Transcript BAA3

Interviewer (Ir): OK, so the date is [redacted]. OK. So thanks very much again for agreeing to take part in this. We couldn’t do this research without you giving up your time.

Interviewee (Ie): Pleasure.

Ir: So thanks for that. So I’m just gonna… most of the interview is about policy, how policy instruments can be used to improve energy efficiency in data centres. But I’m just gonna start off with a few questions that are kind of about your job role and the data centres you manage, just to put it in context.

Ie: Sure.

Ir: So first of all, yeah, if you could just say a bit about your job role here.

Ie: So I’m the data centre manager for [employer]. Currently I’m responsible for the core data centres, which there is 3 core data centres [redacted]. But I will soon be responsible for 24/25 other small server rooms, which will be coming under my remit. I have a team of 5 staff who basically look after the day to day operational aspects and running of the data centres, and I do lots of procurement, tenders, things like that, so that’s primarily my job. Managing the staff, managing the resources, to make sure the data centres are currently fit for purpose, and that they’re capable of supporting future requirements.

Ir: OK. So that encompasses looking after the cooling and power provision…

Ie: It does indeed. So I’m responsible for the infrastructure within the data centres which is the power, the cooling, and the other traditional things that you have in data centres, fire suppression, water detection systems, physical security, policy and procedures for health and safety and access control. Yeah. That’s pretty much what we do in this team.

Ir: OK. And the IT as well?

Ie: It depends what you mean by IT, my job is primarily looking after the infrastructure that supports the IT that’s hosted within the data centre. So we would be responsible for the racks, for the installation of equipment, for the PDUs, for the UPS. We basically present them with a server that they can then use and then run their applications on.

Ir: OK. And presumably it’s, you’re purely running services for [redacted], you don’t take in any business from outside…

Ie: We do host equipment for other institutions, but it’s primarily [redacted].

Ir: OK. What’s the system for, who’s responsible for the energy bills, does that come under your bracket?

Ie: Not really, so [redacted] pay for the electricity. Because IT is a service provider, we do not get billed direct for electricity. But we do have a responsibility to make sure that we are energy efficient, and that we’re not wasting money. So carbon reduction and energy efficiency is a huge issue and a big driver in everything that we do, we try to be as energy efficient as we can. And we cannot always be that energy efficient, which is why we do look at hosting services off premise, whenever we can, where it’s value for money and helps towards reduce of carbon on premise.

Ir: Could you give me a bit of an indication of the size of, the total size of the data centres that you manage in terms of footprint or power consumption?

Ie: Sure. So in terms of…. There’s 3 main data centres [redacted], and there’s about 20 smaller data centres, but we refer to the 20 or so as server rooms. If you were to combine IT, core IT, and faculty IT and HPC, 3 years ago you were talking about 1 MW for everything. That’s probably dropped to about 7 to 800 KW at the moment. And IT, if you separate faculty IT and HPC would be about a third of that. So if you combine faculty IT and our IT, it’s 2 thirds of approximately 750 KW.

Ir: OK.

Ie: In terms of footprint, I like to talk about racks, so if we’re talking about a rack that hosts 42U of equipment in the data centre, total capacity in rack terms would be about 300 racks plus, but we’re trying to reduce that as quickly as we can.

Ir: OK. In what sense? In terms of putting services out to co-location.

Ie: Yeah, so as part of our data centre strategy we want to reduce from that amount of racks down to about a dozen racks. Which is a huge step, really is a quantum leap in terms of where we want to be. We’re very confident of doing that in a 4 or 5 year period. And we will be using private cloud, public cloud, co-location, software as a service, platform as a service, infrastructure as a service. We’ll be using all of those technologies that are available to us to reduce that energy capacity on premise. And let’s say, get rid of tin, antiquated tin.

Ir: OK. Erm, do you measure PUE at all? Or any other kind of energy efficiency…

Ie: We do measure it, but we’re measuring it manually. At the moment we don’t have any capacity to do it at the substation level, nor really in the data centre level. But what we do is we take our own, we go round periodically and take our own readings. Currently, the data centres on premise are probably somewhere in the region of 1.7 PUE. We want to get down to 1.2, and in some instances with specialist cooling [redacted] and HPC 1.1 is attainable depending on what technology you use to cool. So we are collecting PUE information, but not automatically. Its not something that we can just press a button and get the very latest figures.

Ir: Yeah.

Ie: But we do…we are specifying in all our documents that we, wherever we go whether it’s co-location or a refurbishment on prem, we want to get below that 1.2 PUE mark if possible.

Ir: Yeah. OK good, and think that gives us a good idea about who you are and what you do if you like.

Ie: Cool.

Ir: So the next chunk of questions is all about the EU Code of Conduct for data centres.

Ie: Yeah.

Ir: As far as I understand it you’re not participants of the…

Ie: We are not participants of the EU code. We are aware of it, and it does come up whenever we go to seminars and some of the other organisations where we meet up to discuss data centre policy. But we are not signed up. One of the reasons we haven’t signed up is because of the difficulty…we would have great difficulty in meeting the requirements because our data centres are legacy, and are in old buildings. Some of these buildings do have planning restrictions on them and listings. So it’s very very difficult. So no, we are not aligned to that at this moment in time.

Ir: Erm, so it’s primarily technical restrictions that prevent you from…

Ie: Some of it’s technical, and some of it’s planning permission type scenarios, yeah.

Ir: OK. Are you, how familiar are you with the kind of best practices that the document outlines?

Ie: Erm, I wouldn’t say I’m an expert on it. I read articles regular from the Green Grid and the Uptime Institute, and some of it is directly related to what’s going on in the EU Code of Conduct. So I try to keep abreast of what’s happening, and what the best practices are. And then we try to get a best fit in what we can achieve on premise at [employer].

Ir: OK.

Ie: You could say, a classical example is, we’ve recently set our data centre temperatures at 27 degrees, which is the real mark of the, to be as energy efficient as you can. So we’re not kicking in the chilling until we reach that point in temperature terms. Sometimes if we have a failure of some units we have to alter that. Because we are in old buildings. But we do try to keep at that level wherever we can. And that’s looking at standards that everybody’s using and what they say is best practice.

Ir: OK. So presumably then, there’ll be some aspects of the code of conduct which you’re maybe already compliant with, and others which you can’t meet because of…

Ie: That’s almost certainly the case. I have not read every single line item on the European Code of Conduct but that’ll almost certainly be the case. We will be compliant with some and not with others. Potentially non-compliant with more than what we are compliant with, which is why we haven’t signed up to it.

Ir: OK. Do you think other departments within [employer] have much of an awareness of the Code of Conduct to the extent that there’d be any pressure on you to try to gain that kind of accreditation, or any other kind of accreditation.

Ie: I think certainly the facilities department, or [redacted] would be well aware of the code of conduct. There may be one or 2 that are aware of the code of conduct within [redacted]. I wouldn’t say there’s dozens and dozens.

Ir: There’s some of the people I’ve interviewed have mentioned that there’s a bit of an issue with poor administration around the code of conduct. Have you heard much talk of that or have any opinions on that.

Ie: I don’t have an opinion on it specifically. I did, I mean for instance 3 years ago at Data Centre Dynamics there was a 4 hour break out session that was completely, all about the Code of Conduct, and it was a… shall we say it was a very heated debate that was going on in there. So they had a couple of the main guys who’d wrote this, that had come over from the EU, and they were saying that they were looking to the UK to get a lot more people involved with signing up to this stuff. But there was a big heated around things like administration and things so… I listened, it’s a few years ago, I didn’t take that many notes because I knew even at that time that there was no way we could meet it. I was trying to be realistic. Not that we don’t want to meet every standard that comes out. But in terms of [employer] and how buildings are built here, and what you can achieve in the old buildings, you have to be realistic in terms of where you’re gonna put your energy and resource.

Ir: OK. Well I think that kind of covers the stuff on the Code of Conduct. I was just gonna ask you some questions on other policy instruments, existing or potential if you like. So first of all, just kind of fairly openly and broadly - do you have any ideas of what kind of policies you think could be useful in driving energy efficiency in the data centre sector? Perhaps which aren’t around at the minute?

Ie: Well, I guess, it depends what you mean by a policy. It’s extremely difficult because in our data centres for instance we’re using 4 different types of cooling. If you could have a policy that just said ‘you’re using water from now on because water’s the most efficient means of cooling data centres’, that sounds all dandy if you like, but it’s not possible on [redacted], because of the way that the buildings are built, and the amount of space you have on roofs, that kind of dictates what kind of cooling you can use, even if it’s not necessarily the most energy efficient. So for instance we are refurbishing a data centre. We would all love to do something like adiabatic cooling. Or we might want to do some truly immersive liquid cooling. Or we could just say let’s all go to water. And what we’ve ended up having to do is, we’re gonna use the very latest DX cooling now. We can get down to 1.2 PUE with DX units, but we cannot get down to 1.1. But simply because of the restraints on the building and restrictions on space, and the amount of weight that’s taken up by the different types of cooling technology. So the external plant, and the weight of it, actually has an impact on which you can use on the buildings. So it really does depend what you mean by policy. There’s also policies within IT for instance, so if we jump out of the data centre just for a few moments, we do try to have everybody’s PC turning off in offices at certain times. So it’s things like that, to save energy, not just within the data centres, but right across [redacted] in terms of our data centres are providing the applications and the services out to clients, but them client PCs if you like are also using an awful lot of energy. So we’re looking at both aspects. But it’s difficult when you say “What policies?” because you can have thousands of policies. So that’s pretty much… there is policies, but we can either go through them one by one or we just generalise…

Ir: OK. Do you come under the Carbon Reduction Commitment?

Ie: Erm, I think the answer to that is probably yes, but it’s more of a thing that the [redacted] Facilities, deal with than us. I am aware that we have to abide by these, the latest EC rulings etc. And I am aware of the implications of carbon taxes, if we, additional taxes, if we go over our carbon limit, our footprint if you like. And I am also aware of the, shall we say the wider, controversial thing of buying credits, carbon credits, which I don’t think [employer] do. They may do they may not. I am aware that [redacted] deal with that aspect more than us. We try to reduce our carbon in terms of reducing energy more than anything. Cos if we think if we can reduce energy then we’re helping towards [redacted]’s strategic goal of reducing carbon. Which hopefully meets the… The British government’s legislation and the EC’s legislation in terms of carbon reduction.

Ir: Yeah. OK. So as well as the Carbon Reduction Commitment, which is the kind of more straight energy tax, there’s, what is it probably 2 or 3 years ago there was a Climate Change Agreement introduced for the data centre sector, which you might have heard about, but it’s more for co-location…

Ie: It certainly doesn’t ring any bells straight out, to be honest. But I’m sure it will have been raised at some of the seminars that we’ve attended. And it’s almost certain within a framework agreement that we’ve just signed to take services from a data centre in [redacted], from a co-location point of view.

Ir: Yeah, they’ll be under it. I mean basically the way that that works, the CCA, you have to achieve certain improvements in your energy efficiency to then get a rebate on your CRC…

Ie: We are aware that, just by, if we outsource, in terms of infrastructure as a service, co-location, we are aware that we cannot just do that simply because, oh well, we’re not using x-amount of energy, we’ve saved all that. Because we are still using that energy, and the co-location. So we are aware of some legislation that we have to meet in terms of, even if we’ve got kit somewhere else we are responsible in some part in terms of the amount of energy that that’s using and the amount carbon that’s producing as well. And it is all written into a framework agreement that we’ve just signed with the provider.

Ir: OK. So do you think that kind of approach helps to drive energy efficiency?

Ie: I think it does. Well for one reason, well, many reasons, but the biggest is, big commercial data centres, I’m gonna be honest, they spend millions and millions, and can actually put the very latest cooling technologies in there, pushing down the PUEs to below 1.15, so you know, around that 1.1 mark. So a lot of companies, one of the drivers is that they will put their business where they can be seen to be the most energy efficient, which pleases both the co-lo that’s put that money in, and it also pleases your customers because they can see that you’re putting your money somewhere else, but you’re making sure that where you’re putting it is very energy efficient at the same time. So I think it does drive it absolutely.

Ir: OK.

Ie: And sometimes it’s very important, because we can’t always do it here. Which is one of the reasons why we’ve started looking off premise. We try to be as efficient as we can here. But we can certainly be just as efficient there, or even more efficient. Which is all part of our strategy going forward.

Ir: So what’s your primary reasons for starting to move more of your services off premises is it to save money or…

Ie: There’s several reasons. I’m not gonna lie, of course one of them is cost. One of them is absolutely energy efficiency. One is service, in terms of availability, and uptime. If we wanted to build a tier 3 data centre on premise here it would be 3 times as expensive as what we are currently spending on refurbishing a data centre. Co-locations, new data centre builds are often very efficient. So because of the amount of equipment that’s going in from multiple clients of theirs, it brings down the cost. In fact the framework that we’ve signed with our provider allows us to have a reduction in costs as more and more customers put equipment in because that drives down their costs, and helps them to reach their critical point of getting their PUE down quicker. Because as you’ll be aware, the PUE’s fantastic, well it’s not the only measure, but they can only reach that magic figure as it becomes fuller and fuller with equipment. So they’re very eager to fill it up as quickly as they can because then they get that magical figure of 1.1 in terms of PUE. And that’s the good thing about these data centres. That money gets put in to achieve that very very quickly. We could build a data centre on premise, it might take 4 or 5 years to fill it. Which means our PUE’s not as good as it should be in the interim. So what we want to do is move the majority of our equipment that we do see we need in the future, off premise, where we can get an instant good PUE, or very quickly get a good PUE. And then achieve a better PUE on premise, because we’re using less equipment in a smaller data centre, which allows us to do that.

Ir: OK. So the next thing I was gonna ask you about was…I’ve had some discussions with some of the interviewees about things like subsidised energy audits and subsidised engineering and design services as a route to helping data centres to push their energy efficiency along. Do you think that kind of approach could be helpful?

Ie: I think it probably is helpful but, I’m not an expert, my gut feeling tells me only up to a point. [redacted], facilities, have a certain amount of money to, shall we say, put towards helping others achieve better energy efficiency. So [redacted] can contribute, let’s say if you’ve got a project, and the capital cost of that project is a lot higher. But to get a better energy efficiency is gonna cost you 25% more money in capital terms up front – [redacted] sometimes would give you that extra money. Because the energy savings over 5, 6, 7, 8, 9 years will actually pay [redacted] back from what they give you up front. Now, it’s a risk when you do that, because nobody know s what energy’s gonna cost in 3, 4, 5, 6 years time. So [redacted] take that risk. But if I was being honest, they don’t have millions of pounds, it’s a small amount compared to some of these project costs, so I think it’s helpful, but we have to be realistic. If [redacted] are gonna… [redacted] may give somebody, twenty, thirty, forty thousand pounds, but if you’re building something that’s multi millions pounds, you’ve got to be realistic in what you think you’re going to get from [redacted]. I think more importantly is when [redacted] go out and refurbish whole buildings, like’s going on now…one of the big drivers is to make them buildings as energy efficient as possible and insulate them to such an extent, where [redacted] really do get a return on their investment. So it’s not just about nice furniture and nice runs [redacted]. It absolutely is also about making sure that these buildings are efficient and well insulated. So you could say that we get on the back of that. So if we’re building a, or refurbishing a data centre within a building that’s just been refurbished by [redacted] we benefit from some of that. But we’ve got to be careful. We might benefit in terms of the building’s efficient, but that doesn’t mean to say necessarily that what you do in the data centre is efficient. We have to do something, that we’re extracting, taking heat out of a building. So no matter how nice and insulated that building is we’ve got to make sure that that heat extraction that we’re putting in is also efficient. So the two of them can sometimes work against each other. I think it’s a good idea, but up to a point, depending on how much money’s available.

Ir: Yeah, I suppose because if you’re making audits or design services more affordable, but then the capital cost of the improvements that they might suggest are a bigger cost…

Ie: Yeah. You’ve also got to be careful on… when we talk about carbon and things like that, not everybody thinks in terms of carbon as a global thing. They just think in terms of a local thing. And when you’re ordering equipment, you can actually buy equipment that’s more energy efficient, but it may be 10,000 miles away. And shipping that equipment over to install here, has got a huge carbon attached to it! Let’s be honest, huge shipping uses pure crude which is unbelievably dirty. And some of the stuff is built in countries where they don’t give a hoot, they’re very inefficient in terms of carbon efficiency and energy efficiency. So we might think we’re buying something that’s nice because it’s slightly more energy efficient, when in real terms, it will take a hundred years to get that back in terms of the additional carbon that’s been used in building that equipment and shipping it over to the UK. So you’ve got to be really careful on some of this stuff. We need to look more than just here. We need to be looking at all this equipment that we’re bringing in, where is it getting built, how is it getting brought here, and then look at the real cost in terms of carbon efficiency, cos I think we’d get a very different picture indeed, to be honest.

Ir: OK. So that’s that, and one of the other things that’s been raised is if there’d be any benefit for making training programmes more widely available for data centre operators, to kind of improve levels of… I mean obviously it’s gonna vary from data centre to data centre how aware people are of energy efficiency and things like this, but do you think there could be any benefit to, maybe even having a system where anyone managing a data centre had to take a certain qualification to make sure that they knew about energy efficiency?

Ie: Yeah, the answer is yes. There are training programmes that data centre operatives and managers can go on now, there didn’t used to be. 7, 8, 9 years ago you’d be hard pressed to find something. But these days there are. So for instance I went on BICSI (?) courses. And the Green Grid and Data Centre Dynamics and other institutions do now run specified courses where you can get accredited qualifications for data centre management, data centre design, data centre efficiency. Operators who work in the data centres can then be given specific training. Yeah there’s certain things like, everybody needs to be aware of anything you need to do in a data centre needs to be done in an efficient way. I think the big thing that we have to do is that any equipment that’s being installed in a data centre is efficient. If you can do that, that’s a massive bonus. We need to make sure that lights, simple things like lights being turned off automatic, or turned off when you walk out of a data centre, and if you cannot do that, make sure that everybody does turn lights of and things like that. All of that sort of stuff helps, so yeah. Training programmes yeah, it absolutely will help towards it, yeah.

Ir: OK. The other thing I was gonna ask about was… I think we kind of have touched on this, but do you, there’s other standards available besides the code of conduct, like the ISO standards, and there’s this new CENELEC EN 50600, are you signed up to any of these standards?

Ie: We are, so we are signed up to ISO in some respects, but not in every respect. We are certainly signed up to ISO in terms of the data centres where we’re gonna be putting equipment off premise. And we are trying to move towards ISO accreditation within what will be a refurbished data centre on premise. Now there’s a number of aspects to that. So there’s meeting ISO in terms of security and there’s meeting ISO in terms of infrastructure, and all sorts of different things associated with ISO. So it really depends which aspect of ISO. We are aware of ISO, and where we can meet it we do try to meet it, and we will continue to do so.

Ir: Yeah. Because I think there’s some talk of bring the EU Code of Conduct best practices into an ISO standard, and I think it’s already been done with the CENELEC standard as well.

Ie: I’m not sure about the, CENELEC?

Ir: CENELEC. Basically, I think it’s CENELEC EN 50600…

Ie: Right. So you’re talking about them wanting to incorporate some of the European directive stuff, European Code of Conduct stuff directly into ISO. So are you talking about ISO 2002, 2007…

Ir: The energy efficiency one…

Ie: OK. Well you could say it probably makes sense. I guess… do we know where we’ll be after Brexit…

Ir: Well, yeah…

Ie: That’s an interesting one isn’t it. But actually at the end of the day, it doesn’t really matter if Brexit comes along or not, does it? We’ve got to be as energy efficient as we can. And I think the UK actually leads the way in some of this stuff. Not everybody’s signed up to the European charter of course. But I mean England is seen as leading the way in many aspects in terms of energy efficiency. So yeah, I think broadly, if they’re gonna bring parts of the EC Code of Conduct into ISO, it wouldn’t surprise me. I can’t imagine it would harm… it might simplify things actually. Could potentially simplify it. I don’t suppose you know if that means that you’ve to meet ISO and the European or you might just have to meet one in terms of meeting that energy efficiency requirement?

Ir: I’m not sure, I think a lot of people think that you should, if you can pass one…

Ie: That’s one I’m thinking…

Ir: Whether they’ll manage to set it up that way I don’t know!

Ie: Time will tell. So long as, we don’t want to end up in a situation where it makes it more complex. Because I think one of the things about the EC Code of Conduct, is that people see it as complex. It’s not necessarily complex, it just seems to be a fair amount of work. I don’t know if it’s right to say that that’s what puts people off but… smaller institutions if you like. But it’s got some good stuff in there. It’s got stuff in there that we all want to do. And most people I think in their right minds do try to achieve what they can.

Ir: OK. Well I was just gonna round off with a few questions about, I mentioned that a lot of my experimental work is about aisle containment, so I was just gonna ask you a few specific stuff about that if that’s OK. So, do you have aisle containment installed in the data centres here.

Ie: Up until 3 years ago, the traditional form of cooling was hot, cold aisle, but not containment. So hot cold separation where racks would be back to back so the heat would be dissipated at the back, and by normal air circulation it would move, the warm air would go back to the coolers. And virtually all of the cooling on premise apart from the HPC side was DX. Three years ago, or just over 2 years ago we built our first hot aisle containment. Which is in one of our data centres, that’s a 20 rack installation. It’s very efficient, it’s 200 KW capacity, and it’s probably got a PUE in the order of 1.2. So we are using true hot aisle containment in one of the data centres. We are refurbishing one of the data centres on premise very soon. That will also incorporate a hot aisle containment system where we are extracting the hot air straight out of the aisle. So completely sealed, everything you’re probably aware of. It’s got a roof on, it’s got doors on it. Everything’s sealed in and out, and we only take blanking panels off when a piece of equipment is put inside. We may end up with one sealed cold aisle containment area, for more low powered equipment. Alongside a hot aisle containment area. And that’s what we’re gonna end up with. Three years from now we expect to just have one data centre that’ll have one hot aisle, one cold aisle, both contained, for IT, and then there will be the data centre left for HPC. HPC is water cooled. And it also uses some of the space in the hot aisle containment system. So at the moment the HPC is using water. Which is good. It’s efficiency is, I’m not 100% sure, but I think it’s between 1.1 and 1.2, about 1.15. So I’m a big believer of hot aisle containment. Even 5 years ago I did designs for when I thought we were gonna build quite a big data centre, things have changed now. And that was gonna be 5 hot aisle containment systems all next to each other. But the world changed, the cloud came about. That came about. It’s actually matured, which is really moving the world now. So, I’m a believer in aisle containment.

Ir: Yeah. So what are some of the issues that have kind of slowed down your ability to get containment installed in all the data centres?

Ie: Cost. Cost is always a thing. Building a data centre on premise is extremely difficult at this site. It would be fair to say that IT simply do get the locations that nobody else wants. And that is a problem because sometimes we have to build data centres in areas that are not really the best places to put data centres. And that restricts what we can and cannot do. And I think we mentioned earlier on, restrictions on space, and that restricts what you can do with what type of cooling you can do and things like that. So it’s a number of things, it’s money, it’s planning permission, it’s the speed in which IT changes. It can take 3 years to plan and build a big infrastructure, and within 3 years IT can change that dramatically. You could say that building a data centre on premise now is a huge gamble. Especially with what’s happening with the pace of how the cloud is becoming mature. And I think we talked earlier about, even now, we’re looking at trying to put as much out there in the cloud as possible in terms of using platform as a service and software as a service, and there’s a lot of traditional applications that still need to be on premise, but in 3 years from now, almost certainly, they’ll become a commodity. We should be able to buy them and just use software as a service. So I think the world’s changing in terms of, the data centres that are getting built now are by the big corporate data centre companies who can build these things. Because they know that everyone’s gonna be shipping a lot of their stuff out from traditional data centres what you get in small businesses. They’re all moving into that cloud space. Maybe in 3 years, co-location, infrastructure as a service, I suspect its probably gonna be providing 50, 60% of all IT. For small and medium businesses. Your big, big corporates will still probably retain their own data centres, but you can bet your life they’ll also have some of it out there as well. So I mean that’s the driver now for us. The big other thing that’s happened to our data centre strategy, we’ve finally got everybody to agree on what our strategy should be. And that strategy is if we can put it in a cloud, we put it in a cloud. If we can use it as software as a service, it’s software as a service. I think the same will end up being true for platform as a service. Infrastructure as a service is a given. What we cannot put out there as a software as a service, if we can host it in a co-lo that’s what we want to do. What we want to retain on premise is only the stuff that must be on premise. Maybe because it needs such data transfer speeds, very close to some specific research equipment. Or it’s some business stuff that just is not quite ready to go out into that public space. But that’s our strategy now. If it can go off premise it goes off premise. But going off premise is also about cost and security. Two big things. It’s got to be value for money. It’s absolutely got to be secure.