it has quite subjective things, there’s’ commonality in where you start they but all business are different and they really need to think about it and come up with an appropriate set of measures.

I: (58:50) Then we are through all the elements of the business model. It was super interesting to hear your perspective and what \*company\* is doing. Do you have another 10 minutes or are you pressed for time and have another appointment?

P: No no I got 10 minutes if you want

I: Okay perfect because I have a few more questions

So there is a lot of, there’s a lot of things going on that you could consider circular at \*company\*, and as you said about growth strategy happening at the moment. What else do you think should be changed in the business model, in de elements we just talked about in order to achieve circularity? The next step, like a bit more futuristic? Future oriented is maybe the better word.

P: Interesting. The base level that we already mentioned, the idea about ownership, there is a perception there, people perceive power by the hour, as \*company\* leasing an engine, not really the case at the minute, but that is changing, that is one of the things that would be a positive move in that direction, so \*company\* retaining ownership of the asset. There’s all kinds of value in that from a customer level, being able to better provide power and ensure availability, but in terms of circularity of us having control of the asset, gives us better access of the resources that are in it, better understanding of the performance of the product, work towards this utilization of resources in a more efficient manner. An ultimately if we have opted re-use them and recycle them, so that is one thing that I think is going to change. Just looking in the future, there is a lot of stuff we do at the minute in terms of products that is not particularly sustainable. They burn fossil fuels, kerosene in a lot of instances. This has to be long term, to move away from that, if we’re still making engines at the kerosene in 100 years’ time we’re probably in a lot of trouble. I don’t know what that product is going to look like, how it works, but it needs to provide power in a different way. There is a lot of talk about all electric aircraft in particular, yet some of the, we’re working with airbus on this, and some of the ideas are very very good, there’s been an element of burning fossil fuels, but through optimizing the system, the aircraft, with the flight profile, and managing the power better, we’re able to really cut out on the amount of fuel that’s used and generate most of the thrust through electricity. Like air say, it’s not the full answer, but it’s a step in the right direction, we’ve got to take those steps. To learn, understand and be able to take the bigger steps and the next step that’s going to bring us even closer. From an aerospace perspective there’s certainly that. From another past of the business like marine power systems, more ground based power, or stuff that’s on the water, if it stops delivering power it’s not such a problem, where weight is an issue, there is a lot more opportunities for all electric like fuel cells, and other ways of delivering fuel. Or delivering different types of fuel. That’s all areas we’re quite keen to investigate, that’s our core competence; power provision, we’re a power systems company, we’re driving ourselves towards more sustainable, they’re all, we have look at in the past and still look at. It might be less of a change in that area just because of, because we’ve got a bit more flexibility, we can change the whole engine system, power system, but the product on the outside is going to look largely the same, with an aircraft because the way the system is parked, we’re going to see some more extreme changes, the whole architecture of the airframe is going to need to change in order to deliver more sustainable thrust. That presents another problem; culture and behaviors. People are very particular about significant changes. You’ve probably seen the flying wing, it’s a design that’s been shown for years, it’s a much more efficient design, but it’s vastly different from what an aircraft looks like at the moment. One of the problems with implementing that design change is peoples’ perception of that, it doesn’t look like an aircraft and they’re not used to it, they’re not prepared to get on it. So, it’s those stumbling blocks that might be an interesting area, maybe technology will be delivered before we get people to accept it.

I: 1:04:49 I’m curious how that develops, if you look at airplanes, really the design over the past decades really has not significantly, at least not from outside.

How do think can circular business models lead to sustainable consumption, not only in a B2B but also in a B2C context?

P: Well, I don’t know, is that a question that really needs answering? That’s fairly fundamental to the idea of a circular business model it has to deliver both otherwise it is not very circular.

If we talk about resource efficiency and maximizing the utilization of resources, then that is more sustainable consumption as I see it. You’re getting more out for less resource put in. Other people say, from a business perspective they talk about decoupling throughput from profit, you can use a similar analogy in terms of people I think, you’re decoupling functionality from the material, getting more functionality per unit of material. That’s continually increasing.

I: Then I have one last question left; what do you think will be the key difference in the way business will be done in the circular economy in the user and or consumer perspective?

P: Well, I go back to this idea of ownership. I mean, there’s all kind of assets and elements to that in terms of how good people get together to poor resources, poor capabilities, it’s community, as a business or whatever, this idea of ownership is going to be the biggest change.

I: We’ve reached the end, are there any final thoughts that you would like to share that has not been covered yet.

P: It has been a very interesting discussion; I don’t think I was perhaps as prepared I would have liked to. You get me on my toes on that, it was good to think of those kind of things.