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Right so, a bit about my team what we do. So the sustainability team in estates, small team of 6 people, we look after all things operational, sustainability and a bit wider than that, so we look after energy, erm, that is buying the energy, monitoring the energy, paying the bills, doing energy monitoring and targeting and identifying waste, and developing projects to reduce that waste. So we sort of look after, you know, cradle to grave really of energy, for the university and all its buildings, erm we look after waste and recycling and we get involved in sustainability and everything else, construction and all the other things we do as a university. Um, on the energy side, so in terms of energy purchasing, one of the things we've recently done, is to start buying, at various points in my career at the university we've bought renewable energy on a tariff and paid a little bit extra for that.

Ok.

Depending on which company we've been with and whether or not the tariff they can offer is seen as good value.

Ok, so depending on the price basically.

Depending on the price yeah. So at the minute we're paying a little bit extra on our annual electricity budget. It's something like £ 25,000 a year extra on a roughly £ 5 million annual electricity spend, so it's a very small percentage. Erm what's that, half a percent I think. And for that now under the current contract, we've actually got a sort of locational contract. So all of the university's energy now, from very recently, is supplied from the new wind farm off Blyth, so it comes from the North East, and our consumption is matched to the generation from that wind farm, and we get the sort of, we can't guarantee that the electrons are the same electrons that were generated out at sea, it's all done by a contractual instrument, you know our consumption is matched to the consumption of that wind farm.

So that's one aspect of energy trading, and as far as the wider energy trading goes, we use a company called the energy consortium who are our energy brokers and they buy our energy according to a risk management policy that we set, and we're in a basket essentially with lots of other universities, and we all tell the energy consortium, this is how much energy we need, you go away and buy it off the market and get us the best price you can. And they do that by buying chunks of energy, either gas or electricity, at small chunks, spreading out the risk prior to the period of delivery, so for example, winter 2018, the 6 month period, October, November, December, January, February, March, so starting in October 18 running through to March 19, that's a period called winter available on the market. Tech have virtually bought all our requirements for that period. Then you move into summer 19 the following 6 months where they might have bought at the minute 60 to 70% of that annual requirement and they're also starting to buy energy out into winter 19 and summer 19, so they're buying our energy requirements quite far ahead in advance. So that's how the actual trading bit of it works. Tech employ a trader and he is literally the guy who is pressing a button to buy a certain amount of energy on the market which is then dolled out across all these universities who are in this basket, you know. Um, so that's how that works, and I report to the university on what price we've achieved.

That's one part of it, that's what we call the commodity cost, the energy cost, the market value, it's a bit like oil prices that goes up and down. The other part, the cost that we pay as a university to pay our bill is what's called the non-commodity costs, these are things like climate change levy and hydro levy and renewable obligations and feed-in-tariff. Essentially, regulated costs where government is recovering cost via the energy bill and the energy suppliers have to cover that cost on the behalf of

government. So you know on top of your energy price that you've bought by trade, you've got all these other items that go to make your pence per kilowatt hour that you pay on the bill. And increasingly that part of the bill is becoming a much bigger proportion of the bill, energy prices go up and down, um, non-commodity costs just go up at the minute, and that's because we need to invest in the UK's energy infrastructure, all these renewable energies are paid for essentially, or at least the governments investment in that infrastructure is being paid for out of these levies that have been passed onto these customers such as the university. So that's why we're seeing these levies increase. So that's another aspect of what we do in energy, my team manage that. And over and above that we are a generator.

So we have PV arrays for which we receive feed-in-tariff for some of our arrays, those that were installed after the feed-in-tariff legislation came in. We're also a generator of ROCS at Cockle Park Farm for our digestion plant that we've got up there, so we buy renewable energy under a contract, the stuff that we buy from the offshore windfarm at Blyth, that's bought under a contract that uses RIGOS, Renewable Energy Guarantees of Origin Scheme, so we are a customer of renewable energy generation under a RIGOS contract. We use a broker to buy our energy requirements on the market, including commodity and non-commodity, and we are also a generator of renewable energy, so we've got a number of PV arrays, including on the Devonshire building, um, we've also got solar thermal in a couple of places.

With the new buildings from now on, is it more important to incorporate renewables into them? I know you've got the new urban sciences building which is very eco-friendly, is it becoming more and more important now? Like a requirement to reduce the energy from the start.

It's easier to get the investment required to do the renewables as part of a capital project. So if you're building a new building you have certain requirements to meet from a building control point of view, so you have to prove that your building performs at least as well as the building regulations require. The university's own regulations mean that we would want to go well beyond the minimum requirements laid down in legislation, um, and part of that is we would set targets, such as the BREEAM target, environmental assessment methods for construction, where we would set a target saying we want to achieve BREEAM excellent, which is what we did at USB, and as part of excellent you would have to demonstrate that you've got a good approach to energy efficiency and renewable generation and biodiversity and all the other things that go to make up that metric. And then because the university is signed up to making its own targets for construction, usually that means on a new building that means you're going to end up with a new PV array on the roof. At USB, the nature and scale of that array was a question, how do we put an array up there that works for an energy generation point of view but is also useful for research, which was why we ended up with one PV array that's just a standard one and another that is a PVT array, an integrated photovoltaic and induction in the one panel, um so that's just to enhance the research going on in the building.

We've got 50 main buildings as a university thereabouts, and lots of those buildings have lots of roof area which if you had a few million pounds to throw at it you could cover with PV. There's a business case there, without the need for feed-in-tariffs or anything like that. The business case for commercial roof mounted solar is getting to a point where the cost of the panels has come down that much that actually the industry incentives aren't really required to make a business case anymore, as long as you're willing to accept a fairly long-term payback for your investment. Um, and that's the issue really. The university does have money to invest, and this comes onto your other point, how we go about reducing energy consumption in buildings, we do have money to invest in that, we're doing projects to reduce energy consumption, as it would make sense to reduce energy consumption before you generate, for example, we're just at the minute, I was interviewing

contractors yesterday for the LED lighting to replace all the lights in the university with LED lights. That's £2.5 million that we're spending on that, and we get a payback period of somewhere around 5 to 8 years depending on your return on investment for investing in renewables, PV panels on the roof is going to be longer than that still. There was a time when you had the feed-in-tariffs and they were at their high levels, when it was a little bit less than that, down to 5 or 6 years depending on how cheaply you could do the project, it's probably higher than that now. The question is how much capital does the university have to invest in all these things. And really what we do is we take a prioritised approach, and that means taking energy consumption first and we will get to a point where we've picked all the low hanging fruit, you know, and as we work through the estate, we're about to spend £50 million on Claremont tower and Daysch building, and where well clad that building in a new thermal envelope, new windows, new walls, and it'll get a duvet covered over it basically. And then well move onto the next building.

So you're going to finish that process first?

Not necessarily, so it's about the amount of, we're about a £0.5 billion turnover organisation, £450 million turnover a year income and expenditure with some reserves. So we get that income from research and students and then we spend it all again on paying lecturers on paying lecturers and building buildings, and as well as doing all of this we also borrow money from banks to fund things like the urban sciences building. So in that mix I've got to convince the finance director, well you tell me finance director how much money you've got to invest, and Ill do what I can and give you the best return that I can for that money. He might turn round and say well you bring forward a business case that tells me what rate of return I can get for my investment, and Ill put it in the list of all the other things that the university wants to do, which might be to fund 20 more professors, or to build a new halls of residence. So there's that decision making is done on a business case basis at the university level. And I'm pleased that in recent year, A that over the 10 years I've been with the university, we've built a team, we've got a team that does this, and we're continuing to increase the amount we invest basically. That's not to say that there isn't more that could be done if you had the money, so I think it's a tough sell to the university, which has lots of priorities. I could probably spend £20 million on renewables on the roofs and demonstrate a long term payback for that, but the university doesn't want to invest that right now when it's got other priorities to deal with. So its about finding the right path through, and that path is often things like, the work will get done when we refurbish the building, so when it comes to Claremont tower, its got a lot of flat roof space, its not decided yet what's happening as part of that building, but its expected to see a level of renewables within that refurbishment, as well as the energy reduction.

In terms of energy reduction what other things have you done apart from the LED lighting?

We've done loads of things over the years, so invested heavily in our building management systems, so they're our computerised systems that control the heat and ventilation and conditioning in the building, so we've got about 3 to 400 different controllers controlling different bits of kit in the university. Those bite of kit control millions of pounds in expenditure in heating, cooling and ventilation, um, so we've spent a lot of money there. We've done energy campaigns with staff and extending to students to try and control how they use energy, change their habits. We've invested in insulation of building and pipework, lighting, lighting controls, we're doing more of that as part of the LED program. So lots of things, there's a whole long list of things we've done, lots of stuff we've done with motors, and conditioning systems, low energy motors with variable speed controls, lots of measures. So its millions of pounds that's been invested over the years, wither directly through our carbon reduction stuff, or for other reasons, for example, we spent \$4 million on new boiler plant about 5 years ago now, so yeah, loads of things. Lots of expenditure, and as a result we're managing

to keep our carbon emissions relatively flat, despite the fact that the university is growing at quite a rate. But we're not on track to meet the sectors target of an absolute reduction of 43% by 2020, because of that growth issue. We'd be just about on track if we stayed the same size, since baseline year in 2005/6 we've built umpteen buildings. So much more expansion in energy intensity of the estate. So yes we make things more efficient, but then we make more space that uses energy, so it's a constant battle to keep pace with the growth of the university, and try and get their graph heading in a downwards direction.

So what about ISO50001, the standard?

So we've got both 14001 for our environmental management system, and we've also got our energy management system, and they're both accredited to the international management standard. So they just basically mean that we have a documented management system that basically says, this is how we manage energy in the university, and we do this to achieve a continual improvement. And that system flows from the leadership of the university, the policy objectives of the university, into a system that has a range of procedures that says this is how we manage the energy consumption of our buildings and identify waste, what to do to correct it when we find it. All that sort of stuff. It just means we've got a documented management system with a series of procedures which says how you do stuff, and that we audit against those procedures, we check ourselves and we have that externally verified by an external each year. So the management systems by aligning what you do to the international standard, you can demonstrate what you do is of good quality. But we could always do more if we had more resources.

But it's the money that holds you back in a way.

Yes that's true, but that's true of anyone in the university, that's the reality of it, is that we are in competition with other part of the university for resources. It always has to be a balance once you get into that sort of allocation of resources question.

Yes exactly. So there's a research group looking into Blockchain, you know that Bitcoins traded on Blockchain, and so how energy could be traded via this within a community, so if you're looking at Newcastle University as a business, how they could trade with the local community, or with other businesses, um, if they had that renewable generation, probably not at this scale but if it was ever to grow and you were to install more.

Yes I'm interested in this. So we've got this RIGOS contract to buy renewable energy from the windfarm, at Blyth, first time we've had a contract like that, but its still a sort of contractual instrument. Its not, that windfarm was being built anyway and we've just contracted to buy some of the energy from that windfarm. The interesting thing about the model that you're talking about is that the university by perhaps investing some of its money in a model like that, the extent to which it could generate additional investment in renewable energy that otherwise wouldn't happen. And in doing that could assist communities to generate in that way and get all the benefits as part of that process. That's an interesting model. I know its talked about in the energy industry at the impact, the impact that Blockchain might have in blocking out the likes of the distribution companies, like Northern Power Grid, which of course is also another part of the non-commodity cost element of the bill that we pay, our transmission and distribution charges to the network operators, either national or local. So yeah those new models that are emerging where you almost contract directly with a producer that might be local and then pay a sort of conveyance fee to the operator, um, its something the university might be interesting in doing at some point, quite how we might dip our toe in that water I don't know.

I hadn't really thought of it like that that is interesting.

Yes, so the university is sort of connected to that and something we are involved in to a certain extent is around its investments fossil free, so a big campaign by the student body, nationally and internationally to get rid of their holdings in fossil fuel companies, the university considered that issue and came up with a report that said here's what we're going to do on this issue over the coming years and its generally in the direction of diverting its holdings in fossil fuels companies, certainly particular types of fossil fuel companies. The question then becomes well if we're not going to invest in those companies which have historically given quite a good return on money, which we have a duty and the university as a charity has a duty to seek a good return on its investment because the money it has, has been awarded to it on a charitable basis, so its what alternative models, if we took a million pounds out of investment in BP for example, where do we put that million pounds. Now we could give it to, what we normally do is instruct our investment managers to take that million pounds from there and put it into a different fund that doesn't have fossil fuels, and that money will get spread out across a range of companies that are into retail and all the other industries that investment managers invest in. What's more interesting to me is if you took a sort of climate change, social justice sort of set of objectives for that million pounds where you would put it, and what novel or interesting sort of new market opportunities does that bring for a player like us. Can we actually drive a product that will mean that for example, an estate in the west end of Newcastle will end up with solar panels on their roof, for a 20 year contract to do that. The resident gets cheaper energy, the university buys the excess, or just enables that investment to actually happen as long as we're getting a return on that investment, and the residents are benefitting as well. SO there are things that are going to come out that way that I think the university's at the very early stages of looking at what that might look like. But the models are starting to appear I think in the market, so at some point we're going to have to dip our toe in the water I think, and try a low risk model. The university is quite a risk adverse organisation, we're not into high risks we want a steady return for its investment, and some of these new models are inherently going to be risky, so quite how we get to one where the university's got some comfort will be interesting,. But yes it's definitely an area where I can see us in the medium term getting involved with, yeah.

Ok, thank you very much, I won't take up more of your time because I know you're really busy, but thank you for talking to me.