HOUSE OF COMMONS

Environmental Audit Committee

Oral evidence: Risks and opportunities to the sustainability of data centres in the UK, HC 22

Wednesday 1 July 2026

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Watch the meeting

Members present: Mr Toby Perkins (Chair); Olivia Blake; Julia Buckley; Jonathan Davies; Barry Gardiner; Sarah Gibson; Chris Hinchliff; Sojan Joseph; Manuela Perteghella; Adrian Ramsay; Martin Rhodes; Dr Roz Savage; Blake Stephenson; John Whitby; Sammy Wilson.

Questions 73 - 117

Witnesses

I: Tone Langengen, Senior Policy Adviser for Energy Policy, Tony Blair Institute; Adam Eaton, Chief Executive Officer, VIRTUS Data Centres; Arka Chanda, Associate, Centre for Economic Transition Expertise (CETEx).

Written evidence from witnesses:

– VIRTUS Data Centres (DCU0019)

- Centre for Economic Transition Expertise (CETEx) (DCU0046)

Examination of witnesses

Witnesses: Tone Langengen, Adam Eaton and Arka Chanda.

Q73 **Chair:** Welcome, everybody, to the latest meeting of the Environmental Audit Committee and part of our second panel event looking into data centres. I am glad to say that we have an excellent panel in front of us. Could I ask the three of you—starting with you, Mr Eaton—to introduce yourselves, your organisations and your involvement in the issue of data centres?

Adam Eaton: Thank you for the introduction, Mr Perkins. I am Adam Eaton. I am the CEO of VIRTUS Data Centres. We operate 13 sites across the UK, delivering close to 225 MW of installed IT capacity, which makes us the largest data centre operator in the UK. We contribute about 23% of the UK's installed IT.

As CEO of VIRTUS, my responsibility is to ensure that we are leading with sustainability and environmental initiatives, and that we build and develop our data centres in the right places for planning, permitting and delivering on the environmental aspects.

Tone Langengen: I am Tone Langengen. I am a Senior Policy Adviser at the Tony Blair Institute, where I lead on energy policy. We have spent a lot of time looking at policy for interactions between AI and energy.

Arka Chanda: Hello, my name is Arka Chanda. I am an associate at the Centre for Economic Transition Expertise at the London School of Economics. We are looking at the impacts of transformative changes throughout the economy, including climate change and the environment. We have recently done some work on the implications of data centre deployment for the UK's climate goals.

Q74 **Chair:** Excellent. Mr Eaton, talk us through the case for expanding data centre infrastructure domestically in the UK and your sense of how attractive the United Kingdom currently is as a place to be siting data centres.

Adam Eaton: They are both very good questions, Mr Perkins. May I take the second one first and talk about the demand piece? In terms of the regulatory landscape, the UK is a great place—particularly for AI companies—to do business. There is a definite segregation between the way we operate and the way the rest of Europe operates, which has driven an amount of the hyperscalers and some of the cloud demand into the UK.

Q75 **Chair:** Could you explain what those key differences are, if you can?

Adam Eaton: Lighter-touch regulation around AI has given the UK the opportunity to benefit from early-stage adoption within those data centres. It is not just about AI demand: it is about cloud demand; it is about general demand from social media, financial services, the NHS—all

the apps that we use on our phone day to day are driving demand. The UK has always been at the forefront of driving technological adoption, which is driving quite a lot of demand there.

To the second question, about where to build those data centres, there are two parts to that story. From a VIRTUS perspective, our customer base has been driven by a mixture of enterprise, so financial services, public sector, cloud companies, as well as some of the US hyperscalers. They are very much driven by latency requirements and needing to be close to the eyeballs. As a result, VIRTUS has predominantly built into the west of London—the north-west of London—and we are currently developing what was a brownfield site to the north-west of London as well.

More generally on where data centre demand is required, the technology is changing. With the advent of artificial intelligence as well as cloud services, there is now a split between needing to be close to the eyeballs—so being positioned in west London, Manchester or wherever, close to where those people need to be—and being able to build data centre locations away from major conurbations to drive some of the different types of predominantly AI demand.

Q76 **Chair:** Thank you for that. Ms Langengen, what do you see as the certainty of the demand underpinning the growth of data centre attractiveness in the United Kingdom, and is there anything else you want to add on the case for expansion of that?

Tone Langengen: It is important to start from the basics here. AI, cloud and all these things are going to be part of the UK economy. There are different types of data centres. Obviously, we have the traditional cloud data centres. Then we have AI data centres, and there are two different types within that: inference data centres and training data centres. For the UK, the group of inference data centres in particular will be really important. The reality is we are not going to be the US or China; we are not going to be training these massive models, which are the most energy intensive and the biggest, but we will need significant inference data centres.

Because of this point around latency being reduced, some of that can be elsewhere. We can take some from different parts of Europe and the world, where they have more energy, but we will need some domestically, for different reasons, such as national security. For things like our public services, for instance—thinking about the NHS—where the data goes might really matter. Therefore, the UK should be thinking about AI sovereignty as a strategic capability and the need to have some of that strategic capability here.

How much that will be is really uncertain. We saw the Government setting out a target of 6 GW of AI-ready data centres in the UK by 2030. That is one target. NESO, which plans the UK energy system, has very

different ones. It does slightly depend on how quickly they can connect to the grid and how well we enable them to do that.

Q77 **Chair:** Taking as a given what you are say about the need for nationally significant infrastructure to remain in the UK, to what extent should the UK be attempting to become an attractive place for commercial data centres—those that could be based elsewhere—more generally? Should the UK be fighting for this business, should it be reluctant to have it, or should it be somewhere in between?

Tone Langengen: I think that the UK should be fighting for this business, because the need for compute that we are looking at, for the baseline layer when we are thinking about—and it is not just the public services; it is also commercial companies that, for different reasons, want to have the security of having onshore data centres. To be honest, we need to attract as much as we can to hit those targets. We are nowhere close to being on the path to hit 6 GW, and the Government have clearly set out very good reasons why we need it. This is the time when the UK needs to think about how we accelerate that, rather than thinking about something that needs to be stopped.

Q78 **Chair:** Mr Chanda, is there anything else you want to add on the case for expanding data centre usage? What do you see as the risk of overbuilding data centre infrastructure in the UK?

Arka Chanda: I echo the points that have been made. The role of data centres in enabling digital and data sovereignty is important. Having data stored and processed in the UK is a very important strategic need.

An additional risk to consider is that a lot of the companies that are building and deploying AI models are not UK companies. You have giants like Anthropic, OpenAI, Google DeepMind and so on, which are American companies. This introduces some additional challenges that will not simply be met by having data centres sited onshore.

On the point about overbuild, I agree: there are a lot of construction challenges in getting data centres deployed, built and developed. However, I would also like to underscore that, based on recent figures put out by Ofgem, about 20 GW-worth of data centres have arrived at some kind of final investment decision. A lot of the challenges that we are running into are, in our opinion, about the data centre industry's ability to secure a social licence to operate. One way to address that is by not relaxing regulations and safeguards, especially around environmental impacts, water impacts and social impacts, but strengthening them and providing a baseline that lifts good and bad actors up to a level playing field.

In our view, the biggest risk around overbuild is the associated infrastructure that is needed for the successful operation of data centres. The International Energy Agency's most recent report on energy and AI—it came out in November 2025, so it is a little bit dated—found a

sevenfold difference between the highest estimate of global energy demand from data centres and the lowest. As a lot of industrial energy demand declines around the UK, there is a risk that we will see what has also happened in the US, where most of the additional demand that is prompting utilities to build additional energy generation infrastructure—renewable or otherwise—to service additional demand is coming from data centres. This leads to a very high concentration of risk associated with new infrastructure development within just a few actors.

If we take into account this world where there is a difference of about seven times between the highest and lowest estimates of levels of demand, where we build too much infrastructure and we are not able to tie the capital investment from that infrastructure to a PPA, or to some form of agreement where it is paid for by a commercial data centre, we leave utilities potentially exposed to the risk of bearing all that, which is then more often than not socialised to ratepayers.

Q79 **Chair:** Mr Eaton, you are someone who is making these decisions about where things are based and trying to encourage people, presumably, to base them in the United Kingdom on occasion. We have heard in previous evidence that the issue of the cost of electricity and energy is one potential competitive disadvantage for the United Kingdom. By the same token, you have already laid out some of the reasons why the United Kingdom is an attractive place for the building of data centres. This Committee obviously is particularly interested in the environmental aspects of the building of data centres. How hopeful should we be that we can have some of this growth created by data centres in a way that is not environmentally damaging? We have heard about tying data centres to renewable energy, reusing the heat, and other measures. How optimistic or concerned should we be about the environmental impact of the data centre growth that you might hope to see?

Adam Eaton: That is a good question. You referred to some of the previous answers to the Committee, and I think they are useful to take into account. As a responsible data centre operator, we need to work very closely with the appropriate parts of Government and the right agencies to build the policies that support sustainable, environmentally friendly growth in the UK.

Let me take the example of the data centre that we are building in Saunderton. It is a £1.4 billion investment. It is built on a brownfield site—the site of an old tobacco machinery manufacturing location—so it is making good use of available land that sat derelict for 15 years. The opportunity for us, as operators and developers, is to source those parcels of land where we can sustainably improve the environment that they are in, taking into account the various environmental regulations that are in place, but also to work with the Government and policymakers to make sure that, as the technology changes and improves—understand that we are going through a period of rapid acceleration through technology. Three or four years ago, the market was using far less power

than it is today. If we fast forward, as Tone was talking about, we are going to be using a lot more power, but with that comes technological advances and the opportunity potentially for the data centres to give power back to the grid and start to balance that as well.

Therefore, I think that the right policy framework, which is what we are exploring at the moment, is how we as operators can work with Government to rapidly introduce the right policy that takes into account what might happen into the future.

Q80 **Sarah Gibson:** That brings me on to my question about costs and where we position it. In the US, electricity prices near data centres have increased up to around 260% in the last five years. What do the three of you think about the implications of data centre growth in the UK for its energy systems? Do you expect households to see similar cost rises?

Tone Langengen: I am happy to answer that. Energy cost is clearly a barrier to investing in the UK and it is also leading to the tech clash that we are seeing, in the US in particular. That would not happen in the same way in the UK, because we have a national price, so the impacts would not happen in the same way.

One thing that is important to remember about the UK system is that one of the most important challenges of the energy system now, and one of the most important reasons why electricity is expensive in the UK, is that demand has gone down and we have built more infrastructure. We have to find ways of stimulating more electricity demand, because when we are investing in grid and in renewables, these are fixed costs on the grid. The more people who are connected to the grid, the more we spread those costs out.

If you have a data centre load and make it run 100% of the time using the grid, it does not really help, because the wind that we produce in the UK varies, and so on. But I think that there are huge opportunities for thinking about how to create connections that are more flexible, where the data centre can become a more flexible asset. That can include things like having on-site generation or on-site batteries, for instance, so that when the grid is drained you can offload and use the batteries on site. There are also trials of whether you can shift demand at different times. I think that if those things are done and we can come up with a proper strategy for AI data centres and energy together, it will reduce bills for bill payers rather than increase them.

Arka Chanda: I agree with some of those points: about the potential for data centres to provide a stable baseload level of power for the grid, and how we are unlikely to see the same magnitude of increase as in the US. However, I want to add a couple of things.

First, I think it matters significantly how much data centre capacity we build in the UK. If we start from the numbers, as I said, 20 GW of installed capacity has reached final investment decision according to

Ofgem. That is 40% of peak electricity demand right now. Now let's add the timing dimension. If we want to build enough energy to power this 20 GW, we need new energy. On the basis of the last construction numbers, data centres can take about 12 to 24 months to build; for new energy capacity, you are looking at about three years, so there is a lag here—I think this was covered in the last panel—where the deployment of data centres is largely outstripping or outpacing the installation of new energy capacity to power them. As you add more demand and you are not able to meet it with increasing supply, we are back to Economics 101: there is very likely to be some upward pressure on prices, at least in the near term.

Secondly, data centres are a stable baseload energy demand profile, which means they will operate at a relatively flat level of energy consumption 24/7. That means it is quite difficult to meet data centre demand year-round with just renewable sources, with the exception of some areas where we are able to get hydropower in, for example. If you are just using solar, wind and battery storage, inter-seasonal variances, especially, make it quite difficult to meet it entirely with renewables.

One example of good prospective modelling that looks at what happens to the energy mix here is Malaysia. Some prospective modelling there showed that gas utilisation went up 76%. That means that 76% more of the time, gas was a marginal price setter for the wholesale electricity market. That means you have a greater exposure in some cases, and you are inadvertently entrenching fossil fuels in the grid—at least in the near term—until we are able to develop technologies that allow us to move off fossil fuel generation entirely.

Q81 **Sarah Gibson:** Mr Eaton, do your data centres all have on-site gas generation and suchlike in order to compensate?

Adam Eaton: No. There are only two instances of gas generation that has been approved in the UK in the data centre industry. The majority of our customers prefer to have grid connections. The UK grid infrastructure is very stable, so they would prefer not to have any form of behind-the-meter generation. That said, because of some of the challenges of connections that we face today, having a bridge to power solution temporarily is a good thing.

To touch on a couple of those points, I think we often look at the data centre baseload today rather than looking at baseload of the future—in three or five years' time. We are seeing the efficiency of the chips increase—we are seeing more coming out of those chips—which means that the baseload will most likely flex and we need to make sure we plan and legislate appropriately to manage that in the future.

Q82 **Sarah Gibson:** Yes, we heard that argument in our last session. We talked about the fact that, as they become more efficient, we just expect them to do more; we assume that the drop-off would not be quite as good because we just keep asking for more data.

Adam Eaton: I think what we will see is a continued demand on the digital infrastructure layer, which is the data centre layer—absolutely. It may be that the chip demand increases because people are adopting AI more effectively and more people are using it, but the digital infrastructure layer will continue to grow. It will not increase at the same pace as the chip layer, but the digital infrastructure will still need to increase to support that. To touch on that point of whether we are overbuilding, I suspect we probably aren't because we do not know what that future demand actually looks like today.

Q83 **Sarah Gibson:** That is quite interesting. Going back to the energy issue, Mr Eaton, do you feel that corporate power purchase agreements mitigate or shift some of the impact on energy systems?

Adam Eaton: That is a good point. At VIRTUS, 17% of our energy comes through a corporate PPA, predominantly a wind PPA. There is an opportunity within the industry to adopt more PPAs to move away from using up some of that grid power and having that private wire direct into the data centre. That gives us that flexible load that we need to have running in there, and then the grid will potentially provide the variability on top of that.

Q84 **Sarah Gibson:** That is interesting; thank you. Mr Chanda, the Centre for Economic Transition Expertise modelling said that data centres could account for 8% of the UK's emissions in 2035. How do you think that might be mitigated?

Arka Chanda: It is a good question. The up to 8% figure is based on the demand profile of data centres increasing the intensity of the grid through increasing utilisation of gas facilities, as well as on what we think is the ceiling of data centre installed capacity, which is around that 20 GW number.

I would like to echo some of the solutions that have been proposed already. One of them is certainly demand flexibility. Being able to link to the grid would greatly reduce the emissions intensity of data centres. I say that because at the moment, as I am sure you will appreciate, there isn't a whole lot of data available on the nature of all the projects in the world. We were able to procure some, and from what we were able to see, it is a reasonable expectation that about 70% of data centres will connect to the grid and 30% will have some kind of behind-the-meter generation.

This behind-the-meter generation is where a lot of the emissions intensity sits, because in the near term it is largely expected to be gas. The International Energy Agency, for example, says that only 50% of data centre demand will be met with renewables out to 2030; the rest will be fossil fuel based, such as gas and coal. To the extent to which that can be mitigated, it would reduce the emissions intensity of the data centres themselves, but of course we have to trade that off against the pressures that it places on the grid.

Another potential solution is hourly matching rather than annual matching. A lot of data centres are able to purchase renewable energy credits, which are then balanced out; some of them can have life periods of up to 16 months. A paper published recently in the *Electricity Journal* showed that an hourly matching approach is much more effective at reducing emissions impacts, largely because it creates the incentive for investment in battery storage solutions on site, which reduce the emissions footprint of data centres.

Tone Langengen: Could I make one very basic point? A data centre in the UK has 70% less emissions per year than one in Saudi Arabia, 43% less than in the US, 31% less than in Germany. The point is we are going to use these data centres anyway. The question is where they are at. Having them here in the UK is a good thing for the climate in terms of emissions because we have a really decarbonised grid. There are few countries that can rival us.

Seeing it just in terms of how much it will add in emissions—in particular if you think about it in territorial terms—I think is the wrong way of thinking about the question. I also think that there are huge opportunities in utilising some of the investment by hyperscalers, in particular, in energy tech as a thing that will help drive down the costs and drive the innovation that we are going to need to deliver the energy that we need for other things as well. I think there could actually be some quite positive emissions impacts.

Q85 **Barry Gardiner:** Thinking of these things in territorial terms, that means actually complying with our NDCs and our targets. We do have our net zero target.

Mr Eaton, you have painted a very rosy picture. Last week, the Secretary of State for Housing, Communities and Local Government gave permission for a data centre in Bedfordshire to be entirely fuelled by gas generation. That is going to be 3 million tonnes of CO_2 per annum, a huge amount of energy, which will now be on our books and which we will have to mitigate in order to reach those net zero—thinking of this in territorial terms—emissions reductions. Further to that, as I understand it, data centres need back-up, and most data centres employ diesel-powered generators as that back-up. Now, they may not have to use them, but that is the strategy, is it not?

Adam Eaton: I am not across the details of the data centre in Bedford, but from a VIRTUS perspective—

Barry Gardiner: You did not see the announcement?

Adam Eaton: I saw the announcement. I don't have the details behind what that particular proposal entails and how they have set their structures up.

Q86 **Barry Gardiner:** But if the figures that I gave you are correct, do you

not think that that presents certain problems for the way in which the Government goes about managing the sector?

Adam Eaton: From a VIRTUS perspective, the data centre that we are currently building in Saunderton is a 78 MW data centre, so it is a significant deployment. For scope 1 and scope 2, VIRTUS is net zero; we are net zero by 2030. We use renewable energy across the portfolio and 17% of our energy is through a PPA. Yes, there are generators on site in the event of a failure, but they follow very strict emissions standards as set by the Environment Agency.

I think it comes back to us working with the appropriate Government policy and the policymakers to ensure that what we are deploying from the data centre perspective not only meets today's requirements but supports the climate in the future. To Ms Langengen's point, data centre demand is driven not by the data centre operator, but by the users on their devices, so we are just supporting the demand that is being created.

Barry Gardiner: Just carrying out orders, okay.

Adam Eaton: We are just carrying out orders.

Barry Gardiner: Mr Chanda, you wanted to come in.

Arka Chanda: I want to come in on the point of the UK seeking to meet its NDCs. You may have seen that the Climate Change Committee laid a report before Parliament just a week ago, which said that we are actually not making as much progress as we would like to be on that front. I brought some numbers with me so I can show you. Electricity supply in 2023 accounted for 37 or 38 million tonnes of carbon emissions. By 2030, we want that to go to 9.8 million. That is a 74% reduction in emissions in electricity supply.

I would like to bring your attention to the modelling that we did. In our medium case scenario, we assume that about 10 GW of data centre capacity gets built. Incidentally, that is very similar to the 9.6 GW that DSIT noted would be the compute demand for data centres, including cloud and AI data centres. That is our medium scenario. In that scenario, where there is about a 95% reliance on gas, behind-the-meter gas generation for data centres alone produces 9.4 million tonnes of CO_2 emissions in 2035.

The emissions impacts where we are relying heavily on fossil fuel generation are hugely significant and, as you will see, very similar to the total emissions from electricity supply, which is where we want to be in 2030. We are already at risk of not meeting that. I read a study just this morning—I am happy to share the resources with you afterwards—that said we were probably about five years delayed in this process. A lot of what is driving this is capacity constraints in grids. Being able to connect to the grid with new green energy projects, adding an additional 10 or 20

GW worth of connections to the grid, would create an additional bottleneck.

Barry Gardiner: Mr Chanda, if we were playing basketball, I would say, "Slam dunk." Thank you very much.

Chair: The evidence we are hearing is prompting further questions, so I am going to come to Olivia Blake and then to Sammy Wilson, and then we are going to try to get back on track.

Q87 **Olivia Blake:** I just wonder if you think that this is a good use of the carbon budget that we have.

Tone Langengen: Just to make one point very clear here, that example of the gas-generated data centre, and the fact that that is happening, is a sign of the failure of the grid. As I was setting out previously, we are generating way more electricity than we used to. We are adding loads and loads of gigawatts to our electricity system. We need to use the grid more. We need to use that energy productively. That is also what is going to reduce bills—and that is clean energy as well.

I think the big challenge here is that you basically need to get Ofgem to work together with data centre developers and the grid to think about how you accelerate these connections, for instance through flexibility and through other means where you have on-site generation. If you do that, you get a win-win, because you don't get those significant impacts on climate. I obviously do not want big data centres being connected to the gas network either. You can thereby reduce the emissions impact of data centres as well.

Q88 **Olivia Blake:** Does anyone else want to come in on that? Given that we have other areas that will be very hard to decarbonise—aviation, and some industries—is this a good use?

Arka Chanda: There are a lot of technologies that are starting to come into play around data centres to reduce the footprint that they have. Some of those are around improved efficiency within data centres. A lot of them are around improved efficiency and recycling heat, recycling waste, and those kinds of innovations.

In the longer term, there is some scope, and we have done some research at the LSE that looks at the innovation potential and the cascading benefits of artificial intelligence in facilitating technological breakthroughs. In terms of data centres providing bankable demand for new experimental clean technologies, like small modular reactors, we are seeing a few cases of data centres in the US providing offtake for innovation in these technologies.

There is potential, but I would like to stress that we are weighing off potential against short-term, very real, very tangible impacts. In that sense, I think the points are around implementing the appropriate safeguards so that there are enforceable commitments to emissions

reductions over a specified time period, rather than simply voluntary commitments that we have seen.

Q89 **Olivia Blake:** There is a huge amount of investment accumulating. Do you not agree that perhaps—I know this was asked in the previous session—newer technologies, like green hydrogen, should be looked at? Obviously, they need more investment to become more affordable, but given the huge amount of energy consumption and the need for a stored source of energy, that would be a win-win scenario for the UK economy.

Tone Langengen: Just to clarify, do you mean that we are investing at the same time in hydrogen together with these data centres?

Olivia Blake: To power—

Tone Langengen: To power the data centres?

Olivia Blake: If renewables are not universally—

Tone Langengen: I think that data centres, by the way, are one of the easiest things to decarbonise, because we know how to decarbonise the grid—that is why the Government have their 2030 target for decarbonising the grid: we know how to do that—and you can connect the data centre to the grid. It is already electric. That is great.

Green hydrogen is a very inefficient way of using electricity. Basically, you have to use the electricity and make it into these molecules that are really difficult to transport and really hard to store, so it is a very inefficient use of energy. There might be some niche uses for hydrogen in other parts of the economy, but for data centres the best thing you can do is connect them to the grid and make the grid clean.

Q90 **Sammy Wilson:** Ms Langengen, I think it was you who, in answer to Sarah Gibson, rightly pointed out that consumers in the UK are not likely to experience huge spikes in the cost of energy because of a data centre being located near them due to the fact that we have a national price. But there is another cost that is involved in supplying electricity to data centres, and that is the fact that the grid very often has to be upgraded and strengthened because, first, you are using huge amounts of electricity, and secondly, as Mr Eaton said, 70% of your electricity is from renewable sources such as wind, so the grid has to be strengthened and maybe a change made to it.

When it comes to grid strengthening and connections, are data centres charged for the work that is required to be done, or are those costs passed on to the consumer through the general imposition on their electricity bill?

Tone Langengen: Data centre providers are charged in the same way that any other consumer is, I am pretty sure—

Adam Eaton *indicated assent*.

Tone Langengen: Yes. That means that there are a few levels up where they are charged and then the rest is socialised into everyone's bills. Obviously, a huge factor that will increase electricity bills going forward is the fact that we are having to update the grid.

The point I was making earlier is that you can limit the amount of grid upgrades you need by being smarter about how the data centres are integrated into the energy system—for instance, having some on-site generation or making it more flexible—but also about where you place them. For example, you might think about placing them in Scotland, where we are producing more energy and where it is colder so you need less cooling equipment. There are some opportunities there.

Arka Chanda: A lot of the time, where there are additional infrastructure investments that are taken by the utility, they do tend to be socialised and sometimes passed on to the ratepayer. There are some examples of this happening in the United States, which this has partly been associated with increases in electricity prices. As a result, in order to buttress their social licence to operate, we have seen some voluntary commitments from companies like Anthropic, for example, which have said they will pay for infrastructure investments that would otherwise be socialised. Again, I would like to stress that these are voluntary commitments that have been done on a one-off, ad hoc basis.

Q91 **Sammy Wilson:** So there will be, on occasions, additional costs imposed on consumers generally as a result of data centres requiring the strengthening of the grid. I just wanted to establish that point that it was not costless to the consumer.

Tone Langengen: No, but we have energy for demand, right? And as I say, you are having to pay, sometimes, for a few levels up if it is a recurring reinforcement, the installation that you want to do, and then the rest is socialised further up into the system.

Arka Chanda: There is one other side to this argument. You have the stable baseload profile of data centres and, as Ms Langengen mentioned, if you put them in Scotland, for instance, you might be able to reduce rates of curtailment and reduce the balancing cost charges that are currently levied on consumers. However, the NESO future scenarios note that only about 20% of data centres that are expected to be built in the UK would be eligible with the right locational signals for that kind of movement.

Q92 **Julia Buckley:** I want to move on to other environmental impacts potentially linked to data centres, particularly where we have clusters. I am thinking specifically about Slough, where we have the largest cluster of over 40 data centres. Mr Eaton, I know that one of those is connected to your organisation.

The Committee has also conducted an inquiry into extreme heat, and we have been looking at evidence of a potential heat island effect: there

have been reports that where you have a larger cluster of data centres, the highest temperature recorded could be somewhere between 2° and 9° higher than in other areas. I would like to hear your views about that. In particular, what implications does it have for planning considerations, and what assessments are being carried out that could be made available during those assessments? Could we start with you, Mr Chanda?

Arka Chanda: A lot of our analysis has focused on the emissions impacts. We have not looked in a lot of detail at the heat-related issues that do arise from data centres. We have seen some evidence of heat recycling and use of waste heat in Italy. However, that is often to help with heating homes, which would not have been very useful if you were in London last week.

I have a couple of points on some other environmental impacts, if that is okay. I think this was raised in the last panel as well, but in a case where you have a large amount of behind-the-meter gas generation—this is not always necessarily the case—there is scope for increased air pollution. Also, about 40% of data centres worldwide are being built in areas with significant water stress. But I am happy to get those points later.

Q93 **Julia Buckley:** If you don't mind me interrupting, colleagues will press you in more detail on those issues. I suppose my question to you is: why are you not doing any research into the heat island effect, given the scale of the impact? Why is that not something that you are looking at?

Arka Chanda: I think the right way to look at it is that it is not something we have looked at yet. It is certainly on the agenda, and I am happy to look through the work that my colleagues and the wider network at LSE have been doing on this as well, as it is quite an emerging issue and it is not something that I am aware of or have a lot of research to point to at the moment.

Julia Buckley: I encourage you to consider it, given the planning implications.

Arka Chanda: Certainly.

Q94 **Julia Buckley:** I will move on to Ms Langengen.

Tone Langengen: We have not looked into that issue specifically, or too much, but cooling is an interesting area that is in the interests both of people and the environment, and of data centre providers. The more efficient you get the cooling, and the better you get those systems, you save operational costs. There is a potential win-win there. I think that is why we are seeing significant innovations happening in that space.

For instance, NVIDIA has announced some really efficient liquid cooling systems, which also help with the water impacts, where you basically recycle and cool in the data centre. There are definitely opportunities, and there are opportunities as well for the UK to think about being an innovator here and driving the right standards. It is definitely an area

where you can think about standards. It is a bit of a quid pro quo, I suppose, with getting a connection: you can require more standards in terms of what the equipment does and how it impacts the environment in general.

Q95 **Julia Buckley:** Do you feel that it should be a factor in the carbon credits we were discussing earlier?

Tone Langengen: It is not a carbon issue directly, but it should definitely be a factor in how you think about the impact of the data centre. You should think not just about its CO_2 impact but about other impacts as well, and you can set standards in that way.

Q96 **Julia Buckley:** Mr Eaton, do you have any thoughts?

Adam Eaton: Yes. As an operator, we are driven by where our customers want and need us to be, and working with local councils—local government—about where we actually build. Slough is a good example. They saw an opportunity as far back as the late 2000s to develop their trading estate to support data centres, and they have continued to develop from there and introduced a special planning zone on the Slough trading estate, which has attracted multiple data centres. With those data centres that have been attracted, the customers have come in, and that has continued to attract more.

I think you are right: there probably needs to be more research done around the heat effects. When we build data centres, we do significant analysis on the impact on the surrounding environment of any heat rejection that happens in those data centres. If there is too much heat there, our cooling capability fails and then the customers fail, so we have to be careful about the environment in which we operate.

It also demonstrates an opportunity to explore the AI growth zones and other areas in the UK where there are practical reasons to build data centres, whether you build, to Mr Gardiner's example, a 600 MW one in Buckinghamshire, whether you build clusters in the growth zones, or whether you build somewhere else—in Suffolk, for example. I think there is value now in looking to explore outside of those regions that have just evolved because that is where the customers have demanded and that is where the operators have naturally gone because that is where they have needed to be.

Q97 **Julia Buckley:** Can I just double check? You are saying that you do actually conduct ongoing assessments of the environmental impact, including temperature, of the data centres that you are running.

Adam Eaton: We constantly monitor the heat that is rejected from the data centre, because we need to manage the infrastructure that is in that data centre.

Q98 **Julia Buckley:** Can you confirm that in Slough, where you are one of 40 data centres, the temperature has risen in that geography as a

consequence of that cluster?

Adam Eaton: I cannot confirm what has happened in that geography. Our data centre has specific operating parameters that we have to adhere to for the customer, and we continue to monitor our data centres to make sure we stay within those operating limits.

Q99 **Julia Buckley:** Do you have to report that back to the council? Is that public information?

Adam Eaton: There is no legislation at the moment about reporting those temperature effects to—

Q100 **Julia Buckley:** So nobody except you knows what the temperature is in Slough.

Adam Eaton: I think the customers and the users of the technology would soon be fairly vocal when those data centres failed because they had suffered from an extreme heat impact.

Q101 **Julia Buckley:** It is two different things, isn't it? There is the demand and you efficiently providing a service, and there is a completely separate question: are you having an impact on the local community air temperature being between 2° and 9° higher, particularly when we are experiencing extreme heat? It sounds as though you are saying there is no regulation, no requirement and no assessment of how much impact you are having on increasing the temperature. Have I understood that correctly?

Adam Eaton: My response is that we have not done a survey of the Slough area to see if there is an extreme heat impact from all the data centres that operate in that area. We would welcome the opportunity to work with SEGRO and the local council on an evaluation of any heat impact in that area.

Julia Buckley: That is a really helpful recommendation. Thank you.

Q102 **Dr Savage:** I will address this to Mr Eaton first and then come on to the other panellists. Looking at the way that we measure the emissions of the data centres and whether that covers the full life cycle, are you satisfied that the current way of gathering this data is genuinely capturing the energy and emissions impacts across the whole of the life cycle, including back-up generation and off-grid activity, or not?

Adam Eaton: That is a loaded question, Dr Savage. I am comfortable that we as VIRTUS, with the data centres that we operate, are meeting all the legislative requirements that we have to that are passed down to us by the Environment Agency. That is not to say there may be others that we should be exploring with the Government and the Environment Agency to understand better the impact of data centres on the environment, and we would welcome the opportunity to do that. But we have a fairly strict operating regime in which we have to work and what we have to report back with regard to emissions, how many times we run

generators, the emissions of those generators, and so on. We have to report that information back to the Government.

Q103 **Dr Savage:** Are you saying that that framework does include the full life cycle?

Adam Eaton: What do you mean by "the full life cycle"?

Dr Savage: The back-up generation and off-grid activity as well as the—so the full supply chain.

Adam Eaton: The operation of the data centre day to day, the back-up generation and the off-grid activities—that is what we have to report on. As a responsible data centre designer and builder, we work with our supply chain to minimise the carbon impact of those scope 3 emissions up and down that supply chain.

Q104 **Dr Savage:** Thank you. Would either of the other panellists like to come in on that question?

Arka Chanda: There was an independent study by Allianz GI, an insurance company, and the title of its finding was: "Data centre emissions are higher than we expect". I think the figure was about 57% higher than what the International Energy Agency had estimated. There are several factors that are a part of this, including the data that are used and the assumptions that each side had made, but one issue that I do think is likely to be a part of this is how we account for emissions across renewable energy certification schemes and how that influences greenhouse gas accounting. One of the things I would like to reiterate is that there is certainly a case for hourly matching requirements around data centre emissions accounting in particular. According to research, that has provided greater incentive for decarbonisation and investment in low-carbon technologies.

Tone Langengen: I think that is a really important point, though. The biggest challenge is not the scope 3 emissions, because they get counted elsewhere in the UK accounts when it comes to emissions. If you have a PPA for solar or wind or whatever, we know that is not a baseload contract—that is 100%—so the more you think about hourly matching, I think you will also incentivise investment into other solutions, which is in our interest because we cannot run the grid on renewables alone.

Q105 **Dr Savage:** In that case, I would like to come back to Mr Eaton. VIRTUS says that it does operate 100% on renewables, I believe. How is that actually achieved in practice?

Adam Eaton: In practice, 17% of our energy consumption is through a PPA, which is a wind PPA, and the remainder is green energy procured through the grid.

Q106 **Dr Savage:** I am sorry to keep the heat on you. How often are the back-up generators tested?

Adam Eaton: That is a good question and one I will have to get back to you on. From a technical perspective, I am not sure how often they are operated.

Barry Gardiner: Very regularly.

Chair: Are you done on that, Dr Savage?

Dr Savage: In the interests of time, yes.

Q107 **Blake Stephenson:** I thank colleagues for raising the project in Bedfordshire, which is in my constituency. It is going to be quite controversial, not least because of its size and scale, the particular location and the use of gas turbines on site for energy, but also because it is in a county wildlife site that is home to rare birds. There are lots of environmental and ecological impacts from this particular development.

My question is not about this particular development, because you are not party to that and it would be unfair for me to ask you about it, but, Mr Eaton, given that you are building on brownfield—which I think on the face of it is good—do you know whether any work has been done to consider how much brownfield space is available throughout the country, close to grid connections, such that as a country we could mitigate the risk of large data centres being built in locations that might be considered inappropriate?

Adam Eaton: That is a very fair point. From a VIRTUS perspective, when we are looking for new land on which to build data centres—because we are constantly evolving the business—we continue to look for brownfield sites. We work with real estate developers to look for those. Whether there has been a survey of all the brownfield sites that are capable of running data centres, I don't know off the top of my head. It is a really good idea and I will take it away and work with our real estate partners to see if there is something like that that exists.

Q108 **Blake Stephenson:** Does anyone have anything further to add?

Tone Langengen: I think the point behind AI growth zones, at least initially, was to help do some of that shaping in terms of where you put these things. The reality is that if you are a data centre developer, it isn't that easy to find the right type of land with a grid connection. That is really difficult, and planning is difficult—there are a number of things.

The Government could be even more proactive in trying to identify these areas where you can get easier planning permission and grid access. I don't think that has happened yet to the extent that it needs to. Instead, AI growth zones has become a bit of a stamp of approval for projects that were already in the works. I think there needs to be a more proactive approach to it, including things like mapping the land, mapping the grid connections and making that publicly available to people. The more data that is released so that data centre providers can use it more easily, the

better, because something like grid connection availability, for instance, is not easy to access.

Q109 **Blake Stephenson:** Do you think that would be a good recommendation for the Committee to make to the Government to mitigate the risk of these speculative developments, which put planning authorities in an awkward position and local communities in a very difficult position?

Tone Langengen: Absolutely. The more proactivity you have from the Government in terms of helping these decisions to be made, the better.

Arka Chanda: One thing I would like to add is that given the state of grid connection queues, brownfield sites are often in really high demand. In some cases there is evidence of competition between clean energy projects and data centres. The Climate Change Committee report that came out last week noted that there was a brownfield site—I think it was in Teesside—that was going to go to either a blue hydrogen facility or a data centre, and in the end it went to a data centre. Perhaps there is a case to target agglomeration benefits as well, where we are able to use the site to co-locate different kinds of clean energy projects and data centres and create zones where you can get more than the sum of the parts.

Q110 **Manuela Perteghella:** My question follows on from Blake's question, and I want to focus a little on the key infrastructure constraints. Mr Chanda, you have intimated that data centre demand constraint could delay other infrastructure projects, like electrification projects, especially because they are all competing for the brownfield land close to the grid. You also mentioned the issue of the grid capacity. Can you tell us a little bit more about that?

Arka Chanda: Sure. I think there are three dimensions to this. The first is land. The Teesside example that I mentioned is a concrete example of an area where a blue hydrogen project did not go ahead, partially because of a conflict in the land use, which ended up going to a data centre. These are all within the purview of local government, and it is perfectly within their authority to decide these things, but it is an example of where this is crowded out.

The other thing is that the land isn't always just for the data centre. If we are asking for data centres to bring online their own renewable generation capacity, that has a significant land footprint as well. We did some illustrative analysis for this. If we asked data centres to bring on their own renewable capacity—let's say we asked them to build their own onshore wind. That has a capacity factor of about 0.25, which means that for 1 MW you need four times as much, essentially, because the wind does not blow all the time, so to account for intermittency you need to build more wind capacity than you would if you were assuming 100% capacity factor.

To cut through all the detail, in our medium case you would need about 300 hectares of land to meet all data centre demand.[1] To put that in context, that is roughly all the quality solar and wind resource land that we have available in England. If you look at the high case, which is the 20 GW of installed capacity, you would need about 600 hectares of land of just onshore wind.[2] These are stylised and illustrative numbers, but 600 hectares is roughly two and a half times the size of Luxembourg.[3] If we wanted to do all this through onshore wind—of course, we could use a mix of technologies—there would be a significant imposition and a very large footprint in terms of land.

The second thing I want to pull out is labour. A lot of the jobs created by data centres are concentrated in the construction phase. At the same time, you will also need construction workers over the next five to seven years for a series of other major infrastructure and national building projects that are under way at the moment, including transmission infrastructure and new clean energy generation, as well as housing and a lot of other strategic national priorities. In the case of renewable generation and data centres, in some places it is very likely there will be a significant amount of overlap where you are looking for the same people and you are crowding out the labour market. Those are probably the two major factors here: land and labour.

Tone Langengen: I take your question but I would like to return to the basics here: we need AI. We need it, onshore, for national security. We need it for economic growth. It has positive benefits for climate in terms of the things we can do with it—modelling and so on. When you were talking about competing for grid connections, that is a sign that there is something we have not done right in building the grid, which we all know. The focus should be on how you can think about accelerating grid connections, and how you can use AI data centres as well as other things in a more innovative way to think about how you get more out of the grid rather than less. I think that is a much better way of seeing the question.

Q111 **Manuela Perteghella:** Why don't you tell me, then, how effectively initiatives such as the AI growth zones co-ordinate data centre demand with wider infrastructure and decarbonisation priorities?

Tone Langengen: I do not think it has happened effectively enough to date. There are some good examples. If you think about the first one that was announced, there was a huge grid connection available at Culham, but that was because we did not have a fusion reactor there any more so it was quite easy to get a lot of power. Some of the other ones are positive but they were already things that were in train and in process. The more we identify areas that are brownfield where we can do some interesting things, like thinking about small modular reactors—to your

[1] Correction from witness; about **300,000** hectares of land would be needed to meet all data centre demand

[2] about **600,000** hectares of land will be needed of just onshore wind

[3] 600,000 hectares, not 600

point on energy requirements and the land requirements for that, nuclear energy is a potential source that can give us a lot more energy in a much more compact space and we should be thinking about that. It is good for jobs as well and local communities are generally very supportive. There is more to be done in terms of making those growth zones a productive part of this.

The other point on electrification is that it requires us to make electricity cheaper. As I outlined earlier, I think that AI data centres can be part of helping to make electricity cheaper. Electrification also demands smart, usually digital solutions. If you think about electric vehicles, they use a lot of electric systems—and AI, if we are looking towards autonomous vehicles. The same goes with heating systems. If we are going to make those flexible, we need digital systems and AI to help operate them in the most effective way.

Q112 **Manuela Perteghella:** How confident are you that the AI growth zones will not contribute to speculative development?

Tone Langengen: That depends on how it is done. Speculative development is what is happening now in terms of how developers—and they are kind of forced into this because the lack of grid connections means that everyone will try to hog the land that is close to potentially getting a grid connection. It is a scarcity problem. I do not think that is a result of the AI growth zones. If the AI growth zones are right they can help fix that by targeting and pulling data centres into clusters in the right areas, or in corridors where we think they could work well.

Adam Eaton: To take us right back, my colleague Mr Chanda would never like to see a data centre in the UK ever again. One of our challenges here is that there is demand being pushed through the system that is driving the requirement for data centres. How we build, operate and support those data centres in the UK is up to Government. It is up to us as operators to work with the Government. It is up to us three here to work with the Government and to work with operators to deliver those data centres. We are satisfying a demand.

This is an old report, but by 2024 there were more than 5,000 AI companies driving £23 billion or £24 billion of annual revenue, and it is generating a significant amount of tax revenue for the UK. There is a huge opportunity for us to develop data centres in a responsible way and meet the demands that are being driven through, if we deliver them in a responsible way.

Q113 **Manuela Perteghella:** How can the Government better align energy, land use and infrastructure planning, in your view?

Adam Eaton: That is a good point. One of the challenges we have with the grid connections that we have spoken about is that there are ghost projects within those grid queues. We have been operating data centres now for more than 15 years, so we are a solid data centre operator who

have been in the industry, working with customers, from very small to larger AI data centres now. There are plenty of people in that queue who see a piece of land and think they can put power to it and then sell it for a higher price later on. There is an opportunity to go through that queue and strip out the ones that are not real. Almost to Mr Chanda's point about a sevenfold difference between the bottom end and the top end of what the power requirement in the future could look like, if we start to get some clarity around that data it will help us develop the data centre landscape in the future.

Arka Chanda: To quickly respond, most of my points and where I stand are less about completely abandoning the UK Government strategy to build data centres and more about doing it correctly and on our terms.

Adam Eaton: I think that is the correct response. From an operator perspective, we are looking to work with local councils and the UK Government to develop the frameworks and the policies that allow us to meet the needs of the UK—the environmental needs—as well as the needs of the operators and the customer demand.

Q114 **Sammy Wilson:** I take the view that you have expressed, Ms Langengen, that we need data centres. However, I do have some difficulty when you say, Mr Eaton, that data centres are built in a sustainable and environmentally friendly way. You quoted the fact that you use brownfield sites. But we have already seen—Mr Chanda has quoted them—some of the other environmental impacts of data centres. For example, if 70% of your energy is from wind use, then there are huge demands on sensitive areas of the environment for building wind farms. I can think of some in my own constituency, which I have cited in other evidence sessions, where upland peatland areas are being devastated to produce energy that you can say is green and renewable but nevertheless has environmental impact.

Do you accept that if we are going to have these centres, we have to be honest about it and say, "Look, they make demand on resources, whether it is land resources or water resources, which do have detrimental effects on the environment"?

Adam Eaton: For clarity, it is 17% of our energy, not 70%, that is through renewables. We are connecting to the grid. We are consuming the energy from the grid. From a VIRTUS perspective, we do not have any behind-the-meter gas generation. In those instances, where that renewable energy has come from has been approved and has been through the various planning processes to create those opportunities for renewable energy so that we do not have to use coal or gas to power those data centres.

Q115 **Sammy Wilson:** Nevertheless, it does have environmental impacts—

Adam Eaton: And I think it is really important that we understand as a whole, as the UK, where that energy is coming from and ensure we are building those renewable sources sustainably.

Q116 **Sammy Wilson:** Ms Langengen, you have indicated that we need to look at changes in planning, the priorities we give for grid connections, and so on. If this Committee were to recommend, "Look we've got to try to make this process as painless as possible," what changes are you suggesting that we need to the planning system and the priorities when it comes to grid connection—who should lose out, for example—in order to facilitate the demand for data centres?

Tone Langengen: You raised a very important point about land use, which I am sure you all spend a lot of time thinking about. The reality is we are going to build data centres, we are going to build homes, we are going to build all these things that will have an impact on our natural landscape; that is obviously the case. The reason I was talking about how you could use AI growth zones better and how you could use strategic planning better is that I think that there are opportunities for the Government to better shape how we grade different types of land.

A good example of this is in Spain. When it came to renewables, they looked at grading different land across the country for how environmentally sustainable development would be, or how much of a problem it would be. That makes it easier to build in areas that you deem it less problematic to build, and that is something the Government can do to help shape. It comes back to this point that there is limited information, and limited shaping and incentives in terms of thinking about where you place data centres, how you provide the grid connections to those areas, and how you plan to create the reinforcements that are needed.

In terms of grid connection, I will emphasise what I said earlier: I think we can get much more out of the grid much more easily than we do right now if we are just a bit more innovative about how we think about providing connections. For instance, Octopus Energy could work with a data centre provider that accepts a less firm connection, which is less of a problem for the grid, but use consumer flex to make sure that the data centre gets its uptime. There are models out there. I just think that we need to be more proactive, and the Government need to be more proactive, by providing better data and making Ofgem happier to take some of these risks to make this happen and make the impact less significant.

Q117 **Sammy Wilson:** Can the data centres accept that kind of flexibility, or would it mean—as I think Dr Savage indicated—that you turned on the generators more often than you would have done had you not had that connection arrangement?

Adam Eaton: This is a technological advancement in the way that data centres operate. We have spoken about behind-the-meter gas generation but there are other behind-the-meter solutions, such as battery solutions and fuel cell solutions. It is not necessarily practical today, but we are certainly seeing it in the US. There is a large data centre out there that is

being run predominantly on batteries, or on grid plus batteries, and it flexes up and down to use the batteries to support.

That is where the opportunity is with the flexible grid that we are talking about. Where we need to shave the top piece of demand off, we drop on to fuel cell usage or battery usage, because neither of those is 24/7 baseload; they just do not operate that way, but you can create a flexible solution. The opportunity for the operator is to work with our customers to understand their demand profile, and then to work with the likes of Octopus and the other providers of energy solutions to see how we can clip and use other behind-the-meter solutions to support that.

From an industry perspective, that is very much front of mind in what we are looking to do—to work with the energy providers and with the grid, because we are very conscious of the rhetoric in the public environment and we need to work responsibly to deliver those data centres. We really do. *[Interruption.]*

Chair: I thank our panel very much indeed for the evidence we have heard. We have come to the end of the first panel anyway, but as Members will hear, the bells are going because we have a Division. I will bring this session to a close and Members will go away for, I think, as many as three votes, so we will probably pause for about half an hour and then move on to the second panel. Mr Eaton, Ms Langengen and Mr Chanda, thank you very much indeed.