Official Report
Aithisg Oifigeil

DRAFT

Climate Action Committee

Comataidh Gnìomh air a’ Ghnàth-shìde

Thursday 29 October 2026

Session 7

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Pàrlamaid na h-Alba

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CONTENTS

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DECISION ON TAKING BUSINESS IN PRIVATE 1
ENVIRONMENTAL IMPACTS OF HYPERSCALE DATA CENTRES 2
SUBORDINATE LEGISLATION 55
Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Amendment Order 2026 (SSI 2026/266) 55

CLIMATE ACTION COMMITTEE
7th Meeting 2026, Session 7

CONVENER

*Stuart McMillan (Inverclyde) (SNP)

DEPUTY CONVENER

*Ariane Burgess (Highlands and Islands) (Green)

COMMITTEE MEMBERS

*James Adams (North East Scotland) (Con)
*Claire Baker (Mid Scotland and Fife) (Lab)
*David Barratt (Cowdenbeath) (SNP)
*Martyn Day (Falkirk East and Linlithgow) (SNP)
*Sanne Dijkstra-Downie (Edinburgh Northern) (LD)

*attended

THE FOLLOWING ALSO PARTICIPATED:

Professor Hannah Daly (University College Cork)
Kat Jones (Action to Protect Rural Scotland)
Ronan Kelly (Digital Infrastructure Ireland)
Rosi Leonard (Friends of the Earth Ireland)
Kim Pratt (Friends of the Earth Scotland)

LOCATION

The Robert Burns Room (CR1)

Scottish Parliament

Climate Action Committee

Thursday 29 October 2026

[The Convener opened the meeting at 09:24]

Decision on Taking Business in Private

The Convener (Stuart McMillan): Good morning, and welcome to the seventh meeting in session 7 of the Climate Action Committee. Ariane Burgess joins us remotely. Welcome, Arianne.

Agenda item 1 is a decision on taking business in private. Do members agree to take item 4, which is consideration of a draft report on our pre-budget scrutiny work, and item 5, which is consideration of our approach to the "Scottish National Adaptation Plan: Annual Progress Report 2025 – 2026", in private?

Members *indicated agreement*.

Environmental Impacts of Hyperscale Data Centres

09:25

The Convener: Agenda item 2 is the first in a series of evidence sessions as part of the committee's inquiry into the environmental impacts of hyperscale data centres.

Before I introduce our witnesses, I will say a few words about the inquiry, our approach to which the committee agreed on 17 September and 1 October. Our aim is to find out about the environmental impacts of the operation and construction of hyperscale data centres in Scotland. We will look at aspects such as water consumption, air quality, noise pollution and energy use, including for any back-up generation. We are also interested in the impact of growth in the sector on Scotland's ability to meet its carbon budgets and how it will affect the climate change plan. Specifically, we want to know what systems should be put in place to mitigate any negative impacts on the environment, as well as what Scotland can learn from other countries.

We will gather information in three ways. First, the committee is collaborating with the Economy, Tourism and Energy Committee to run a call for views. I encourage people to share their views on the issue with us. Details can be found on the committee's website.

Secondly, members of the committee recently visited a data centre in North Lanarkshire. A visit to the DV1 site, which is run by DataVita, allowed members to see how a data centre operates.

Thirdly, we will take evidence from experts across three meetings. In the coming weeks, the committee plans to take evidence from witnesses with expertise in the technology sector, sustainability, emissions and heat. Today, we will hear from a panel of witnesses with environmental backgrounds, after which we will take evidence from a second panel on the experience of data centre development in Ireland.

Before we do that, I emphasise at the start of our inquiry that the committee wishes to understand more about the environmental impact of data centres. At this stage, we are gathering information that will be shared with the Scottish Government in advance of its producing national planning guidance. In other words, we are not engaging in the scrutiny of individual planning applications, which are a matter for local authorities.

I welcome our first panel: Kat Jones is the director of Action to Protect Rural Scotland, and Kim Pratt is a senior campaigner at Friends of the

Earth Scotland. Thank you for your engagement with the committee.

Colleagues have quite a number of questions, but I will begin with a couple of quick ones. First, should we have data centres in Scotland? Secondly, should we have hyperscale data centres in Scotland?

Kat Jones (Action to Protect Rural Scotland): It is good to start with those questions, so that we can get to the bottom of the difference between the data centres that we have in Scotland at the moment and the data centre applications that are coming into the planning system just now.

Obviously, data centres do all sorts of useful things in the economy, such as storing our national health service records, as keeps being said, and facilitating online banking, cloud computing and so on. That is all done with data centres that are of a reasonable size. At the moment, the average data centre in the United Kingdom has a capacity of 6.2MW, which is quite a lot bigger than it was last year. I think that that is the average for 2026—or perhaps it was 2025. The average for the year before was much smaller, at about 2.2MW. The average capacity of a data centre in the European Union is around 5MW.

That is the average size of data centres, of which there are a lot—there are hundreds of them covering those sorts of issues. What we are really concerned about is the ones that are coming into our planning system just now. The smallest one that we have seen has a capacity of 125MW, but we are told that that is to be expanded to 500MW, because it is in an artificial intelligence growth zone. The capacity of planned data centres goes all the way up to 1,000MW. They are absolutely immense, and they are not for things that are useful for the economy. They are for frontier artificial intelligence models—the models that the chief executive officers of the biggest AI companies in the world say are going to kill humanity. I am not saying that I believe that, but that is what is being said by the people building those models, and that is what those data centres will be used for.

Thank you so much for the question, convener, because that is an important distinction to make at the beginning.

09:30

Kim Pratt (Friends of the Earth Scotland): I agree with what Kat Jones has said. The data centres that we have in Scotland at the moment help us to run the internet and are used for data storage. They are a completely different type of development to the AI data centres that are being proposed. There are 23 proposed AI data centres, and, if even one of those data centres was built, it would have national-level impacts, particularly around energy and climate, and there might be other impacts that we do not understand well yet. The drive for AI data centres is coming from a small set of US technology companies that have led a rapid expansion of data centres across the world, and that process is now coming to Scotland. That is what we are looking at.

To give the committee an example of how big those data centres can be, the application at Chapelcross would use around 9 TWh of power, and the current gas-fired power station at Peterhead would produce around 10 TWh of power if it was on all day, every day. We are talking about developments that are on the scale of needing a whole power station to supply them.

The Convener: The Scottish Government has set 50MW as the threshold for hyperscale data centres. Is that an accurate figure?

Kat Jones: It is worth looking at what Spain has put in its royal decree in the past couple of days. Its cut-off point for the scrutiny of hourly matching in power purchase agreements and various other obligations is 1MW, but it is being reported that that has now been watered down to 10MW. I would say that 50MW is a very high threshold.

In the EU's most recent report, for 2025, the very largest of its five categories is 10MW-plus. That is what the EU calls a very big hyperscale data centre. That report shows that only 8 per cent of the data centres in the EU have a capacity of 10MW or more. It is good that the Government is saying 50MW, because that draws a clear line. We do not have anything in that region in Scotland, but it is fair to say that data centres that are smaller than that have impacts.

Kim Pratt: I agree with Kat Jones. If the Scottish Government considers setting 50MW as the threshold, it is important to bear in mind a few other details of its plans so far. Its guidance, which it plans to publish in December, cannot possibly consider the environmental impacts fully. So far, we know that 23 developments are being proposed, but only two have produced environmental impact assessments, and those are incomplete—I can explain later why we think that. There is currently a lack of detail around the environmental impacts of those data centres, and there is no real understanding of their cumulative impact. That is a far more important issue to focus on.

The Convener: How should a green data centre be defined, and what should a green data centre have to be shown to do when a planning application is made?

Kim Pratt: These developments are so big and would use so much energy that they cannot

reasonably be considered green. Building even one of these data centres would have national consequences.

I will talk a little bit about energy, if that is okay. In terms of energy demand, Friends of the Earth Scotland submitted a couple of graphs for the committee to look at. Figure 1 in annex B shows that data centres will increase Scotland's demand for fossil fuels. In 2024, we used 26.5TWh of electricity in Scotland. Over the coming decades, we plan to use less fossil fuel energy and more electricity for heating and transport, which means that we will have to significantly increase our level of electricity generation. A plan is in place to rapidly scale up renewable energy deployment to meet that demand, even before data centres enter the picture. By 2030, Scotland's electricity consumption will jump to 94TWh of power due to the rapid expansion of renewables. AI data centres would add an extra 80TWh of power on to that figure, almost doubling it.

There are only two ways to get that amount of extra power. One is to expand renewables, but we are already planning a major expansion, so doing even more on top of that within a short timescale is not realistic. The only other way to provide the additional energy that data centres need is from fossil fuels, and that is not currently accounted for in the environmental impact assessments of those AI data centre developments.

Kat Jones: We have done quite a lot of work on that element of national planning framework 4. Green data centres are a specific element under national development 12, which relates to the digital fibre network. We looked at the greenhouse gas impact analysis, which said that the policy of green data centres would have a "negligible impact" on our greenhouse gas emission levels. We were very surprised at that, because we know how data centre developers frame their applications, which is to say that they are at national development level.

We looked into the analysis further and found that the reason that it reached that conclusion was that it was looking at the data centres that would be needed to support a better and faster fibre network. Essentially, it was saying that, if we had a faster fibre network, people would use their devices more. They might work from home more, because they would have a better connection, and there would be more video conferencing and so on. As a result, there would be an increase in data centre use and device use, and the marginal increase in data centre capacity would support that while the impacts would be offset by people travelling less to meetings and so on.

The conclusion from our analysis of what was really meant by that policy, which is called green data centres, is that it was intended to cover literally only a small increase in data centre use for existing purposes. It was not intended to include AI hyperscale data centres, which can be up to 100 times larger.

The Convener: Thank you. I am conscious that I am over time with my questions, but I will ask one more. What would a responsible hyperscale data centre actually look like?

Kim Pratt: We have a choice in Scotland. It is clear that these hyperscale data centres have huge environmental impacts, particularly around energy and climate, that cannot be mitigated. There is also the impact of chemical pollution. If you decide to build these AI data centres at any scale in Scotland, you will have to think about what we will not do in Scotland. What front-line services will we have to cut? If we have these AI data centres, what activities will we have to stop or scale back in order to accommodate the associated carbon emissions and still meet our carbon budget? Alternatively, we can decide that they will have too much of an impact on Scotland, that they have no benefit and that we should not build them here.

Kat Jones: What we are really asking is that work be done to investigate the answer to that question. At the moment, we just do not have the information. After all, these are new things—no AI data centres have been built yet in Scotland. They are only just starting to be built in England, and none has been completed. The biggest data centre that we know is operating anywhere in the world is Colossus 2, which has a capacity of 946MW—it is in Memphis and is run by Elon Musk. The one at Chapelcross, for which planning permission has just been applied, would be bigger than that, at 1,000MW.

These things are new and we do not know about them, so we are asking the Scottish Government to properly implement the pause that was voted for by the Parliament; to carry out a proper analysis of the impacts on the grid, on communities and on the climate; to look not only at their strategic impact but at taking a strategic approach that would cover what we actually need these for and how Scotland would benefit, if at all, from them; and to bear all of that in mind when writing the guidance. We do not think that this is something that can be rushed out by Christmas. The work actually needs to be done, and these questions cannot be answered without the research being undertaken.

The Convener: Thank you very much. I call Ariane Burgess.

Ariane Burgess (Highlands and Islands) (Green): Good morning. I am sorry that I cannot be in the room with you today. In fact, you are probably happy that I am not there.

I have a couple of questions, the first of which is for Kat Jones. How much of a role do you think that communities should have in developing the thinking and the guidance that, as you have just mentioned, the Government is bringing forward?

Kat Jones: I am sorry—I did not catch what you said at the beginning of the question. Can you repeat it, please?

Ariane Burgess: How much of a role do you think communities should have in developing the guidance?

Kat Jones: What I have seen over these past few months, from being in touch with these communities and advising them on the planning aspects, is that they have become total experts in this area. Experts, of course, have to live somewhere, too, and there are data centre experts, grid experts and other engineering experts living in these communities and contributing to the work that is being done on the planning aspects of the data centres that they are dealing with. If you want to know who, in Scotland, has that expertise at the moment, it is these communities, and they know their stuff.

Civil society and the local communities have to be consulted on the guidance and any strategic approach that is taken. In that respect, I would mention the letter that came out from the Government yesterday, which said what it is doing on this issue and made it clear that it is talking just to Government agencies such as the National Energy System Operator, the Scottish Environment Protection Agency and others. I think that it is missing where the actual expertise is. It really has to go wider and carry out a proper consultation.

Ariane Burgess: Thanks for that. Kim, do you have anything to add? If not, I will go on to my next question.

Kim Pratt: Yes, I would just like to add something quickly. I agree with Kat Jones, and I think that we should look to America, which has seen a greater expansion of data centres than anywhere else. The centres were imposed on people without giving them a proper say, and we are now seeing a big backlash on them across America.

I also think that an opportunity has been missed here. The people we are talking about are those who best understand the local impacts in their area—for example, on the local wildlife—and who can tell us what those impacts will be. Therefore, they should be involved in the conversation. We recommend that the committee speak to people from local communities as part of its inquiry.

Of course, it is not just the local communities that will feel the impact from hyperscale data centres; people all across Scotland will also be impacted if they are built, and everybody deserves to have their say. They will have profound impacts on our energy systems as well as our climate. As I have said, everyone in Scotland deserves a say, and that means a national consultation.

Ariane Burgess: Thank you.

Yesterday, the UK Government published its data centre covenant, which sets out five tests that data centres ought to meet before receiving additional UK Government support. Have you had time to look at that document? If so, do you have any reflections on how we might have a similar agreement in Scotland?

Kat Jones: I have had a look at it, and I am extremely concerned about the fast-tracking of grid connections that is referred to in that announcement. It says that grid connections for data centres will be expedited and that, in the meantime, they will be permitted to build on-site alternative generation—and that means fossil gas. We have been worried about that since we started working on it, because, given the size of the data centres that are being proposed, they cannot run on renewables alone and the grid cannot support all that extra baseload demand—it is basically the same level of demand 24/7. That has to come from baseload providers of energy, such as gas and nuclear, so we have been very worried about that.

Seeing that in an actual Government report was a bit of a shock, and I think that we should be extremely concerned about it, especially given what we know is already happening in England, where two data centres, Wapseys wood and quest park, representing a total capacity of 1.3GW, have been given permission to build on-site, behind-the-meter gas. That is just the start, because, once the data centres are built or get planning permission, there will be calls for them to connect to on-site gas because the grid connection queue will be so long.

Ariane Burgess: The recent announcement about Jackdaw comes into my mind, because it is domestic gas. Do you see a connection with Jackdaw being consented?

Kat Jones: I do not see a direct connection, but I see a direction of travel that I am really concerned about. Data centres have a level of demand for energy that fossil fuel companies will be really pleased about. It is also worth saying that the UK Government data centre covenant is lacklustre; there is not really anything to it—it just says a few things that are not very ambitious. The Government is hoping for a PUE—power-usage effectiveness—of 1.3, but the covenant just contains a load of things that are not very definite or tied down. The Spanish proposal is for a PUE of 1.15, so the Government really needs to look at the issue, because the covenant is not an ambitious

document in any way whatsoever. We know that it has not spoken to communities about it, because, only the day before yesterday, Spotlight on Corruption published a report showing that UK ministers had not met with any community groups or non-governmental organisations to discuss data centres. How is it supposed to be a covenant with communities, given that it is highly unlikely that the Government has actually run it past anybody?

Kim Pratt: I will add to Kat Jones's comments. Yes, we see a direct connection between Jackdaw and data centre developments. As I set out earlier, data centres are not included in our climate change plan, and, if they are built in Scotland, they will require additional energy, which, in that short a timescale, we cannot supply using renewables. That means greater reliance on fossil fuels, at least in the short term, which is not reflected in the developers' environmental impact assessments at the moment.

We recommend that the committee suggest that the guidance should require environmental impact assessments to use a UK grid carbon intensity factor to report carbon emissions, which would provide a truer reflection of the carbon impacts of data centres. I will give an example of the difference that that would make. The Chapelcross environmental impact assessment suggests that carbon emissions would be about 75 kilotonnes of greenhouse gases per year. However, if the UK grid carbon intensity factor were used instead to reflect the probable use of high amounts of fossil fuels, emissions would jump 20 times to 1.55 million tonnes of CO_2 per year, which is the same annual emissions as the entire NHS in Scotland.

Martyn Day (Falkirk East and Linlithgow) (SNP): What impact would hyperscale data centres in Scotland have on emissions?

Kat Jones: It is all about the cumulative impact. We heard from a NESO official, in evidence to the Economy, Tourism and Energy Committee, about the amount of data centre demand on the Scottish grid queue. Later, press officers corrected the figure to 8.9GW. We know of 7.3GW that is in the planning system, and we have another couple on a watch list, so that roughly all adds up.

That is an absolutely huge amount. If all those data centres were to go ahead, our peak energy use would triple. The electricity use alone—not including the emissions from the building lifecycle, the testing of the emergency diesel generators or anything else—would create 11 million tonnes of CO_2 a year. That is more than the emissions that are created by all domestic transport and shipping, including aviation, which, as you know, is the sector that accounts for the biggest share of Scotland's emissions.

In relation to energy and emissions, we are concerned about the impact of the diesel back-ups on air quality. We have considered the nitrous oxide emissions from a typical testing regime for the industry, as set out in one of the EIAs, and have cross-checked them against emissions from diesel generators. We found that one of the smaller data centres would have to have three 3.2MW diesel generators operating at all times during the working day just to run the testing regime that would be needed. If everything was added up, that would equate to 163 per cent of the top NOx polluter operating in Scotland at the moment, which is the Lerwick diesel power station.

Kim Pratt: I agree with what Kat Jones has said. I refer members to figure 2 in our submission, which shows that Scotland's total carbon budget—our entire emissions—for 2026 to 2045 will be 406 million tonnes of CO_2 equivalent and that, based on a UK grid carbon intensity factor, data centres would account for more than half of that figure over that period. That huge level of emissions is unaccounted for and would be impossible for Scotland to bear, because it would require us to cut huge amounts of services or miss our legal targets.

Martyn Day: Is there any potential for artificial intelligence to help us to reduce emissions, perhaps by optimising industry manufacturing processes or energy consumption in domestic properties?

Kim Pratt: We have to think about this in terms of net benefits. The impacts of data centres will be so huge that any potential small opportunities for efficiency gains will not result in an overall net benefit to society. There has been a lot of discussion about AI's future potential, but there should be a lot more focus on the impacts on people in Scotland today.

Kat Jones: There has been a study on that exact question. I do not have all the figures to hand, but I can provide them in a follow-up email. In general, the study found that there has been a huge amount of hype, in journal articles, in newspapers and elsewhere in the media, about AI large language models helping to solve the climate crisis. However, the only evidence that the study found of AI impacts on these kinds of processes came from machine learning models from specific industry-led or university-led research projects. The study compared the emissions from large language models with those from machine learning models. Large language models produce vast amounts of CO_2, whereas the models that are being used for useful work on these questions produce very small amounts—well, the amounts are not very small, because we are still talking about big data centres.

Martyn Day: I look forward to seeing more on that study.

Have you any thoughts on how we should monitor and assess the emissions from construction, back-up generation and electricity used over the lifetime of the data centres?

Kat Jones: At the moment, one of the main issues in Europe is the lack of reporting requirements for data centres. It is a no-brainer that data centres must be required to report on their environmental impacts. A starting point is obviously before they begin construction, and we are pleased to see that proposed data centres over 50MW are required to provide environmental impact assessments. There should also be requirements concerning, or at least consideration of, the impacts on the climate, water resources and other factors of smaller data centres, given their energy use.

I will leave it at that.

Martyn Day: Kim Pratt, would you like to add anything?

Kim Pratt: Yes. We would recommend that a UK electricity grid carbon intensity factor be used when assessing the carbon impacts of these data centres and that particular attention be paid to the cumulative impacts of the 23 proposals. The data centres are not part of the climate change plan, so any assessment of their impact on the climate change plan would be very useful.

The Convener: I have a question to ask before I bring in Claire Baker. Kat Jones, you mentioned NESO, which has given evidence to the Economy, Tourism and Energy Committee. NESO has suggested that siting data centres in Scotland could reduce constraint payments, lessen the need for investment in the transmission grid and, ultimately, reduce electricity bills. Is that accurate?

Kat Jones: At the same meeting, the committee heard from an academic called Callum MacIver, who said that the positioning of data centres in Scotland—not simply whether they are located in Scotland—matters. They have to be sited north of the constraint boundary. Currently, all the proposed data centres would be in the central belt, south of the B4 boundary, where most of the constraints occur. In fact, a report from Montel said that 87 per cent of constraint payments are due to generation north of that line.

However, the biggest issue with the claim that data centres will solve the issue of curtailed wind power is the fact that wind energy is being generated to decarbonise the UK. We are already laying undersea cables—I think that six are planned and two will be online by 2029, which is presumably before any of these data centres would be built and operational. Those cables will carry renewable electricity. It is basically a timing issue: the renewables are coming online before the transmission infrastructure, which will be coming online shortly. Up to 12GW of transmission capacity is planned to be built over the next 10 years or less. That means that, if we are building data centres here, that renewable energy, which has already been factored in to UK decarbonisation plans, will not be available to support those centres. Curtailed wind is being thrown out there as an issue, but the matter is being resolved.

Kim Pratt: I agree with Kat Jones that that is a red herring. Developers like to suggest that they can help to resolve the issue, but there are several reasons why that approach will not work, as Kat Jones has set out. The main reason is that the UK and the Scottish Government have a plan to fix the bottleneck between Scotland and England by 2029. Even if you approved a data centre today, it would take three years to build it. Therefore, by the time the data centre was built, the problem would have gone away.

Claire Baker (Mid Scotland and Fife) (Lab): I will try to unpack some of this.

We have to consider why we are having data centre expansion in the UK. Governments will argue that most of our data is not held in the UK, so essential data, whether it relates to defence, health or other things that we value, is not stored within the UK. We do not have the capacity to keep it here. Other nations have expanded their data capacity, so we are potentially at the mercy of other countries that hold our data. Therefore, our Governments will argue that there is a need to expand our capacity within the UK.

You can be critical of the UK Government's position if you want to be, but it has a strategy in place. You might disagree with its strategic approach, but at least there is one. In Scotland, as you mentioned, we have a number of active applications but there is no such approach.

10:00

The Scottish Government has committed to creating planning and spatial guidance by the end of the year. Kat Jones, you said that that timescale is challenging. Do you have confidence that the Government can do that in that time? If you think that the Government is going to approve or create some kind of plan that will allow the development of data centres in Scotland, what safeguards would you like to see in the updated guidance?

Kat Jones: I will start with the first section of your question, which is about the sovereign AI issue. I will need to write to the committee in a bit more depth, as I do not have such a good understanding, but I know that the European

Union is extremely concerned that all of our data and the tech that we rely on is American and is owned by America. There is a law that allows America to access data in an emergency, which means the data is not necessarily safe if, let us say, America decided to try to access it. That is my understanding, but I will need to get back to you on that.

Secondly, the sovereign idea is strange considering what is happening with the DataVita data centre at Chapelcross, which is a co-location for the information of Glasgow City Council and North Lanarkshire Council. Our information is held in a data centre in Scotland, which is obviously good, but the centre says that it has now contracted all of the capacity for its AI growth zone to CoreWeave, which is a US company. We would like to know more about why it is doing that. If this is all about our data being here, why is that company doing that? If it is okay, I will write to the committee with more information on that.

On the timescale for the Government's proposal, there is a substantial amount of work to be done to look into all of the issues. The committee knows of our concerns. Sovereign AI is not understood. We have to take a strategic approach to considering all the impacts, and that needs to come before any guidance. A proper amount of work has to be done, so I do not want it to be rushed through. It needs to be consulted on.

Claire Baker: You mentioned the lack of consultation with communities. You referred to the letter that we got back from the minister, which talked in broad terms but did not give a direct route for communities to engage. Have your organisations had any discussions with the Government?

If the Government decides to approve data centres in Scotland, or if it gives a mechanism for them to be approved, that will have an impact on our carbon emissions. Judging the carbon emissions is not built into the planning. Therefore, what would development in that area mean for the carbon targets that we are currently working with? Has the Government engaged with you on that?

Kat Jones: Not much. We have had two meetings with officials in the planning department, but the last one was on 31 July. Since then, we have not been able to meet with them, despite asking. We had a look at how many letters we have written to ministers to ask to meet—it is eight. We have not had a single meeting with a minister. We did that work because of the Spotlight on Corruption report, which encouraged us look at what is happening in Scotland as opposed to the UK. I asked community groups, and they have asked repeatedly to meet ministers and have not had any meetings either.

Kim Pratt: On your point about security, we believe that AI data centres will not meet security needs in Scotland. As Kat Jones said, they are being developed by US tech companies, which will have access to and control of the data. An important question that the Scottish Government needs to answer is how will people in Scotland be protected if they are using the AI data centres in Scotland?

We think that the guidance will be useful, but it is not nearly sufficient to understand the impacts of data centres. Several steps need to be worked through to ensure that the process is legitimate and democratic. The first step involves understanding the impacts properly. We know that developers are already underestimating the carbon impacts of data centres. A lot could be done on heat, on PFAS—perfluoroalkyl and polyfluoroalkyl substances—and chemicals, and on the use of critical minerals. All of that needs to be understood.

The Scottish Government should clearly set out the case for why it thinks that data centres are needed in Scotland. That should include what the impacts will be and who will be asked to bear them, and how the Scottish Government intends to ensure that people's bills will not go up if it allows the data centres to go ahead. The Scottish Government also needs to set out how data centres will be included in our climate change plans, our circular economy strategy and our energy approach.

Once that has been done, there needs to be a national consultation in which people are allowed to have their say in a free and informed way. An example of where that has already happened was the consultation on fracking in 2017, when the people of Scotland were consulted on the issues. That approach needs to be followed again. All of that has to happen before decisions are made on data centres in Scotland.

The Convener: For clarification, when you reference data centres, do you mean hyperscale data centres, not others?

Kim Pratt: Yes.

Claire Baker: I was going to ask whether there were parallels—fracking came to mind. Would the planning process that you have both said you would like be unique to hyperscale AI data centres, or are you aware of whether there are equivalent planning processes that are as detailed or intricate?

Kat Jones: We are very clear that the Scottish Government has limited leverage to deal with the problem. For example, NESO will be given grid connections, which are not within the Scottish Government's powers, as it is a UK Government

responsibility. Everything that is related to energy is not within our powers.

For Scotland to be able to deal with the potential issues that are coming down the road, it has to be done through the planning system and the guidance. At the moment, we are saying that we should pause until the guidance is in place. Once the guidance and strategy are in place and once we have decided what Scotland's approach is, the planning system can be used to deal with it. As soon as one data centre gets planning permission, we will lose control of our strategy, because the centres are so big that even one would completely blow apart our climate targets.

Claire Baker: The Government has previously argued that it is for local authorities to make decisions and that it will be criticised if it starts to give central direction. Do you agree with that? How can you deliver a strategic view when local authorities will make decisions?

Kat Jones: The Government does that all the time: it provides the framework and local authorities make decisions. We think that it is very important that local authorities take decisions on the developments. However, they need to have the right guidance. Two local authorities have agreed motions to ask the Scottish Government to put a pause on data centres, so that they can have the guidance that would help them to make decisions, because the decision-making framework is not there at the moment.

Kim Pratt: I agree with Kat Jones. I would add that local authorities are being asked to consider one or two applications in their area but they do not have the oversight of the cumulative impact, so they need national direction.

Claire Baker: I have a final question about one of the aspects that constituents are concerned about, which is noise pollution. Do we have an understanding of what impact the noise from hyperscale data centres would have on local communities?

Kat Jones: Again, it is instructive at look to America, because that is where data centres have been around for the longest and where people have been interacting with them. The longer-term impact of the data centres is evident. A recent *British Medical Journal* article refers to noise in particular. It says that the unrelenting noise can:

"disrupt sleep, affect mental health and cognitive functioning, and lead to overall poorer quality of life and wellbeing".

Data centres have massive health impacts, which we recommend that the committee consider. We would like the committee to speak to NHS Scotland about it and to look at what has happened in America.

Claire Baker: Kim Pratt has set out the impact. Could it be mitigated?

Kat Jones: I do not have much to add on noise, but I know that it is one of the primary issues that communities are concerned about, apart from diesel generators, which produce air pollution and noise. I think that it is a highly relevant issue.

Claire Baker: Kim, do you have any suggestions to make on mitigation? You have identified the problems with noise. In America, has anything been done to mitigate that? Is there any way to prevent the negative impacts?

Kim Pratt: I go back to what I said earlier: the developments that we are talking about are so large that it is difficult to mitigate their impacts to a certain level.

David Barratt (Cowdenbeath) (SNP): Claire Baker asked about consultation on the guidance once it has been published. I submitted a written question on that, which I expect to be answered in the next couple of weeks. I was looking for post-NPF4 precedents. The guidance on 20-minute neighbourhoods, which came out after NPF4, was consulted on. I think that that is a helpful precedent.

Kat, your written submission calls on the Government to provide a statement of need to go with any new planning policy and to tightly define the term "green data centres". How should the statement of need be framed? Should it define our domestic demand, or should it identify opportunities to meet international demand?

Kat Jones: That call was related to the fact that, at the moment, green data centres are seen as national developments, so the need for them does not have to be justified. The Government ought to look strategically at what data centres are for, what benefit they bring and whether we want to use such large amounts of energy for data centres, given that other industries, such as housing and the sector that is involved in the transition to a green economy, are concerned about the impact that that might have on their energy use.

David Barratt: That leads on to my next question, which is for Kim. In Scotland, we have existing capacity of around 30MW to 40MW, but some individual applications are for data centres with a proposed capacity that is many times that. Do we have an understanding of exactly what the proposed hyperscale data centres would be used for? How easily can that be controlled through regulation and planning?

Kim Pratt: We do not have a very good understanding of that. It is a good question, which the committee should put to the Scottish Government.

The drive for AI data centres has come from US tech companies, which are incredibly powerful. Their power has been shown by the fact that AI data centres have been pushed on to agendas in countries throughout the world, and that is now coming to Scotland.

Scotland has a weak planning system, and the chance of such proposals being pushed through means that Scotland could face a future in which AI data centres could increase inequality and have mounting health and environmental impacts on its people. It is therefore really important that we consider the issue before any decisions are made.

Kat Jones: It is impossible to know what the proposed data centres, which will be used by the biggest AI companies in the world, will be used for. Given that the Scottish Government has an AI strategy that includes the concept of ethical AI, a good look needs to be taken at whether we can say what the proposed data centres would be used for.

For example, when Anthropic produced its Claude Mythos model and the US Government said that it was too powerful to be used outside the US, two giant Anthropic hyperscale data centres in Europe suddenly switched to providing services only for the US. In other words, they sat on EU soil but were used only for the US. That makes a mockery of the sovereign AI argument, because they were, in effect, outposts of the US, and they could have been being used for absolutely anything. In Scotland, where we have ideas about being an ethical country, we should consider that.

David Barratt: Many questions probably need to be answered before you answer my next question, which relates back to the statement of need and defining exactly what data centres will be used for. There are probably two different answers, depending on what the answers to those other questions are. Data centres operate in a very globalised market, so does it matter where they are located? I ask that to be devil's advocate, to an extent.

10:15

Kat Jones: The answer is no, because, when AI is being trained, the location does not matter. The reason why there are so many data centres in Slough is because it is near the financial centre of London. It is near to the businesses—the banks. The data centres are there because of what they are used for. When you are just training AI, the latency—the time that it takes for information to travel down a fibre-optic cable—does not really matter, so the centres can be anywhere. That is why we are seeing data centres coming to Scotland, and it is how we know that they really are only for training frontier AI models. They are not for the kind of stuff that needs low latency.

Kim Pratt: Another reason why developers are interested in Scotland at the moment is because they see the country as having a surplus of renewables that they could use. However, that is not the case. We are a country where a quarter of our households live in fuel poverty. We also have a climate change plan, which means that we plan to use that energy to heat our homes and decarbonise our transport, for example. That energy is not there for private data companies to use instead.

David Barratt: Whether surplus energy exists is a useful point for us to consider.

Is there a risk that, if we do not get the statement of needs that has been called for right, we will offshore our data centre use, which will either have no climate impact or will make the impacts worse, depending on where the centres are developed? For example, we could offshore our data centre use to countries that do not have renewables. Is that an argument?

Kat Jones: It is good to use the example of Edinburgh's academic expertise in AI. The University of Edinburgh hosts the UK supercomputer. We have two of the biggest useful supercomputers in the UK here, in Edinburgh, and we have massive expertise in the issue. That sector employs many people and is creating amazing research. If Scotland wants a thriving tech sector and wants to use the opportunities, we should invest in things such as the Edinburgh academic supercomputers to do research using the models that are there, which are much smaller and use an awful lot less energy for a lot more impact than is the case with the large language models of AI tech companies in the US.

Kim Pratt: Data centres are a global problem, and Scotland has the opportunity to be a leader in creating a new path to a more sustainable future for the use of AI. We could be at the forefront of that if we just take our time to make sure that it happens in a more responsible way. We cannot do that if the decisions are made now, before we have had the opportunity to consider the impacts and what the people of Scotland want and then to act on that.

David Barratt: That is a helpful final quote. I have noted what time you said it, so that I can go back and look at it.

James Adams (North East Scotland) (Con): I will ask about water use. How do you assess the potential impact of hyperscale data centres on water resources in Scotland, both nationally and at a local catchment level? How can high levels of water use in data centres be mitigated?

Kat Jones: With most of the proposed data centres, the developers say that they are going to be closed loop. We do not know enough about water use to scrutinise that, but we feel that the Scottish Government should be scrutinising water use in the analysis and research, because we know that the less water is used as it is recycled, the more energy is used—there is a close relationship there. There will be pressures on developers to use more water, because it will cost them less because of the energy.

There needs to be more scrutiny. However, we have not concentrated on that issue. In our work, we have concentrated on the energy side.

Kim Pratt: As Kat Jones said, many of the proposals would use a closed-loop water system, which would probably use less water overall. However, closed-loop water systems require the use of PFAS chemicals, which are sometimes known as forever chemicals, in their liquid cooling systems. It is important to note that neither of the environmental impact assessments that have been published gives details on PFAS or on how leaks or treatment of water that may contain PFAS would be managed.

PFAS is a very persistent man-made chemical that has profound impacts. It is carcinogenic and it is linked to developmental, hormonal and reproductive diseases. There are many sources of PFAS—AI data centres are not the only source—but this is an emerging public health crisis that we are just starting to understand in Scotland. AI data centres with closed-loop water systems could worsen that crisis if we do not correctly manage their use of PFAS.

James Adams: On that point, what information on water use and environmental performance should those data centre operators be expected to report publicly?

Kim Pratt: On PFAS, we would like them to state what chemicals they are using, to what extent and how they will manage them, particularly around leaks and discharge.

Looking wider than that, we would like information on their use of materials. We would like them to trace what critical raw materials they are using in their servers. Critical raw materials are materials such as nickel and copper. They are strategically important materials, but their supply chains are associated with human rights abuses and environmental damage on a global scale. Data centres will increase Scotland's demand for those critical minerals.

In fact, Scotland's recently published circular economy strategy recognises the need to reduce dependence on international supply chains of critical raw materials. We would like data centres to use a due diligence approach to understanding those supply chains.

James Adams: Kat, do you have anything to add on that point?

Kat Jones: As you mentioned the circular economy, I will say that the amounts of e-waste that would be produced is vast. We know that NVIDIA chips need to be replaced every five years, but they are being replaced more often because they create more power. A three to five-year replacement of the infrastructure will be a big problem for Scotland's waste ambitions.

The Convener: That takes us nicely on to Sanne's questions

Sanne Dijkstra-Downie (Edinburgh Northern) (LD): I was going to touch on e-waste, because we have seen recent press reports, most recently on the back of a white paper by the Basel Action Network, about hyperscale data centres potentially creating a huge amount of additional toxic e-waste. Servers, batteries and circuit boards, as you say, have a limited lifespan but, as I understand it, they are not currently produced with recycling or reuse in mind. Kat, you touched on the importance of considering e-waste. Do you believe that it is currently receiving enough scrutiny in the planning system?

Kat Jones: I do not, because it has not been mentioned in any of the planning applications that we have seen so far, and I feel that it is being ignored because many of the applications are coming in from companies that will not be bringing in the specific chips. They are getting the planning permission in order to sell it on, with the idea that the end user will fit the data centres out, so that decision making would be with the end user.

It is very difficult for us to scrutinise that, because we do not know who the end user is and what hardware they are going to use. The issue has received almost no scrutiny, and it could be a really big issue.

Kim Pratt: It is an important question. We estimate that these data centres would create an additional 19,000 tonnes of e-waste. To put that into perspective, Scotland's level of e-waste in 2023 was around 49,000 tonnes, so it would be around 40 per cent of the whole of Scotland's e-waste.

Sanne Dijkstra-Downie: How many data centres are you looking at for that quantification?

Kim Pratt: All 23.

Sanne Dijkstra-Downie: Okay.

Kim Pratt: The problem is the servers, which are burned through every couple of years. The Chapelcross EIA suggests that they would need to

be replaced every four years, but we think that the timeframe would probably be shorter than that and they would have to be replaced every two or three years. That would have massive carbon and waste impacts at a time when the Scottish Parliament is about to consider statutory circular economy targets to help ensure that we become a circular economy by 2045. The Chapelcross development would make that much harder to do.

We recommend that the committee require that the guidance consider the environmental impacts of e-waste, and that those impacts be presented more clearly in environmental impact assessments.

Sanne Dijkstra-Downie: You mentioned PFAS, so should forever chemicals be included in the guidelines as well?

Kim Pratt: Yes.

Sanne Dijkstra-Downie: Kat, do you agree with that?

Kat Jones: Absolutely.

Sanne Dijkstra-Downie: Thank you.

I have another question that is on a slightly different tack. Data centres generate a lot of waste heat. Kim, you mentioned earlier that there are opportunities to do something with heat—I think that that is how you phrased it. How feasible is it for the waste heat from data centres to be captured and used in heat networks?

Kim Pratt: Heat is an important resource. Think about your laptop and how hot it gets, then imagine that on the scale of a data centre. We are talking about huge amounts of potential heat.

Neither the Larbert nor the Chapelcross environmental impact assessment includes a heat and power plan, despite policy 19 of national planning framework 4 requiring major developments to have one. That means that, if any data centres are built in Scotland, we will potentially lose an opportunity to make the best use of the heat that they generate. We recommend that the guidance require environmental impact assessments to include a heat and power plan and that it be a requirement of the guidance that waste heat generated by those developments is used from day 1.

Kat Jones: As you probably know, heat networks are very few and far between in the UK. When data centres in the UK are involved in heat networks, the projects are usually pretty tiny. Recently, there were reports of a swimming pool being heated by a 50kW centre that is the size of a washing machine. The only heat network relating to a data centre of scale that exists in the UK is not yet built—it is proposed for west London. It would take 17MW of heat from two data centres and put it through a heat network for 9,000 to 10,000 houses that are proposed to be built.

As you probably know, heat networks cannot be retrofitted. They must be built in when houses are built and places are planned, as retrofitting them would be extremely expensive. In Europe, heat networks and data centres do work together. There are plans to build data centre heat networks in places such as Berlin. There is the potential to do that in cities that already have such heat networks in place.

The levels of heat generated by data centres peak in the summer, which is when you do not need heating, so that heat can only really be used for the baseload. That could be for hot water, swimming pools or industrial facilities. It comes out as low-grade heat, at around 20°C, but it needs to be pumped up to around 70°C to go into a heat network, which is a very expensive process. You need heat pumps to do that, and somebody has to pay for it. When you look at the economics of it, the heat that comes from a data centre is a low-grade waste product; it is not high-grade heat. You would need to invest in order to pump it out. Who would pay for that? Who would put in the heat networks?

It is unrealistic to think that any of the proposals in Scotland would be able to do anything for heat networks, because that has not been planned alongside any development. The data centres would be so big that nobody would want to build houses next to them anyway. Housing developers are worried about whether a data centre is planned near developments that they are planning.

My assessment is that, if you are really doing it seriously, data centre developments need to be planned and integrated into heat networks, as is the case in European cities, and that the data centres that provide the heat need to be part of that. The network that is proposed in London would have a capacity of 17MW; we are not talking about the amount of heat that would come from the data centres that are proposed in Scotland.

Sanne Dijkstra-Downie: That is helpful, and it touches on questions that I had on retrofit versus new build. I have one follow-up question. It is my understanding that, if you take waste heat from any supply, it does not need to be right next to where you are building. You have made the point about the nervousness about data centres being right next to new developments, but it is my understanding that waste heat can travel. Do you have any reflections on that?

10:30

Kat Jones: Heat can travel, but it is expensive to put in incredibly insulated pipes, and it loses temperature as it travels. That is the difficulty, even

with the data centres in Europe, because they must be close enough to cities and keyed into the biggest grid supply points for the energy, but then they are closer to homes, which will have an impact.

For me, it is about the scale of the data centres. We have to look at the scale, which is why we need a proper investigation into what scale would be beneficial for Scotland—if there is a beneficial scale—and how it would integrate with all the other ambitions that Scotland has for ethical AI, heat and this and that. We have to start from scratch. We cannot just take any one data centre and say that it could be made good enough. We need to decide what we want to do and how we can do it properly in Scotland. The minister has expressed the ambition to do it properly here, so let us do so.

Kim Pratt: I want to add one quick point on heat. I recommend that the committee speak to NHS Scotland about its concerns about heat and the microclimate around data centres.

Ariane Burgess: How well do the current planning policies address the land use impacts that are associated with large-scale data centre proposals? What should the Government be doing about the guidance on land use, food production, nature and such things?

Kat Jones: NPF4 covers all those things. However, the issue that we see with the data centres is that they are trying to make out that they are green data centres so that they get priority and do not need to make a need case. They are saying that they are part of national priority 12. The most insidious thing in the whole planning system is that the data centres are trying to get priority over other developments. Looking at it as a whole, when there is that level of demand—three times the energy demand of Scotland—you cannot say that all of those are priorities. That is just ludicrous.

Kim Pratt: These are very large developments and many of them would be wholly or partly on greenfield sites. Some nature impacts have been identified in the current assessments, but there has not been a comprehensive assessment of those impacts. We recommend that the committee speak to representatives from the local communities, to understand the impacts of the data centres, including the impacts that they would have on nature locally.

Ariane Burgess: Kat, you mentioned NPF4 and I note that, under NPF4 soil policy, which is policy 5, building on prime farmland is already restricted. Is that being applied in this case?

Kat Jones: I did not mention earlier the reason why we are seeing data centre applications for such unsuitable sites. We are talking about green belt land, grade 2 farmland, historic battlefields and sites that already have planning permission for 1,400 homes, which are all evidently terrible places on which to put data centres. I think that the reason for that is that data centres have been emboldened to feel that they are priority developments. You can certainly see, from what came out of the UK Government's budget, how much encouragement data centres are getting from the UK Government to come and build these things. I think that they have been emboldened to put in applications for places that are completely unsuitable. The unsuitability needs to be made much clearer, which is what the guidance must be about.

Martyn Day: I have two quick questions. Being mindful of the time, I will combine them. You have indicated how difficult it would be to adequately use the waste heat, but let us just assume that we were able to use it for a form of district heating. What safeguards would customers need in case the data centre closed or changed its operations? That is my first question. My second is on water. Scottish Water advised developers to consider alternative water supplies, such as treated waste water. How practical is that approach? I apologise for the two unrelated questions.

Kat Jones: Will you repeat the question on waste heat?

Martyn Day: Yes. Assuming that we were able to adequately use the waste heat coming from a data centre, what safeguards would we need for customers in case the data centre closed or changed its operations?

Kat Jones: You would have to speak to heat network experts, but, basically, when you run a heat network, you cannot have just one place serving the heat; it must be distributed, for exactly that reason. Another issue is that heat networks run for multiple years—perhaps 20, 30 or 40 years—whereas the data centres are not anticipated to have that long a life.

It is a good question, but I want to note that, in general, safeguards do not exist at the moment in Scottish policy systems. Specifically, the grid impacts are not covered by things such as the strategic spatial energy plan or NESO policy making. As I said in my written submission, when a data centre applies for a grid connection, it only needs to show that it has readiness requirements. It does not need to show a strategic need, whereas wind turbines, wind farms, battery storage and solar farms need to show alignment with strategy. That includes the clean power 2030 action plan, which is taking us down to net zero, and the strategic spatial energy plan, which has not yet been written. Data centres and demand connections do not need to show that, which I think is a legacy of the past, when you would never say

no to a demand connection, because it would be for a housing estate or a factory. However, there is now, in essence, infinite demand from data centres—apparently, there is 80GW in the grid queue for the GB network. This is an unprecedented situation that is not covered by policies, and, if it is not covered by UK or Scottish policies, we need to deal with it through the planning system as it is right now.

The Convener: Thank you very much for your evidence this morning. Kat Jones indicated that she would send further information to the committee, which would be much appreciated. If we have further questions, we will send them in writing.

I suspend the meeting briefly ahead of our next panel of witnesses.

10:37

Meeting suspended.

10:39

On resuming—

The Convener: I welcome to the committee our second panel of witnesses, who join us online: Professor Hannah Daly, professor in sustainable energy, University College Cork; Ronan Kelly, chief executive officer, Digital Infrastructure Ireland; and Rosi Leonard, data centre campaign lead, Friends of the Earth Ireland.

Thank you very much for joining us today and taking part in our inquiry. I also thank you for your patience, as the first panel overran slightly.

We have a range of questions. First, can you tell us about the history of the development of hyperscale data centres in Ireland? When did the developments begin to arrive, and what is the current state of affairs?

Rosi Leonard (Friends of the Earth Ireland): Hi, everyone. Can you hear me okay?

The Convener: Yes, we can.

Rosi Leonard: Great. Thanks for the invitation to be here. It is brilliant that the Scottish Parliament is holding these hearings now.

On your question, as you probably know, Ireland is now considered by the United Nations to be a cautionary tale when it comes to data centre development. The data centre industry really took off in Ireland around 2015, with data centres that were not necessarily hyperscale but involved co-location, which is very dominant here. In 2015, data centres used 5 per cent of Ireland's electricity, and they now use 23 per cent, which is the highest per capita rate in the world. Essentially, Ireland lacked a robust policy that took data centres into account in terms of clean energy strategy, emissions targets, the climate action plan, electricity prices and energy security itself. Those questions were not addressed at the beginning, and we are paying for that now.

What Scotland has done now, Ireland should have done in 2015, when data centres' energy usage reached 5 per cent, which was already very high. Data centre demand in Ireland has risen approximately 450 per cent over the past 10 years, and the demand in all other sectors has risen by only about 3 per cent. There has been an extremely unregulated system. We can talk about this later, but I think that Ireland has reached what we would say is kind of a red line in terms of data centre expansion, and I think that Scotland can learn from that.

Professor Hannah Daly (University College Cork): Thank you for the invitation to join you today. I am very happy to discuss Ireland's experience in relation to data centres.

I am an academic and a researcher. My expertise lies in Ireland's energy system and our climate policy, although I have worked previously in the United Kingdom, including on modelling that underpins the sixth carbon budget. That is the context in which I make my statements.

I have undertaken analysis of the impact of Ireland's data centre electricity demand on our statutory carbon budgets and on our fossil fuel reliance and on renewable energy. Some of the research that I have undertaken shows the growth in data centre demand that Rosi Leonard referred to between 2015 and now, and it also demonstrates that, over the past six years, the growth in data centre demand was greater than the growth in renewable energy demand. There is not a direct relationship between the two, but the scale of demand growth has meant that fossil fuels are remaining on Ireland's electricity system longer than they would otherwise have done.

The concentration of data centre demand in the Dublin area, in particular, has meant that more than half of electricity demand in Dublin and the surrounding counties is consumed by data centres. Those are unique developments in terms of the concentration of their electricity demand, and that has created a great deal of pressure on the local electricity network, which led our utilities regulator, the Commission for Regulation of Utilities, to issue strict new connection agreements in 2021. That is often referred to as a moratorium, but it was not a moratorium on new data centre connections. Rather, there was an imposition of strict new connection conditions, and I understand that only one new data centre has connected since then.

10:45

Nevertheless, the growth in electricity demand has been a result of the ramping of historically constructed data centres. The lesson from this is that the regulation needs to come well before ramping, because the impacts on the demand are bedded in in the years following any new regulation.

Last year, the energy regulator—the CRU—issued a new policy in relation to the grid connection agreements. The policy sets the conditions under which large energy users, such as data centres, may receive a connection to the electricity network, recognising the large pressure that existing data centres create on the electricity network and the electricity infrastructure. The policy requires that data centres construct onsite generation capacity or battery storage matching their maximum instantaneous demand, so that the data centres can fall back on onsite generation or battery storage when there is pressure on the local network. In practice, if we observe planning permission, this has meant that data centres are now being constructed with large-scale gas generation power capacity to be able to meet that need.

The large energy user connection policy also requires that, six years after their energisation, data centres match, on an annual basis, 80 per cent of their demand with new renewable energy generation that is generated in Ireland. I have undertaken modelling and analysis of the impact of this pathway on Ireland's carbon budgets, our fossil fuel dependence and various other statutory and policy targets. The scale of potential new demand in Ireland, which is similar to Scotland's potential new demand for data centres, would lead to a substantial increase in gas generation demand because of the six-year period before which data centres are required to bring in new renewables. There is also the fact that there is no requirement for hourly matching of demand with supply, as the renewables are required to be matched on an annual basis rather than on an hourly basis, and it is not full matching. I would be happy to share this analysis with the committee.

In summary, Ireland, as Rosi Leonard said, is somewhat of a cautionary tale. Even though our demand is not driven by hyperscale AI-driven data centres, it demonstrates what happens when a country leans into data centre demand growth to this extent without putting conditions in place to minimise the impact on carbon emissions, fossil fuels and electricity infrastructure.

The Convener: Thank you for that. You referenced a regulation from last year. If you can share that information with the committee, that would be very helpful.

Are the back-up generators at large-scale developments all fossil fuel based, or are they a mix of fossil fuel and the likes of hydrotreated vegetable oil?

Professor Daly: Back-up generators are typically diesel generators, or they might run on HVO. They can be multifuel. However, they might run for just a couple of hours a year—they are not generally required to be the primary energy source for data centres. What we are seeing in Ireland is that data centres are being constructed with large-scale gas-fired power plants, in the same way as they are being constructed in the US, because the local grid infrastructure simply cannot meet their needs. Those power plants would run either largely or entirely on fossil gas, as far as I can see. We already have one entirely islanded data centre in the Dublin area, which runs entirely on fossil gas. It does not have an electricity connection and it purchases renewable bioenergy credits from Germany, but these are not physically connected, so it buys credits somewhat like offsets.

I would add a strong caution in relation to HVO. HVO is seen as a renewable replacement for diesel, but, in effect, there is not enough sustainable resource to meet HVO demand at a large scale. Much of Ireland's—and indeed the UK's—renewable diesel comes from similar sources to HVO's. There is strong evidence that the supply chain could be contaminated by palm oil and similar feedstocks that are contributing to tropical deforestation, so I would not make any assumption that HVO is a sustainable alternative as a back-up generation fuel.

The Convener: I will bring in Ronan Kelly to answer the first and second questions.

Ronan Kelly (Digital Infrastructure Ireland): Thank you for inviting me. I am the chief executive officer of Digital Infrastructure Ireland. By way of background, I have spent 31 years working in Ireland's tech sector, so I have watched the evolution of the sector to the point that it is at now, where it contributes roughly 30 per cent per annum to the Government's corporation tax take for the whole of the Republic of Ireland—it is a significant contributing factor to that.

To talk to the origins and growth of the Irish data centre industry, one has to cast the lens back to the 1990s, because that was the beginning, when investments were made predominantly in the Dublin area to serve as the foundation for an evolving tech sector. That began with significant investment in a major fibre-optic network. Around Dublin, we have the M50 motorway, which is similar to the M25 around London—it kind of circles the city. On the periphery of the M50, a 16-duct fibre network infrastructure called the T50 network was built, and that network was woven in

and out of every major industrial park on that M50 route. Those industrial park locations are where the majority of the data centre facilities that are based near or adjacent to Dublin have been deployed, and that has resulted in a reasonable concentration of data centre facilities in the greater Dublin area.

Over the years, and particularly in the past 10 years, we have encountered a misalignment with Government investment policy on the national grid. We built the fibre infrastructure to attract the facilities, and they came as a result of that investment, and they continue to grow. However, 10-plus years ago, we put a pause on investment in the national grid, much of which was to do with the policies around doing less of everything to allow us to align better with our green targets that were coming from Europe. That included making less investment in the grid, so it was getting about €1.5 billion a year by way of investment, which is just about enough to keep the thing running but does not allow for any upgrade or expansion in capacity.

The sector continued to grow and workloads continued to evolve. I was delighted to hear both the previous witnesses make the distinction between co-location facilities, which tend to house the compute resources of organisations that are proximate to the facilities, be those private enterprises or Government agencies, versus the hyperscale facilities, which quite often just house compute resources that belong to the owner of that facility. Along the route of the T50 network, there is a significant concentration of co-location facilities, many of which have already secured the status of critical national infrastructure. Because of the workloads that they house, they have been deemed to be critically important.

The workloads have evolved over the years. Many of the data centre facilities in Ireland that emerged in the early 2000s began life serving up a means of software distribution and hosting some light compute workloads. The workloads have evolved significantly towards cloud-based workloads. Now, the vast majority of data centre facilities that are deployed across Ireland are responsible for hosting cloud-based workloads.

The number of AI-focused data centres that Ireland has deployed today is actually zero. What is the difference between a cloud-focused data centre and an AI-focused one? It is predominantly about the power density that is deployed in the data centres. Typically, we measure that by the number of kilowatts per rack of capacity that is available to drive the compute resources deployed within each rack, and many of these data centres would house up to 1,000 racks of equipment, depending on their size. Typically, a cloud-focused data centre would have in the range of between 5kW and 15kW of capacity per rack, but what we are starting to see now in the AI world is the on-ramp for an AI-focused data centre being predominantly in the range of 70kW per rack, and that is rapidly increasing to 120kW for the newer NVIDIA Blackwell 200 series chipsets and onwards up to 150kW per rack for the 300 series.

We are part of the European Union Data Centre Association, and I have sat in on its recent presentations. Recently, it invited NVIDIA to give a presentation, in which it talked about a roadmap towards 600kW per rack and a future density of 1,000kW—that is, a megawatt—per rack. The existing data centre facilities do not lend themselves to that sort of power density. The size of the grid connection that they have is not sufficient to support it. Equally, a data centre facility that has been designed for 1,000 racks could accommodate 10 of those future-state racks. You can see that Ireland faces some fundamental challenges if it wants to play a role in relation to the newer AI data centre facilities that are emerging.

It was fascinating to hear the earlier conversations around sovereignty, and I note that we are seeing a push from the European Union towards sovereignty. The EU has announced that Europe needs to triple the number of data centres that it has in order to maintain its sovereignty status and be competitive in relation to its international peers in the US and China. It has also identified a need to build seven AI gigafactories, which are data centre facilities that house in excess of 100,000 graphics processing units. When you equate that down to megawatt scale, that is basically an entry level of about 250MW, which eclipses anything that is deployed in Ireland at this point in time.

The way I look at things is that the world is at a time of transition with regard to digital workloads. The digital workloads that have serviced our societies for the past 20 or so years will continue to evolve, but there are newer, much more power-intensive workloads coming through that are predicated on the AI investment wave. Some of those workloads will be housed in dedicated AI data centres. However, equally, we will start to see smaller language models being used. Earlier, we heard reference to the concept of large language models, which are the very large compute deployments that have been used by the AI systems to date, but there are also small language models—or small large language models, as they are described. You will start to see enterprises applying their own AI workloads on their own compute resources, many of which will be in these co-location data centre facilities, and some of which will be in the hyperscale data centre facilities as well. That will put increasing upward pressure on the existing facilities with regard to power

demands, too. Therefore, grid upgrades are going to be required just to house what is already there today and to continue to service the growth.

I liken the situation to the transition that took place from the very beginning of the internet era, when we were on dial-up connections and we had limited time on the internet because other people wanted to use the phone and so on, to when we went to always-on broadband over copper networks and then on to fibre networks. Those changes fundamentally altered how people interacted with this new thing called the internet. If you go back to the start of that process, you will see that no one was able to predict with any degree of accuracy the ways in which we would all end up using internet and cloud-based services into the future.

The exact same situation exists today with AI. Nobody can accurately predict what is going to happen. We all have ideas on where it is going to be able to contribute towards society, and there are lots of ideas about where it is going to detract from society, but nobody can make those predictions with any degree of accuracy. However, we are starting to see some novel innovations that will help society, such as new antibiotic breakthroughs that have been fundamentally driven by AI. A lot of work cases are coming through, but the reality is that we need the joined-up planning to be able to support the facilities if we want Ireland—or Scotland, in your case—to be part of that next wave of technological advancement.

The Convener: Thank you for that comprehensive answer, Ronan. I will hand over to Martyn Day.

11:00

Martyn Day: What do the hyperscale data centres in Ireland do? Are they built to train AI models, do they simply facilitate the use of AI, or is it something else?

I ask Rosi Leonard to start.

Rosi Leonard: That is a really interesting question. I was listening to your earlier session, and, as I think some of the witnesses mentioned, it is very hard to know, because the companies themselves do not disclose that. We have the same issue regarding energy, emissions and water.

We have heard a variety of things about what some of the larger data centres in Ireland are doing. They are running AI operations for the companies that own them, but they are also doing some things that are quite worrying. For example, Microsoft has one very large data centre in Ireland. Professor Hannah Daly mentioned data centres that have significant gas facilities, and that is one of them—it has now built its own gas plant. That is unusual, as there are very few data centres in Europe that have built their own gas plants. It also has emergency back-up generators.

We know that that data centre is hosting data for the Israeli Defence Force, because that came out in an investigative study by *The Guardian* last year—you can access it online, but I can send it on. I am sure that it is also doing other things that are far less nefarious than that. However, that points to a very real question about the price that is being paid to build data centres in Ireland at the scale at which they have been built, in terms of the climate, the environment, electricity costs and energy security, and about what they are actually doing. We do not have accurate data from the companies on that, although we would really welcome it.

I think that some of the previous witnesses mentioned the EU energy efficiency directive. Under that directive, data centres are supposed to disclose data on energy, water and resource use. Again, however, because of a lack of good regulation in Ireland—Scotland need not follow that approach; it could be a leader on this—our Government has not fully transposed the directive. Only one in six data centre operators in Ireland has disclosed information on resource use. That is a major issue.

I would strongly urge Scotland to consider establishing a national database on energy and resource use, and penalties for companies that do not comply. Other countries have done that. That is just one of the blind spots. It is important to look at those blind spots, as well as those relating to what the companies are doing, how they are operating and what they are hosting on their servers.

Ronan Kelly: I think that the question was heavily biased towards the level of AI activity within the data centres. As I mentioned earlier, the facilities that have been deployed in Ireland have not been designed for any meaningful level of AI compute activities.

In response to Rosi Leonard's point, I note that, just like every other enterprise out there, some companies are using AI for their own business activities, so it would be misleading of me to say that there is zero AI activity. However, when it comes to AI training runs or AI inference runs, I can say with absolute confidence that there is zero such activity at a large language model scale in the Irish marketplace, because the data centres simply do not have the energy available to them to run those facilities.

On declarations regarding energy usage and so on, I am not sure whether everybody is aware that

the EUDCA, working with the European Commission, has recently pushed through the European common rating scheme for data centres. It is very similar to the A to F rating scheme for the energy efficiency of electrical appliances. The EU Commission is pushing through the scheme in order to get data centres to sign up to it for energy and water usage, with a rating associated with each. The longer-term goal is to extend that to the application operators, if you will, that exist within data centres, so that they can publish that information. I do not want to name any specific application providers—it would be unfair to do so—but, if I was a large-scale streaming application provider, I would be able to declare that I used only A-rated data centres in that regard. In that way, the users of my service could take a more informed position as to whether I was a good citizen or a bad actor in the marketplace from an energy efficiency and water efficiency perspective.

Professor Daly: Regarding what data centres in Ireland are actually doing, it is correct to say that they are not doing large-scale AI inference or training in the same way as the gigawatt-scale data centres that are proposed in Scotland. The important lesson for Scotland to learn from Ireland is about the very high concentration of energy demand that would result from dozens of new data centres. Although we do not have AI training in Ireland, we can offer very important lessons in terms of the energy context.

There is a huge difference between the era of moving to broadband internet from dial-up and the era that we face now, in which AI training is causing very significant growth in global energy consumption because AI effectively eats energy. It is a hugely energy-intensive process, unlike broadband internet or any other digital technology that we have seen before. Therefore, the question is not necessarily about what value the services bring but about the impact of energy demand on national energy systems and on statutory policy targets.

The energy efficiency rating for data centres that Mr Kelly referenced is a very poor indicator of sustainability, climate impact or energy efficiency itself, and it does not tell us an awful lot about a data centre's impact on overall energy demand or greenhouse gas emissions.

Ronan Kelly: I have a very brief comment in response to that. The step change that society saw in tech companies' compute resource energy consumption with the emergence of the internet was exponentially greater than what preceded it. I do not dismiss the suggestion that we are now seeing another step change as we move into a new era, but it is really important not to dismiss the first step change, which was substantial and triggered the emergence of the data centre industry as we know it today. It would not exist without the emergence of the internet and the power challenges that we now face. None of that would exist without the initial step change, so it is really important not to dismiss that.

We are in another era of step change, which is an evolutionary era. Yes, there is a lot of uncertainty and a lot of challenges come with that, but it is not the first time that we have had to deal with such challenges.

Martyn Day: That sets up the area that I am coming to next. What information do we have about the lifetime of the current hyperscale data centres, and how might that change in the future?

Ronan Kelly: I am delighted to take that question. In Ireland, we have 109 live data centres, to the best of my knowledge. Keep in mind that I have been in the sector since it began in the country. I am not aware of a single data centre of reasonable scale having been closed in that time.

Do not get me wrong: the innards—the compute resources—get changed over time. I listened to the witnesses on the previous panel, who spoke about a four or five-year life cycle for GPU resources. Time will tell whether the timescale is as short as that. Traditionally, we have, as an industry, seen a 10-year life cycle for compute resources. It is also important to remember the trickle-down effects. What tends to happen is that the leading edge of compute resources starts to age out after a 10-year life cycle, but in many scenarios they do not break. They also do not get thrown in the bin. In many scenarios, they are repurposed for less intense workloads and redeployed elsewhere as new compute resources come in to replace them.

There are also companies such as SK tes—one of the DII partners—whose sole purpose is repurposing and recycling all the components coming through the data centre system, if you will, and ensuring that all the rare earth minerals and so on are extracted, recovered and repurposed in the system. There are companies that are solely focused on the data centre industry for the purpose of extracting all the valuable and recyclable components and putting those to use.

Rosi Leonard: We do not necessarily have much to say about the lifespan of hyperscale data centres. As Ronan Kelly said, the data centres that have been functioning in Ireland since 2015, and prior to that, are still live. I suppose that that introduces the question of how much demand the grid can accommodate in the context of energy security and climate targets, renewables capacity and all those things. I do not think that an assessment of that was done quickly enough in Ireland. You are having this evidence session to answer that question, which is really positive for

Scotland, and I wish that the Irish Parliament had done that at the same stage of the process. It should be a factor in your thinking that the data centres that get permission today will, potentially, be an issue for the grid for a very long time. They are expensive to build and run, and the components are expensive. They are retrofitted, so to speak, but that is actually making them more energy intensive, because, as the previous speaker said, they are being retrofitted to power generative AI and AI components. It is worth thinking about that for the future of energy security in Scotland.

The Convener: Hannah Daly, do you want to come in on that?

Ronan Kelly: I think I have been unmuted instead of Hannah. I can chime in, but, if Hannah has something to say, I am happy to let her go ahead.

Professor Daly: I do not have anything to add—my research did not cover that.

Ronan Kelly: I would like to correct Rosi Leonard: I did not say that the existing facilities were being retrofitted for AI workloads. I do not believe that they can be, given the limitations of their grid connection.

We have seen strong evidence that data centre facilities are helping to accelerate the greening of our grids, because they serve as a primary anchor tenant for investments in renewable resources, whether those are wind farms or solar farms. Data centres can sign up for long-term commitments to the consumption of the energy that comes from renewable generation facilities. I get that, at the moment, there are constraints, many of which, as I mentioned earlier, relate to some of the shortcomings in investment in the grid to cope with the emerging demand. Many of the facilities in Ireland are now approaching 40 years since their original deployment, and they are not going anywhere; they will be here for another 40, 50 or 100 years because there is no reason for them to go anywhere.

The key point is that, although we are facing short-term challenges with regard to grid and renewable energy capacity, we will see many of those challenges dissipate and disappear over the next 10 or so years. What will be left is a large demand centre pulling from a predominantly renewables-based network underpinning those investments for many decades. Therefore, it is important to take a mixed view about the short-term constraints that we face versus the long-term benefits that can emerge from having these facilities deployed in-region.

David Barratt: I am interested in how effective the Irish Government's policy has been in managing the environmental impacts of data centres. The committee received a written submission from the Irish Environmental Protection Agency that states:

> "The potential environmental impacts from data centres … are considered to be appropriately mitigated".

In the first evidence session, we heard from the contributors that they do not feel it is possible to mitigate the environmental impacts at the scale that we are talking about. I feel that the written evidence from the Irish EPA, that it considers those impacts to have been appropriately mitigated, is quite a bold statement without much narrative to back it up. I do not know whether that was because of the length of the contribution it was able to submit to us. Is there something to back that statement up? I am interested in people's views on that.

11:15

Rosi Leonard: The EPA's response is very interesting, because we absolutely do not believe that the environmental impacts have been mitigated correctly. You do not need to take my word for that—the Climate Change Advisory Council, whose members are appointed by the Government, has said directly that large energy users such as data centres, some of which were named, are potentially "cannibalising" renewables capacity that comes on stream. Therefore, there is direct evidence on the risk of the growth of data centres in Ireland to our climate targets, our renewables industry and our ability to take fossil fuels out of the system.

I do not want to go on for too long, because Professor Hannah Daly is an expert on the issue and has done research on how data centre development in Ireland is affecting our carbon budgets. However, if the Climate Change Advisory Council's words are not enough, there is also strong evidence from the Sustainable Energy Authority of Ireland, which has said the same thing: the speed of the development of data centres, along with the level of demand that will be coming and that is already present in Ireland, is reducing our ability to displace fossil fuels in our system.

Within the European Union, Ireland is the fourth most dependent country on imported fossil fuels. That involves emissions being produced in real time, so we are far off track in relation to our carbon budgets, our energy efficiency directive guidelines and our energy reductions. That is having an impact at all levels of our energy system, including on our electricity bills. I will not go into detail on that now, but I would like to speak about that later.

I urge the committee to read Professor Hannah Daly's work on the issue, and I will send supplementary evidence on the work of the

Climate Change Advisory Council and the Sustainable Energy Authority of Ireland. Based on evidence from multiple sources, I do not think that we can say in any convincing way that the environmental impacts have been mitigated.

Professor Daly: On the question of how, through policy, environmental impacts have been mitigated, I will confine my response to energy and climate impacts as opposed to broader environmental impacts on biodiversity, noise and local air quality. Until the 2025 LEU connection policy, there were, in effect, no policies in Ireland to mitigate the impact of data centres on energy, fossil fuels and greenhouse gas emissions. My research has quantified the LEU connection policy and has considered the framework that allows new data centres to seek electricity grid connections, the scale of demand for new data centres, the extent to which data centres are required to build on-site generation capacity or battery storage, and the requirement to invest in new renewables capacity following six years of a data centre's operation.

My research has shown that data centres will add significant greenhouse gas emissions that will cause our carbon budgets and sectoral emission ceilings to be even further out of reach, particularly because the trend is that data centres are being constructed largely with on-site gas generation facilities to meet their very large energy needs.

The strong prevailing narrative in Ireland is that, given that data centres are required to engage with power purchase agreements or to construct on-site renewables capacity to match some of their energy demand, they are contributing to Ireland's climate goals, but that confounds the purpose of renewables in the sustainable energy transition. Renewables bring benefits for the climate and for energy security only if they displace fossil fuels. If they are diverted to meet the needs of a large new energy industry, they bring no climate benefit.

My research and modelling, which I will share with the committee, show that, even if the 80 per cent matching requirement under last year's LEU connection policy is met, the share of renewables in the electricity system will reduce and the overall level of fossil fuels and greenhouse gas emissions will increase, because the growth in demand will be much faster than the growth in renewables.

In addition, given the scale of the demand that we are talking about, which includes many gigawatts of new demand, I find it inconceivable that additional renewables capacity could be created on top of that which is required under our current climate action plan to decarbonise our transport system, our heating and our existing industry, so the cannibalisation of renewables for one industry is a credible threat that should be taken seriously.

David Barratt: My next question follows on from that comment about cannibalising renewables and the idea that renewable energy is effective only if displaces the use of fossil fuels. I understand that the situation with regard to the limits that have been placed on data centre development in Ireland since 2021 because of the limited availability of electricity have perhaps changed as a result of new requirements for on-site generation. This question might be for Ronan Kelly, initially. In that context, what does the future of data centre development in Ireland look like?

Professor Daly: As is the case in Scotland and many other regions, there is a large pipeline of applications and speculative interest from the industry. The energy regulator's policy included a market intelligence exercise that involved the gas and electricity network operators surveying the industry to get an indication of the scale of demand that may be required by the market. That exercise indicated that there would be 5.8GW of new demand by 2040, which matches the pipeline of requests to be connected to the gas network. Seventeen data centres have made applications to the gas network operator, Gas Networks Ireland, to be directly connected to the gas network so that they can power their operations with on-site generation capacity. That represents more than 2GW of electricity generation, which is very large in the context of Ireland's peak electricity demand of around 6GW. That is indicative of the pathway that we are talking about, whereby data centres are connecting to the gas network to generate their electricity on site, rather than placing additional pressure on the infrastructure.

As in many jurisdictions, there is a large pipeline of potential demand, which is projected to grow into the future. I think that 10 of the 17 data centres that have made applications to the gas network operator have already received planning permission, but there is a general absence of quantification of the impact of that demand on our electricity system, on our fossil fuel demand and on our greenhouse gas emissions. I understand that the same is true of the UK and of Scotland. We are operating in a vacuum. The official projections and energy modelling that underpin policy do not factor in such large demand growth because we are operating in a non-linear environment. I find it incredible that, even though ChatGPT was released only a few years ago, this technology is taking over all our conversations about energy and electricity.

David Barratt: Thank you. Ronan, what does the future of data centre development look like to you?

Ronan Kelly: [*Inaudible*.]—the Irish grid, for example. I think that the beginning of my answer was cut off, so I will start again.

Before I look at the future, I will start with the present. Today, the peak demand on the Irish electricity grid is 6.1GW, while a total of 5.1GW of wind capacity feeds into the grid, along with a total of 2.7GW of solar capacity. The total demand for energy from the grid from the data centre community in Ireland is 1.4GW. Therefore, the amount of renewable generation that we have is far in excess of the overall demand for the grid.

As I mentioned earlier, part of the challenge that we face relates to energy storage. That is a major challenge for every country that is trying to transition towards renewables. As we know, solar does not work at night time and the wind does not always blow, so it is vital that we have the ability, when there is excess capacity from those renewable sources, to store that energy efficiently and to tap into it later in periods, when there is less renewable generation occurring.

There is also the challenge of new connections to the grid, on both the supply side and the demand side. Currently, in the wind sector in Ireland, there is more than 1GW of stranded wind turbines that cannot get a connection to the grid to bring their capacity into the mix, and more than 2GW of solar capacity cannot get a connection to the grid. Looking at the pipeline for the data centre industry, more than 75 data centres are in various stages of planning, and they would contribute 1.6GW of additional load to the grid. From those figures, you can see that all those data centres are still focused on cloud workloads and none of them is focused on AI workloads, because they would not have the power density for that work.

As previous speakers touched on, the challenge is that many data centres are being forced to look to utilisation of natural gas products to energise in a timeframe that is required per the investment that is going in while they await their grid connection. We have a challenge with the grid's ability to connect new large energy users, whether they are data centres or otherwise, in a meaningful timeframe. In the absence of an ability to satisfy the demand, those users are leaning towards utilising other sources.

Another challenge is that, as part of the large energy user policies that have gone through, new data centre facilities have to bring matching production capacity that is aligned with their maximum input capacity. If I build a 20MW data centre today, I have to bring in generation capacity equal to 20MW that allows me to participate as a grid participant in the event that the grid is under pressure. If I do that, I also have to put in place matching back-up generation so that, should the grid fail completely, I have the ability to run on my back-up generators in the short term. Therefore, we are seeing a doubling up of generation capacity being deployed at those locations because of the need to be a grid participant and to help alleviate any pressure points on the grid. That is part of the new legislation that has been pushed through.

The sector is not pushing back on that; it is trying to align with it. However, what the sector is calling for is to be allowed, in the interim period, while data centres are waiting for grid connections to come through, to utilise those facilities, so that it can energise and not miss the wave of investment that is coming through. As I mentioned, I have been in the sector for 31 years and this is probably the fifth investment wave that has gone through in that time. These waves do not last forever and, when they stop, they stop reasonably quickly and the cards lie where they lie at that point.

Ultimately, the Scottish and Irish Governments have to ask themselves whether they want to have a role in the next wave of technological advancement—that is, do they want to have any of these facilities deployed in their countries and reap the longer-term benefits that emerge from them over the next 50 years, or are they happy for them to go elsewhere?

I have one last point, which is on the discussions with regard to the impact on the climate. Climate change is a global issue. Sending data centres elsewhere in Europe does not solve climate change, particularly if you send them to countries that have less onerous restrictions with regard to emissions, noise and pollution. I have often argued that Ireland was among the first to introduce new requirements on the utilisation of renewables and that, by hosting more facilities here, because our constraints are much tighter than those elsewhere, we are actually helping on global climate change as opposed to contributing to it.

The Convener: Professor Daly and Rosi Leonard want to come back in briefly, and then we will move on.

Professor Daly: I have a few points of clarification. First, as I am sure the committee well knows, we cannot compare the rated output of solar plants with the input of data centres. Data centres have a high constant demand and solar plants export for about 10 to 15 per cent of the year. You cannot simply argue that data centres can theoretically take the excess solar or wind generation when, as Mr Kelly alluded to, they are being powered by on-site fossil fuel generation plants.

11:30

To clarify, as is the case in Scotland, Ireland's climate policy is based on cumulative carbon

budgets, which are very tight and require rapid decarbonisation. There is no excess room for any new large-scale fossil fuel developments that are not already budgeted for. We have carbon budgets because, at a global level, we have, in effect, passed the 1.5°C critical climate threshold. There is no room for new fossil fuel developments if we are to meet our global and national commitments to decarbonisation.

The point of renewables is not just to grow renewables in themselves; they confer climate benefits only when they displace fossil fuels. I reiterate that, if we grow a new industry at the scale that is required by the data centre industry, that would divert renewables away from displacing fossil fuels, which would work against the legally binding carbon budgets that underpin our climate commitments.

Rosi Leonard: Thank you for letting me come back in briefly, convener. I want to raise one issue that is worth mentioning in thinking about framing a sustainable future of data centre development. A recent connection decision was issued by the CRU—the energy regulator in Ireland—regarding fault ride-through. It is quite technical and I will send supplementary evidence to the committee on it later. However, basically, the level of data centre demand in Ireland is potentially raising a risk regarding their compatibility with fault ride-through. The CRU decision cited data centre demand as a major risk when there is a wobble on the grid, when there is too much energy on the grid or if there is a sudden dip on the grid.

I bring that up now because, in that decision, the CRU notes that the level of data centre demand is actually impacting on the curtailment of renewables—new renewables cannot come on stream or are being asked to turn off because there is simply too much demand on the grid. New requirements are now in place for data centres, to help them to comply with fault ride-through. That is another thing to consider.

You would possibly be misled if you thought that Ireland is somehow awash with all these renewables that we cannot use, as the reality is very different. As Hannah Daly and I have said, gas generation is increasing in Ireland. We are now looking at importing liquefied natural gas, which is fracked gas, on the west coast of Ireland because we supposedly have an issue with energy security.

In terms of where Scotland can go next, I emphasise that it is essential to limit data centre demand, so that you can build out renewables that can displace fossil fuels. I will send the committee the fault ride-through requirements as supplementary evidence, as it is important to see those.

The Convener: I am conscious of the time. I will bring in Ronan Kelly briefly on one point, and then we will move on.

Ronan Kelly: I have a quick point on fault ride-through. The data centre industry was consulted by EirGrid, which is the grid operator, and the CRU, which is the regulator, on scenarios in which, in the case of instabilities in the grid, the data centres would disconnect from the grid and run on the uninterruptible power supply—UPS—and in which, if the situation endured long enough, their back-up generators would kick in. Because the loads from the data centres are reasonably large, if you get a lot of them, particularly on one grid segment, as is the case in the greater Dublin area, a significant load can disappear off the grid very quickly.

Basically, EirGrid has come up with a number of technical specifications to ensure stability of the grid, and those have been put to the sector. The sector is updating its UPS systems—predominantly through software, although with some older systems it needs to be done through hardware—to comply with that. It is important that what was being asserted on that issue does not come across as scaremongering. Things evolve as there is growth, and demand on the grid structure evolves with it. The sector was asked to comply and it is complying.

Ariane Burgess: Thank you for joining us. I had questions on how data centres are being powered, connection to the grid and back-up generation, but we have covered those issues.

I have a couple of related questions. Ronan Kelly and Hannah Daly mentioned recent legislation that means that, since December 2025, Ireland requires new data centres to have generators or batteries on site or nearby, to match the grid connection. My understanding is that, in practice, data centres use gas or batteries. Hannah Daly, do you think that Scotland should copy that rule, or should we avoid it?

Professor Daly: If you want to facilitate data centres that do not contribute to additional greenhouse gas emissions or fossil fuel demand on the scale that we are seeing in Ireland, the regulation should follow the advice of Ireland's Climate Change Advisory Council to the Irish Government. The policy was not adopted, but it recommended that the Government require data centres to be powered only by additional renewables that met all the data centre's electricity demand at every point in time, rather than just the demand averaged through the year, so that the data centre did not require back-up or on-site power generation.

In practice, that is extremely challenging for any data centre, especially a hyperscale one, because

of the scale of the renewables that would have to be constructed to meet the requirement. We would be talking about having a single large-scale offshore power plant as well as a substantial amount of battery storage, and it would also likely require a lot of seasonal hydrogen storage. That is where there is a conflict and a genuine clash between the large energy demand, the requirement or demand for growth, and the climate commitments. In practice, on-site generation power plants are either a fall-back option or the primary energy source, because data centres are growing much faster than renewables. If you want to avoid using additional fossil fuels, legislation has to be put in place that requires data centres to use only renewables from the outset.

Ariane Burgess: Would you suggest that we make that recommendation to the Scottish Government?

Professor Daly: I would at least mirror the recommendation that Ireland's Climate Change Advisory Council made to the Irish Government, which was not adopted.

Ariane Burgess: Friends of the Earth Ireland found that data centres added around €209 to the poorest households' electricity bills between 2021 and 2023. Forecasts for the next decade expect that to rise considerably. How is the demand affecting the green energy transition in Ireland, which we have touched on, and, more important, what should Scotland do to protect our households?

Ronan Kelly: There is a lot of misleading information and assertions alongside Friends of the Earth Ireland's report. First, investments were made by the Electricity Supply Board—the ESB—to green the grid, and the costs were ultimately passed to consumers. As we touched on earlier, at the moment, the renewables that are available to the grid are predominantly solar and wind. As we know, solar does not work at night time and the wind does not always blow. Peaker generators are required if demand is stable for periods when there is a significant fall-off in supply, because they kick in and replace lost capacity, but they are significant investments. This year, in Ireland, the peaker generators were called into action twice—once during the solar eclipse and once on 10 June, if I remember correctly, when the potential 5GW, or 5,000MW, of wind capacity fell to 50MW for a sustained period of about six hours.

As we make the transition to renewables, every grid needs to make investments in increased generation capacity that can be fired up at short notice should there be a sudden change in conditions, and, increasingly, there needs to be a move towards grid-forming long-term storage capacity. Those are functions of a grid that is transitioning to utilising green energy sources; they are not related to the users on the grid. Capacity did not suddenly spike, from a demand perspective, when Ireland's peaker generators were called into action; capacity on the grid was the same as normal, but the generators were called in because of the supply-side challenges.

Rosi Leonard: I am really happy to talk about that research, which was done very thoroughly by Dr Seán Fearon of the University of Barcelona. The research looks at the effect of data centres on wholesale prices, so it does not look at the cost of network charges, which I think Ronan was referring to. A separate report was done by Sinn Féin MEP Lynn Boylan on the cost of data centres in relation to network charges. I can send that on as well.

On the findings of the report that we commissioned from Dr Seán Fearon, the report was looking at the relationship between data centres driving up energy demand as a whole and the cost. Because of Ireland's dependency on fossil fuels, gas was setting the price more of the time than it otherwise would have been due to this very large, inflexible user on the grid, which is data centres.

Again, I emphasise that data centre demand on the grid in Ireland is quite abnormal in that the demand is so much higher than that of any other sector. We had data centre growth by up to 23 per cent over that period, growing very sharply to where we are now. We modelled that in terms of how it was affecting and driving up wholesale energy prices, and you are right in referring to an extra €209 being paid by the poorest households. The average household paid an extra €360 over the past 10 years. That is a cumulative drain from the Irish economy of €715 million over the past 10 years, due to that price effect, which is predicted to rise by up to €1.4 billion over the next 10 years.

The key driver of insulating households from that price is limiting data centre demand in all scenarios modelled, based on the energy transmission operator's own figures of renewables deployed. Renewables will not be enough to reduce the price effect. It is data centre demand that is the most significant and pertinent factor. Limiting demand in relation to the amount of renewables on the grid and in relation to the overall stability of the grid is a key factor in insulating households in Scotland from the price effects that we have seen in Ireland.

Ariane Burgess: Thank you. Hannah, do you want to come in on this?

Professor Daly: No. I have not undertaken research on the impact of data centres on prices, although the trend that Rosi Leonard referred to whereby the increased demand for data centres causes additional periods in which gas is setting

the marginal price intuitively leads to higher wholesale energy prices.

There is an argument that, by being larger energy users and making greater utilisation of the grid, data centres might act as a way to reduce network charges. However, I have not seen thorough analysis to establish that that has taken place. I think that there is a large absence of analysis on the impact of data centres in Ireland on prices. Given that Ireland has the highest electricity prices in Europe, I am surprised that that has not been more thoroughly examined.

The Convener: Thank you. I will move to James Adams, but, first, I ask the witnesses to try to keep their answers a bit shorter, please, if possible, because we are really struggling for time. Thank you.

James Adams: Thank you, convener. I have two quick questions on water usage. What has been Ireland's experience of managing water consumption demands associated with data centre development? What lessons can we, in Scotland, learn?

Rosi Leonard: That is a really interesting question in Ireland. Again, to go back to my initial recommendation, I think that Scotland should have a national database of resource use by data centres and penalties for companies that do not comply, because we have found that there is quite an absence of good data in Ireland regarding water use.

Data centres use quite a lot of water—that is known—but as to how much water they are using, Uisce Éireann, which oversees the public water system in Ireland, has figures based on only 48 data centres in Ireland, so there is a big gap when we look at the data centres that are not accounted for. Through journalistic efforts, the figure that came out was that about 1 billion litres of water were used in 2024. However, again, there is an absence of coherent data. If Uisce Éireann, which is responsible for managing the water system, does not have figures on every data centre, we cannot fully know, so it is essential to ensure that reporting requirements are in place.

11:45

There is also a possibility around the need to reduce data centre water use during hot periods. I am not sure what the situation is in Scotland, but Ireland is certainly experiencing, through climate breakdown, drier summers. We had a period of intense drought this summer, during which a hosepipe ban was in place for households, but there were no similar restrictions for data centres. Data centres say that they turn on their air cooling and use that instead of water, but the air cooling, as witnesses from the first panel mentioned, is also very electricity intensive, so you need to think of the water and electricity uses as one piece of the package. Earlier, I mentioned the fault ride-through requirements when data centre demand goes above safe levels for the grid in Ireland. That demand went above safe levels at the most extreme point of the drought during August. That indicates—as it indicated to the energy regulator at the time—that data centre energy use goes up even further during periods of hot weather. The water and the electricity are one piece of the package, and I recommend a national database to which companies have to submit information about the existing data centres. Going forward, that is essential, because there is no need for us not to have good data on this in Ireland—it is a really big gap in the work.

Ronan Kelly: I will touch on a couple of things. First, the vast majority of data centres in Ireland are deployed with closed-loop cooling systems. Similarly to the radiator in your car, they recycle the water through and through.

I will also refer to one of the points that members of the previous panel made with regard to the use of PFAS—the lifelong chemicals. They are predominantly used in an immersive cooling system, which is when an entire server is dunked in a pool of liquid in order to cool it. That approach is not used in the Irish marketplace and, to be quite frank with you, on a global basis, it is largely a hypothetical use case. With the closed-loop cooling systems, typically, cooling goes right down to the chip level—as in a radiator system, water is fed through the main chips as part of that. To use the phrase from earlier, PFAS is a bit of a red herring that has been woven into the conversation.

There are some things that you have to factor in for the Irish marketplace; the figures from Uisce Éireann, which is the Irish water authority, show that 0.3 per cent of the water that it produces is consumed by the data centre industry. To put that into perspective, one chip set manufacturer in Ireland uses 10 times that amount, and the pharmaceutical sector in the Irish marketplace uses more than 100 times that amount. I do not want to dismiss the fact that data centres utilise some of the water, but, when you compare us with the pharmaceutical sector, a chip set manufacturer or something that most consumers are more familiar with—golf courses—we represent a fraction of the usage that is deployed out there. It is an issue that should not be dismissed, but we are looking in the wrong area—other sectors need to be looked at more closely.

James Adams: As Professor Daly does not wish to make any points in response to that question, I will move on.

How are water use and environmental impacts currently monitored and reported within the sector in Ireland? What information would be most useful for regulators and the public, to ensure accountability for environmental performance?

Rosi Leonard: As I mentioned, although Ireland has not fully transposed it, in Europe we have the energy efficiency directive and, under article 12 of that, data centres should be reporting their data. I recommend that Scotland look at introducing a database of that kind, but one of the challenges with that directive is that it needs to be applied to each data centre. When the regulations were put in place in Europe, companies lobbied quite hard for them to be applied in a cumulative way, so that each data centre's individual resource use would not necessarily be documented and they would be assessed more as a cumulative package. However, that would not be useful, particularly for water and air quality, on which there is a more localised impact. You need that granular, local breakdown of data rather than just the cumulative level.

Ronan Kelly: Transparency in the sector is critical. That is why, at the EUDCA level, Digital Infrastructure Ireland representatives were among the most vocal in pushing through the EU common rating scheme. It is key that the sector as a whole is as transparent as it can be in revealing what it is using. Any fears will be allayed when the general populace gets to see the figures, particularly on water consumption.

James Adams: Hannah Daly, do you have anything to add?

Professor Daly: No—not in relation to water.

James Adams: I appreciate those answers.

Claire Baker: The committee has undertaken an inquiry because there are 23 or 24 live planning applications for data centres in Scotland. Our remit is to consider the environmental impact in advance of the Scottish Government's issuing of fresh guidance, which it has committed to provide by the end of the year. We want to influence that guidance.

I am particularly interested in the impact on people who live near data centres in Ireland. Noise pollution is one of the issues that has been raised, but Rosi Leonard mentioned air quality and other issues. Does your organisation have an idea of the impacts on people who live close to data centres?

Rosi Leonard: We work quite closely with communities. As has been mentioned, most of the data centres that have been built and are running in Ireland are around Dublin, and there have been a few different impacts.

Noise has been a particular issue with Echelon data centre in west Dublin, which I have been to, and the EPA is investigating the issue. A significant level of back-up diesel and gas generation—this relates to other climate impacts—has been built for the data centres in that area, and those generators produce noise, which I have heard for myself. I am not sure exactly what went wrong with that specific data centre, but the EPA is investigating. That has been a serious concern for residents there for a long time.

Another big fear that is raised when I talk to communities in west Dublin and those outside Dublin relates to electricity constraints. As has been mentioned a few times in our discussion, we are talking about extremely large energy users that are using energy very inflexibly. For example, outside Dublin, in Kildare—which is just west of where I am sitting—a proposal for a big data centre development is going through the planning process and, if the development is built, the electricity use of the entire county of Kildare will triple, so there is fear locally about the impact that that might have on what is built later. In west Dublin, there are examples of the entire capacity of substations, which were built by the public network operator—ESB Networks—for the benefit of all users being taken up by data centres. That will have knock-on effects on what gets built later in relation to housing, other services and clean energy, because grid capacity is needed to bring clean energy on stream.

Those are the two major impacts, but water issues have been raised, too, and we have discussed the local impacts. A big issue relates to the opportunity costs regarding what can be used later. The Kildare data centre has also had an impact on food, because a large land bank has been reserved for data centre development. There is a strong feeling in the area that that land could be put to better use, either for local food production or for future housing.

Claire Baker: You said that the noise issue with one of the data centres has been particularly problematic and is being investigated, but other data centres have not produced the same concerns about noise levels. On energy constraints, the issue is not that people are losing their energy supply but that there could be constraints on future developments that would involve energy. Is that correct?

Claire Baker: Finally, I think that Hannah Daly talked about restricting centres to additional renewables, but surely that would be impossible, as it would mean no development of data centres. Would it not be extremely challenging, if not impossible, to produce the energy that is needed for a centre just from additional renewables? Could you respond to that question, Professor Daly, and

to the other question about noise and other impacts on communities?

Professor Daly: I am happy to answer the question. I do not think that it is impossible to power data centres with 100 per cent additional renewables. It would require a longer planning development timeline, as additional planning work would be needed for the renewables, and the infrastructure would need to be planned to ensure that they got to the data centre site. It would also require storage or flexibility of operation to ensure that the data centre was drawing either on renewables that are being generated at any given minute or from storage that had been charged with renewables.

It is certainly not impossible. In the context of Ireland and Scotland, which have abundant wind resource, it could certainly be argued that there should be no reason for data centres to have fossil fuel demands, either directly or indirectly. It would make things more challenging, but it would put the onus of environmental responsibility on the data centre developer, rather than on the public.

Claire Baker: The Scottish Government has said that it would promote green data centres, but we do not have any definition of that. I assume that your example demonstrates what a green data centre could be. Is there anything else that would be included in the description of a green data centre?

Professor Daly: For something to be sustainable and green, we would be talking about far more than just consideration of greenhouse gas emissions. There would have to be consideration of where the data centre and the renewables themselves were sited to ensure that they did not impact on the local environment, local air quality, amenity of the countryside or any alternative land uses.

However, I would say that a minimal requirement for a green data centre would be that it was not powered directly by fossil fuels and did not divert renewables that were being used to displace fossil fuels. For example, a large amount of Scotland's renewable generation is exported to England, where it displaces fossil gas generation. If that wind power were to be directed towards data centres in Scotland of the order that we would see, given the pipeline of demand, it would indirectly cause an increase in gas emissions in England, because Scotland would not be able to export those renewables to meet that demand. You will need to understand the operation of the whole electricity grid across Great Britain to understand whether a new data centre will cause an increase in greenhouse gas emissions. Even if a site has a power purchase agreement with a wind developer or has some on-site renewables, that is not a strong enough condition to ensure that it is not causing a direct or indirect impact on emissions.

Claire Baker: Mr Kelly, you can respond to the question on community impact, too, but the question that I have that might be more suited to you is on how Ireland made its decisions and what kind of trade-offs were involved. Electricity constraints have been mentioned, as well as the use of land for agricultural purposes rather than for data centres. Did that come into the discussion that was had in Ireland on its plan? Did people think, "Well, if we have a data centre, it compromises other things that we could do, so there will have to be trade-offs"? Was that part of the thinking or considered in the discussions?

Ronan Kelly: It is always part of the discussion, no matter whether you are building a data centre, a warehouse, a factory or whatever. There are always trade-off considerations and, indeed, the issue of land being used for farming quite often crops up. We are seeing that in the renewables world, too, with the deployment of large-scale onshore solar farms, which take up very significant amounts of land that could, it could be debated, be used for farming.

In any case, it is reasonable to say that Ireland—and Scotland, too, as I know from the time that I have spent there over the years—is not particularly stuck for farming land. A lot of farming capacity is available throughout the country; indeed, you have only to look at what we export beyond our own national consumption to see that there is a lot of capacity there.

12:00

These centres will consume a bit of land, but the same is true of local logistics warehouses, which are quite often on an even bigger scale, and the solar farms that I mentioned. In fact, every time I fly into and out of Dublin airport, I see the very large amounts of land that those farms consume.

The issue is certainly part of the debate and the discussion, but it all comes down to joined-up thinking. As I have said, Ireland built a fibre-optic backbone across the outer ring of Dublin, and a digital infrastructure built up around it. However, it did not align the policies to meet the growth in energy consumption and, as a result, we have the pinchpoint that we have today. Equally, it did not follow through on the utilisation of district heating, which could have been factored into the planning, too.

As the world moves forward, we must collectively look at all these things in unison and say, "Okay—if we're going to go down this path and deploy this next generation of data centres"—and whether or not they are hyperscale is irrelevant, as the issue is the power density—"how

do we factor in the planning around land use? How do we factor in the planning around repurposing the surplus heat that's generated from the facilities? What are the impacts on the community, on the supply chain around it, on employment and so on?" There are a lot of levers that should be factored into any consideration, but what should also be factored into that consideration is how long this current investment wave will last. If you are going to take five years to debate and discuss these issues, you would probably be better off not starting that debate and discussion, because the investment wave will have gone by then.

I would also like to go back to the issue of community impact, particularly with regard to noise. I have to say that I would challenge the other witnesses on this front. I happen to live very close to the M50 corridor; one of the main concentration areas is a location called Grange Castle, where a large number of what I would classify as proper hyperscale facilities are deployed. I have lived there for 15 or 25 years and I had never gone up to the facility until I started in my current role—I never had a reason to. However, when I started, I said to myself, "Hmm—it might be prudent if I went up and had a look at and a listen to these things." I drove past all of the ones that belong to Google, Meta and so on at 5km an hour with the car windows down—and there was absolute silence. There was nothing—no noise whatsoever.

As for the issue at Echelon data centre facility, I was speaking to one of the Echelon engineers about this, because, when we heard about it, I was asked by our public relations company whether I wanted to comment on it. I said, "I don't want to comment on it until I hear it for myself." So, I drove over to the facility—and there was absolute silence. I reached out to one of the engineers in there and said, "What's the deal with that? What happened?" Basically, they were doing testing. There are three data centres in that location, none of which is, I should point out for clarity, live yet—they have not been energised at this point in time. They were testing the cooling systems and found a faulty chiller unit, which—foolishly, in my opinion—was left to run for a couple of days. Maybe they were diagnosing it—I do not know—but it was generating quite a bit of noise while it was operating in that failed state. Eventually, they shut it down and replaced it, and it will not be an issue with regard to the data centre's operational state. It was a temporary condition, due to a fault.

Claire Baker: Thank you.

Sanne Dijkstra-Downie: We discussed with the previous panel the opportunities for heat networks using the waste heat from data centres. I might come to Ronan Kelly first with this question, given that he has just referred to that issue. To what extent have Irish data centres been able to provide waste heat networks? If they have been able to, what sort of offtakers or customers have they been able to serve?

Ronan Kelly: I would say that that sort of thing has been limited, to date, if I am being completely transparent, and part of that is a function of our housing stock in Ireland, which is not too different from what you guys have in Scotland. We have an awful lot of single dwelling units, whether they be detached, semi-detached or terraced properties, and it is challenging to retrofit district heating to those types of buildings. It is expensive and difficult to do, and it requires a lot of buy-in from the communities that are part of it.

We have one project in a part of west Dublin called Tallaght, where an Amazon Web Services data centre has been piping district heating into a large multi-dwelling unit—an apartment block, if you will—quite successfully.

There are also discussions in relation to the Blanchardstown area, more to the north-west of Dublin, where there are a number of data centres. There is a recognition of the challenge of trying to retrofit existing single dwelling units, so more industrial-type applications are being considered. Around those data centre facilities there are a lot of pharmaceutical facilities, there is a university, there is a hospital and there is the national aquatic centre, which is a large swimming pool, and the possibility of piping the surplus heat from the data centres to those locations is being explored.

As a society, we are nascent in terms of our mindsets and attitudes towards planning around district heating, but we are starting to evolve. The concept is starting to crop up in the conversation now and is being explored.

Knowing the housing stock that we have in Ireland, I would say that it is only really in the past five years—arguably the past 10 years, but more like the past five—that Ireland has started to double down on building multi-dwelling units, and I think that the data centre sector could have a major role in servicing those MDUs as they are built and deployed.

Sanne Dijkstra-Downie: Thank you.

Hannah Daly and then Rosi Leonard, do you have any reflections on what you see as the opportunities for heat networks linking in with data centres?

Professor Daly: I will be brief. I think that the opportunity is potentially there, but its mitigating effect on the climate impact of data centres would be minimal. There are very large infrastructure barriers and physical barriers to being able to utilize that waste heat, as was identified by your previous witnesses.

As far as I am aware, data centres are not being constructed with the ability easily to export their waste heat into heat networks, so there would have to be strong retrospective requirements for them to construct that capacity, and we have lost the opportunity to have that requirement.

Again, using waste heat in that way is one of those sustainability narratives, but I think that it has not been substantiated, and I would be very surprised if it emerged as a significant mitigating factor.

Rosi Leonard: I agree with Professor Daly. There has not been a district heating wave as such in relation to Ireland's data centres—it has not been a requirement for them. To echo what Professor Daly said, when we are talking about the climate impacts of data centres, if those data centres are being largely propped up by fossil gas, which they are in Ireland, we have to then discuss whether having that district heating is an effective trade-off. There are district heating schemes in Ireland that have nothing to do with data centres, so that opportunity is not lost if the data centre is not built.

Sanne Dijkstra-Downie: I have one final question, but I am not sure who is best placed to answer it. Given that there has not been much capture of waste heat for heat networks, or, indeed, for other uses, to what extent are data centres currently resulting in a heat island effect and the warming of surrounding properties and landscapes?

Rosi Leonard: To my knowledge, there has not been an investigation of those effects. I know that there has been in other countries, but I am not aware of any hard evidence in that regard in Ireland.

Professor Daly: Likewise, I am afraid that I have nothing to offer on that question.

Ronan Kelly: Similarly, I am not aware of any studies being called for on that. I do not think that it has been raised as a concern in the public domain, but I could be wrong on that. I have not seen any studies with regard to that specific challenge, which I know is an issue in hotter climates.

The Convener: I thank our witnesses for their contributions to the inquiry this morning. This session started late, so we have allowed it to run on a bit later than planned, and we appreciate your time. I am aware that some information will be sent to the committee after the meeting—thank you for that.

I will suspend the session for a moment.

12:09

Meeting suspended.

12:10

On resuming—

Subordinate Legislation

Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Amendment Order 2026 (SSI 2026/266)

The Convener: Agenda item 3 is consideration of a Scottish statutory instrument. The instrument is laid under the negative procedure, which means that its provisions will come into force on the specified date unless the Parliament agrees to a motion to annul it. No motions to annul have been lodged.

Do members have any comments on the instrument? As there are no comments, do members agree that they do not wish to make any further recommendations in relation to the instrument?

Members *indicated agreement*.

The Convener: That concludes our business in public. As agreed earlier, we will now move into private session to consider the remaining items on our agenda.

12:11

Meeting continued in private until 13:03.

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