Climate Action Committee

Submission from Action to Protect Rural Scotland, 20 October 2026

Background

There are currently 23 proposals for hyperscale data centres (all of which are between 125MW and 1000MW) in planning or pre-planning, according to APRS's data centre map, totalling 7.3GW of energy demand, although Matt Magill, Director of Engineering and Customer Solutions at the National Energy System Operator (NESO), giving evidence at the Economy, Tourism and Energy Committee, said that there was 9.7GW in the grid queue, later corrected by NESO press officers to 8.9GW for an article in The National.

For context, NESO report that Scotland's peak winter electricity demand is currently around 4GW, so if all these applications were approved and built, it would more than triple Scotland's electricity demand. In 2024 the total capacity of data centres operational in Scotland was estimated at between 10MW, and 30MW, just over 0.1% of what is proposed. APRS have assessed the data centres currently operational in Scotland and found 39.6MW of data centre capacity over 1MW publicly listed: this will be an underestimate.

The proposed hyperscale data centres make clear in their applications and publicity that they are for AI data centres and are therefore to be used for Large Language Model training and inference by US tech corporations, rather than for the work that keeps the economy and society running like banking, NHS record storage, server hosting etc.

To give context for the size of data centres proposed in Scotland (fig 1), total data centre capacity in the UK in 2024 was estimated by DataMap to be 1.6 GW, comprising around 400 data centres. Savilles estimated that the average UK data centre size has risen from 2.1MW in 2006, to 6.3MW in 2026.

A European Union report published in July 2026 lists an average size of data centre in the EU27 of 5 MW[1] - this is calculated from the total of 3739 MW (table 22) counted from 741 data centres recorded (Table 17). This report identifies data centres over 10MW as the largest category of data centre, which shows just how extraordinarily big the data centres being proposed in Scotland are (i.e. up to 100 times that threshold).

[1] Counting all data centres over 100KW.

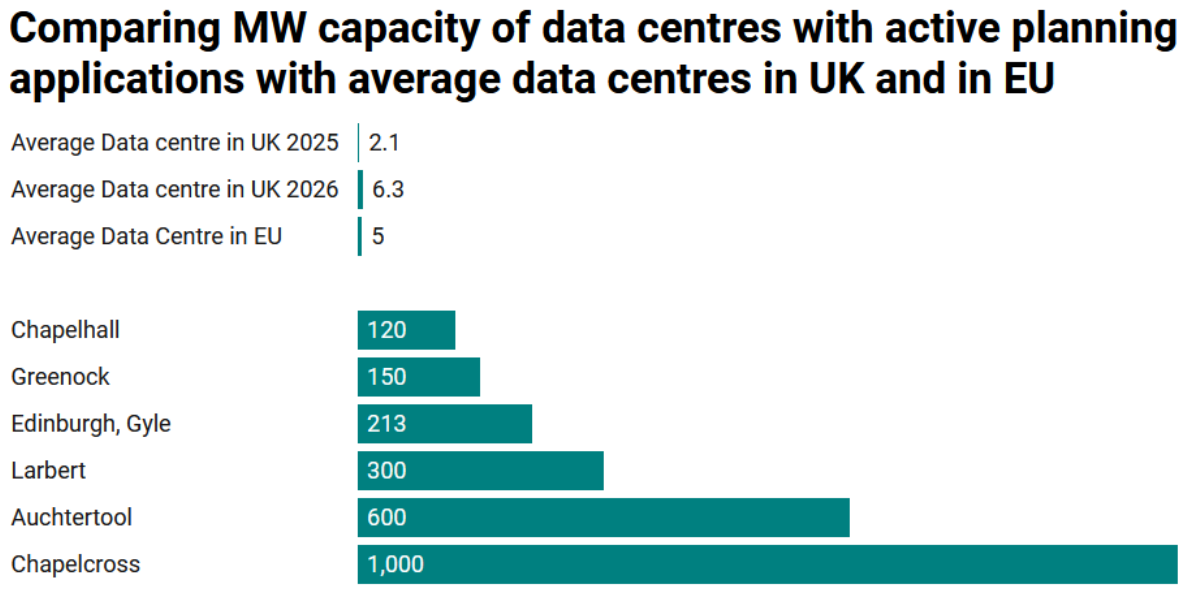

Figure 1: illustration of the average data centre size in UK (2025 and 2026 from Savills data) and EU27 (in 2025 - EU data) with the six data centres which have put in Full Planning, or Planning Permission in Principle applications in Scotland.

Data centre connections to the grid are managed at a UK level by NESO without oversight by the Scottish devolved institutions. This means the only strategic lever available in Scotland to manage the roll-out of hyperscale data centres remains the planning system.

Committee question 1: What are the potential impacts of data centres and their construction on the environment in Scotland, including water quality, air quality, nature and biodiversity and emissions?

1. Data centre developers in Scotland say that they will use closed loop cooling and so will use small amounts of **water** compared to hyperscale data centres currently operating worldwide. This may be true but the less water that is used the more energy must be used to cool that water before it goes back around the loop. We believe that the claims of the data centre developers, with respect to water, are worth scrutinising, however we have primarily looked at the energy side of this tradeoff in our work.

2. The primary **air quality** concern relates to the use of fossil fuel power backup generators. The most accurate estimates of impact come from the EIA for the Larbert site. This development would be one of Scotland's top 10 polluters solely from the routine testing of their diesel generators, and when on emergency back-up, local homes would receive 44x the safe limit for NOx pollution.

   The Chapelhall application shows diesel generators will operate, not only in emergency mode and during testing, but will operate routinely to power

cooling systems in hot weather above 21 degrees. We estimated that the project for the Gyle in Edinburgh, currently with Scottish Ministers, when in operation, would burn 68,040 litres of diesel per hour, the equivalent of 106,312 idling diesel cars. In the case of that project, as with many others, this would be taking place near homes and businesses, including in this case a nursery just 220m away, and for Larbert a care home only 50m away.

There is some evidence of developers putting in applications for Planning Permission in Principle which have been extremely vague on numbers of generators required - e.g. Auchtertool and Greenock both have not said how many generators they would have, and Chapelcross declared that there would be no diesel generators at the site for the purposes of the EIA scoping report. However the EIA showed they would have 336 diesel backup generators of 3.2MW each, a quarter of Scotland's winter peak energy demand. The unprecedented size and number of diesel generators associated with these proposals means that greenhouse emissions from diesel generator testing, emergency operation and peak energy demand operations (e.g. at Chapelhall) are likely to be very substantial.

3. In terms of **nature and biodiversity loss**, the impacts will, of course, depend on the site. However these installations are extremely large in scale, being some of the biggest buildings on the planet. Due to the land-take demanded we are generally seeing them go in on greenfield sites, including on Grade 2 agricultural land, Green Belts, and in other agricultural and rural settings.

4. The **emissions consequences** of these projects remain the most serious environmental concern. APRS commissioned a report earlier this year as part of a collaboration with the University of Edinburgh to look at the 15 proposed hyperscale data centres we were aware of at the time, using publicly available information to estimate their annual energy demand and operational carbon emissions.

   Collectively, those 15 sites added up to 6.8 GW of capacity, exceeding the UK government's maximum estimate of 6.3 GW for the entire UK[2]. These 15 sites (which do not, for example, include the 1GW proposal for Chapecross) would require energy equal to roughly 232% of Scotland's current annual energy demand.

   These sites alone would produce roughly 15% of Scotland's business[3] & industrial process sector emissions between 2030 and 2040, and this emissions impact appears to be excluded from the sectoral carbon budgets in Scotland's Draft Climate Change Plan, putting legally binding carbon budgets at risk. In short, Scotland has a choice: meet our net zero targets or allow hyperscale data centres to be developed.

Scotland has a formal commitment to decarbonisation, and that will require additional renewable power for homes and buildings, transport, industrial processes

[2] See the House of Commons Library research briefing of 27th May 2026: https://commonslibrary.parliament.uk/research-briefings/cbp-10315/
[3] APRS/University of Edinburgh report: https://aprs.scot/wp-content/uploads/2026/10/Climate-and-Data-Centres-APRS-Report-with-header.docx-1.pdf

and more. Scotland's renewable energy is also key in decarbonising the whole UK, and the subsea cables (discussed below) to take energy to England are part of that. Only 1-2GW of growth in data centre capacity across the GB network is included in our trajectory to net zero (see below). However Ofgem reports there is 73GW of contracted demand in the GB grid queue.

We conclude that hyperscale AI data centres of the types and locations being proposed in Scotland currently are incompatible with trajectories to net zero and climate action.

Committee question 2: Where there are negative impacts, can these be mitigated or avoided?

Curtailed Wind

Data centre developers make claims that their data centres in Scotland will solve the issue of curtailed wind, which is wind energy that cannot currently be transmitted south to markets due to the limitations of our grid. Wind farms are being paid not to operate and this cost £365million in 2025. The larger proportion of curtailment costs are for gas generation to fire up in the south of England. The hyperscale data centres proposed in Scotland will not significantly help this situation because:

1. The UK is building six subsea transmission links to take energy from Scotland south. The total capacity of these will be 12GW, and the first two are expected online in 2029, which will add 4GW transmission capacity between Scotland and England, eliminating much of the current curtailment issues.

2. The bulk of curtailed wind energy (87.5% according to energy analysis Montel) is north of the main bottleneck of transmission capacity, the B4 boundary, which lies north of the central belt. None of the 7.3GW of data centres in planning or pre-planning are north of this boundary. Dr Callum McIver, Research Fellow in Electronic and Electrical Engineering at Strathclyde University, in evidence to the Economy, Tourism and Energy Committee on 15 September, said: "Where you locate is important and the studies we have done suggest that locating in Scotland is helpful, but where you locate within Scotland is very important too. … it is not the Scotland England boundary that is the first constraint … it is the B4 boundary."[4]

3. Current constraints being exacerbated by upgrade works on the transmission lines reducing transmission capacity. This is an extremely temporary issue, but has made the constraint figures in the past year spike.

We have written a short report on this issue with input from Dr Callum McIver for more information.

Use of Renewables

The developers of hyperscale data centres in Scotland emphasise their use of renewables with some, such as the Lanarkshire "AI Growth Zone", promoting

[4] See the Official Report of the Committee Meeting

themselves as being powered from renewables. However, our calculations, subsequently published in the Guardian, showed that the developers' intentions to build 1GW of renewable energy as private wire to the data centre would require 100 square kilometres of land. Even that would only provide 50% of the energy needed for the 500MW AI growth zone developments. The 2400MWh battery energy storage system (BESS) they are proposing would cover around 29 hectares, yet could only power the data centre for less than five hours, not enough to provide the constant energy supply needed for a data centre.

Evidence from other places with hyperscale data centres show that their build-out is closely related to the increase in use of gas. In the US, England and Ireland, gas power is being built alongside data centres because it provides the reliability of power that data centres require, unlike the grid. Research showing Irish electricity bills had risen due to the impact of data centres concluded it was partly because generation was pushed into gas generation more often, which is more expensive than renewables.

Power Purchase Agreements[5]

A common argument seen in planning documents for hyperscale data centres is a claim that the energy demand will be fed through 100% renewable sources through the use of a Power Purchase Agreement (PPA). A PPA is a contract between a renewable power generator and a customer.

Data centre operators commonly use PPAs to both help meet their sustainability and net-zero targets, and reduce exposure to energy price variations, with 72% of contracted European data centre demand covered by PPAs[6]. However, because PPAs are a contractual agreement between the generator and the data centre operator (not the developer), they are usually only agreed once the development has a confirmed grid connection and operation date. Promises by data centre developers in planning documents of "100% supplied by renewable energy", years before an operator has been confirmed or the data centre is built, is therefore unlikely to be guaranteed.

PPA energy generation being 'volumetric', i.e. on an annual average, means that although the total volume of energy required by a data centre over a year may be matched with that generated by the renewable project, it is unlikely to always be generated at the same time it is produced, with non-renewable energy having to fill in the gaps. A Princeton University report[7] found that reliance on volumetric matching of PPAs resulted in more fossil fuel sources being required (for example at night when solar generation is zero). They are also often ineffective at reducing power emissions, and in fact increase the number of energy storage schemes required for the grid and crowd out new large-scale renewable projects.

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[5] This is a summary of a section from the APRS/ University of Edinburgh report 'Climate and Scotland's Data Centres' (p12)

[6] Pexapark, "A Data Center Tale: The Hunger for PPAs," 21st October 2025. [Online]. Available: https://pexapark.com/blog/a-data-center-tale-the-hunger-for-ppas/.

[7] Q. Xu, W. Ricks, A. Manocha, N. Patankar and J. D. Jenkings, "System-level impacts of voluntary carbon-free electricity procurement strategies," *Joule,* vol. 8, no. 21, pp. 374-400, 2024.

Energy efficient buildings

Our commissioned report on the hyperscale data centres planned for Scotland found that emissions related to the buildings of a data centre account for around a quarter of 1% of the annual energy demand for all six Scottish proposed data centres studied. Too much emphasis on building-level energy efficiency measures for data centres risks overstating their contribution to overall energy demand reduction as 99.75% of emissions are related to the computing demand, rather than that from the buildings.

Heat networks

The data centre developers proposing the hyperscale data centres currently in our planning pipeline emphasise the potential of heat networks to use the excess heat, however the scale, location and the lack of planning with heat networks in mind mean they are highly unlikely ever to reuse a meaningful amount of the waste heat compared to their huge energy use.

Examples of successful heat networks from data centres in the UK are rare, but where they exist they are mostly extremely small - for example a 50KW data centre 'the size of a washing machine' heats a public swimming pool in Devon. The first heat network at scale in the UK using waste heat from data centres will be at Old Oak in West London, anticipated to go live in 2029, and will use 17MW of heat from data centres to heat new build homes and a swimming pool. Reusing 17MW of waste heat to heat 9-10,000 new homes is very good, but 17MW is a tiny fraction of the heat that would be produced from the scale of data centres planned in Scotland. For example Auchtertool would use the equivalent electricity of 1.3million households, and Chapelcross, 2.2 million households.[8]

Data centre waste heat is year-round, and peaks in summer, which is not the profile you would need for efficient utilisation by domestic heat networks, it is better serving a more constant heat-taker such as a swimming pool or industrial facilities. This means that data centres best operates as a baseload, which, in Berlin, for example, accounts for half of the annual heat demand but contribute only 15% of installed capacity due to seasonality. There is also a need for heat pumps to increase the heat from around 25-30 degrees as it comes out of the data centre, to around 70degrees, which is the temperature needed for a heat network. And this is costly, requiring about 20-35% input additional electricity relative to the heat delivered, depending on performance.

Committee question 3: What systems are currently in place to support avoidance or mitigation of negative environmental impacts and what is still needed?

At a governance level, hyperscale data centres should be subject to various levels of strategic oversight. However, because this wave of applications was both unforeseen and (especially in terms of energy demand) of an unprecedented scale, these various strategic rules provide limited support in terms of avoidance or mitigation

[8] All references for the calculations are in the APRS data centre Calculator

leaving big gaps. One of the gaps, that most hyperscale data centres were being screened out of Environmental Impact Assessments. This gap has now been addressed with a Planning Direction issued 16th September.

The Climate Change Plan

The impact of hyperscale data centres have not been included in Scotland's Climate Change Plan, as noted in the Chief Planner's 16th September letter, whichhttps://democracy.edinburgh.gov.uk/documents/s100292/7.1 - Data Centres Moratorium - Appendix 1.pdf gave the planning direction to local authorities to carry out EIAs on all data centres over 50MW.

Strategic Spatial Energy Planning

The Strategic Spatial Energy Plan (SSEP) which will be published in Autumn 2027 will include 1-2GW of demand, as per this answer to S6W-41364:

"*The SSEP will spatially optimise a specified volume of flexible data centre demand (1-2GW). This will indicate where opportunities for energy system benefits exist, such as co-location of renewables and data centres, supporting the development of government policy on the spatial location of data centre demand*."

Follow-up questions to NESO on this point confirmed that the 1-2GW of flexible data centre demand cited there is across the whole GB grid.[9]

However demand connections do not need to show strategic need, and therefore do not need to align with SSEP or Clean Power 2020, according to this House of Commons Library Briefing: "*Projects that can demonstrate they are both 'ready' and 'needed' will go into a priority queue called Gate 2.175 For supply connections (developments that will add capacity to the grid) this means projects for which there is a strategic need, in terms of the Clean Power 2030 strategy for example, can be prioritised. All demand projects (developments that will draw power from the grid) are considered 'needed' for the purpose of the Gate 2 criteria*."[10]

NPF4 and 'green data centres'

NPF4 contains a reference to 'green' data centres under National Development 12: digital fibre network[11] - but the greenhouse emissions impact assessment makes clear that the 'green' data centres referred to would have a negligible impact on our greenhouse gas emissions targets, as they were to facilitate a marginal increase in device use which would be offset by less travel to meetings. Crucially, NPF4 was being written before ChatGPT was launched, when no hyperscale AI data centres

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[9] NESO response to an APRS email enquiry: "The 1–2GW figure referenced as being optimised by the SSEP is GB-wide rather than Scotland-only. It reflects the volume of flexible data centre demand that is being spatially optimised within the SSEP, rather than a forecast or cap on future Scottish data centre demand. The volume of data centre demand considered in network planning will continue to evolve as projects progress through the connections process and as further evidence becomes available. Any updates would be reflected through future network planning publications."

[10] House of Lords Industry and Regulators Committee, Oral evidence: The energy grid and grid connections, 25 March 2025, Q110

[11] See p112 of NPF4 here:

had been proposed anywhere. It cannot be a reference to the current generation of huge AI data centres which are coming into the planning system across Scotland. We have written much more on this issue here, and communicated this both to the First Minister and to the Minister for Public Finance, Hannah Mary Goodlad.

In terms of what more is needed from the Scottish Government, not just on environmental issues, please see the final section of this document. As a basic starting point, research needs to be carried out by the Scottish Government into the cumulative impact of these projects, including for decarbonisation, grid stability and biodiversity.

Committee question 4: What can Scotland learn from other jurisdictions on the environmental impacts of data centre construction?

APRS commissioned a report earlier this year as part of a collaboration with the University of Edinburgh, which looked at international comparators, amongst other issues. It found as follows, with regard to Ireland, perhaps the European country closest to US levels of hyperscale data centre development.

Electricity demand from data centres in Ireland rose from 5% of the country's total demand in 2015 to 22% in 2024. EirGrid, the country's electric power transmission operator, forecast that data centre electricity demand would double from 9.4 TWh in 2025 to 14.6 TWh in 2034[12]. A report[13] by the Energy Policy & Modelling Group at the University of Cork found that all energy generated by new renewables built in Ireland between 2017 and 2023 were absorbed by data centres.

Committee question 5: What impact would different levels of data centre construction in Scotland have on the ability to meet carbon budgets and anticipated statutory biodiversity targets?

Approving even one project like Chapelcross (1GW demand) would significantly impact on our ability to meet carbon budgets, as data centre demand is not accounted for in the carbon budgeting process.

Approving all the projects in the pipeline would wipe out our grid decarbonisation achieved since 2000 (in 2004, wind power produced 0.8 TWh across Scotland: by 2024 offshore and onshore wind produced 30.1 TWh an increase of more than 35-fold) The projects in the planning pipeline would require **51 TWh** a year of energy between them[14]. Obviously all of these cannot possibly be built, due to the energy demand, unless onsite gas turbine generators provide the power (or, as some are advocating for, modular nuclear reactors), however, once they have planning permission, those decisions, and the impact on Scotland's climate targets, are out of

[12] Commision for Regulation of Utilities, "The CRU Publishes its Decision on New Electricity Connection Policy for Data Centres," 9th February 2026. [Online].
[13] H. Daly, "Data centres in the context of Ireland's carbon budgets," December 2024. [Online]
[14] The average load factor of a data centre of this sort is at least 80% (NESO states that the 'fleet wide average load factor is 70%, yet this has been judged to increase to 80-85% for hyperscale facilities and data centres dealing predominately with AI.) So a calculation of electricity use is 7.3x0.8x24x365

Scotland's hands and in those of NESO and the UK Government who have oversight on grid connections.

A proper strategic and cumulative assessment of the impact of hyperscale data centres on the grid, not yet conducted, might show space for some limited capacity without undermining the carbon budgeting process and the move to net zero: but without such a cumulative national assessment there is no coherent or sensible way for approvals to be given by individual local authorities.

Conclusion

APRS and SCCS have made the following recommendations to the Scottish Government[15], that they should:

- Communicate to the public, local authorities and developers how the national pause, supported by the Scottish Government in the Chamber on 16th September 2026, will be implemented;

- amend the Climate Change Plan to look at the cumulative and national picture;

- Deliver a proper assessment of the impact of new hyperscale data centres on Scotland's climate targets, communities, land and water resources and the electricity grid to inform the guidance.

- Deliver National Planning policy on data centres – either in NPF5, or stand alone national planning policy. This must include a statement of need in the national interest for any data centres covering the full range of data centre types, scales and purposes (ie how much capacity is required and what purpose it serves). And including guidance on the effective use of planning conditions to control environmental harms and negative impacts on community health and wellbeing, and how these will be monitored and, if necessary, enforced – as well as the delivery of community benefits.

- Reconsider the inclusion of "green data centres" in National Development 12 in NPF4. This could either: Remove "green data centres" from ND12, or:

    - Define the term "green data centres" very tightly so that the impacts of any green data centres match those set out in the existing lifetime greenhouse gas emissions analysis for ND12, **and**

    - Produce a revised statement of need for ND12 that includes all types and sizes of data centres falling within the above definition of "green data centres".

- Develop Scottish Government guidance that encourages data centre developers to submit full planning applications. Local planning authorities should be encouraged to use their power to request further information from

[15] Including in an APRS letter of 19 August and a SCCS letter of 29 September to Public Finance Minister Hannah Mary Goodlad

applicants in order to determine applications, especially if PPPs continue to be submitted.

- Consider data centres in carbon budgets (as required in Wales)
    - Assess the impact of hyperscale data centres (individually and cumulatively) on Scotland's ability to meet its legally set net zero target and Scotland's 5-yearly carbon budgets.
    - Assess the demand on the National Grid created by hyperscale data centres (individually and cumulatively) and how this will be managed alongside plans for electrifying and decarbonising heating, transport and industry.
- Require all data centres to set out their electricity and water usage and carbon impacts

Conduct a proper public consultation and engagement process around the guidance and strategic assessment which the Scottish Government have committed to publish.