



The Hidden Climate Problem: Why the software running AI might be a bigger problem than you think.

In short

- Britain wants to be an AI superpower in the global race while also achieving its Net Zero goals. As of now, those two goals, though achievable, present challenges that require a unifying methodology: the government's own estimates of emissions from new AI computers increased more than 100-fold after public pressure to disclose the information.
- Most attempts to make AI "greener" focus on the chips it runs on and the size of the models currently being operated. The code itself, which is the software telling the chips what to do, is mostly ignored.
- Research findings (Banerjee, 2026) show that rewriting the same AI model in more efficient software can reduce its electricity use by 4 to 24 times, with no real loss in accuracy. The same model, running on the same chip, with minimal code changes, can achieve more efficient and greener results.
- These savings are widely achievable using existing knowledge. They require no new power stations, no new chips, and no new planning permission.
- The POLICY CLUB recommends that UK policymakers require AI systems to disclose the computational energy used by their software, in the same way buildings and other physical assets publish energy ratings.

The UK's two-goal problem

Britain, like many countries, is struggling with two clashing priorities. On one hand, the UK wants to lead the world in the global AI race: the government has set up "AI Growth Zones" in Oxfordshire, North and South Wales, and the North East, and is funding new supercomputers in Bristol and Cambridge. On the other hand, it also has a legal duty under the Climate Change Act to reach Net Zero greenhouse gas emissions by 2050. As it stands, these two goals are in constant tension and require a coordinated approach.

Data centres already use about 2.5% of all UK electricity nationwide. MPs on the Commons Science, Innovation and Technology Committee have been told that the figure could quadruple by 2030. The Department for Science, Innovation and Technology (DSIT) expects six gigawatts of new AI computing capacity within a few years, while the Department for Energy Security and Net Zero (DESNZ) is planning for around one-tenth of that. After journalists pressed DSIT for its emissions figures, the department revised them upward by more than 100 times. Carbon Budget 7, the UK's next legally binding five-year climate plan due this summer, faces a conundrum: which set of numbers to use as the official figures.

Government policy so far has primarily focused on physical infrastructure, prioritising the construction of data centres and renewable power. Examples include building small nuclear reactors in North Wales equipped with better cooling systems, while also drafting new planning policies related to data centres in 2026. While these measures are important, similar attention needs to be given to the software running these machines, not just the machines themselves. As it currently stands, relatively little policy attention has been given to optimising the energy needed to operate this software, making its energy consumption heavy, using electricity inefficiently and, in many cases, wastefully.

The evidence: the code itself is wasting electricity

A study by Amar Banerjee (2026) is the first to measure systematically how much the choice of software — not the physical chip or model, but the software itself — adds to AI's electricity consumption and carbon footprint.

The research was conducted by running four common AI tasks on identical computers twice each: once in Python (the easy-to-use programming language that nearly all AI is written in today), and once in C++ (an older, harder-to-write language that runs much closer to the bare metal of the chip). The model, the data, and the hardware were unchanged; only the code was different.

- The C++ versions used 4 to 24 times less electricity than the Python versions. The effect was substantial and statistically robust.
- CO₂ emissions were reduced by more than 75%, with no meaningful drop in accuracy; in one task, accuracy was 97.4% versus 97.1%.
- A real text-classification web service moved from 5.1 to 1.07 kilowatt-hours per million queries, equivalent to a five-fold reduction, simply by rewriting the code.

The policy paper and framework propose a new design called C3-ECO, short for Compact Modelling, Conscious Coding, Energy-aware Execution, and Conscious Optimisation. The basic argument is that software design deserves to be treated as a climate policy issue, sitting alongside the choice of chip and the size of the model.

Two versions of the same AI, running on the same chip, can differ tenfold or more in their electricity use. That means today's "green AI" reporting can systematically undercount emissions because it treats software as a black box. A data centre using 100% renewable electricity can still be running wasteful software, though it may officially appear as a reduction in emissions. In reality, this may produce misleading data because software electricity use is not considered, which, if addressed, could reveal the true impact of energy optimisation.

What this means for the UK's existing tools

- **The Carbon Budget 7 plan** assumes a path for AI electricity use that does not take software efficiency into account. If software is not included in the methodology, the data forecast will be inaccurate, and ministers will plan to build more power capacity than that needed in reality.
- **AI Growth Zones** offer fast-track planning, cheap grid connections, and discounted electricity to data centre operators. These deals do not take into account whether the AI running inside the buildings is efficiently written.
- **The Crown Commercial Service**, which buys AI for the public sector, asks suppliers about accuracy and security. It does not ask about energy use. The taxpayer is buying inefficient code by default.
- **The National Policy Statement for data centers** expected in 2026 is the optimal opportunity to include software efficiency into the planning system and methodology before the next wave of facilities building and planning are implemented.

The POLICY CLUB Recommendations

1. **Request AI suppliers disclose how much energy their software uses during operation.** The Crown Commercial Service and DSIT should require any AI system sold or used by the government or backed by public funding to report the electricity used and CO₂ emitted per million uses, alongside its accuracy of software.
2. **Tie software efficiency to AI Growth Zone and data center planning approvals.** Operators getting fast-track planning, cheap grid access or subsidized electricity must be required to disclose their workloads run on efficient code. For example, by scheduling heavy AI jobs for times when the grid is greenest, tracking energy use in real time, and using efficient languages for high-volume tasks.
3. **DSIT and DESNZ use a unified methodology which includes software use before Carbon Budget 7.** The Climate Change Committee and the AI Energy Council should publish one shared method for forecasting AI emissions which includes software efficiency.
4. **Increase budget for UK research into efficient AI use for public services.** UKRI, the AI Research Resource, and the AI Security Institute should fund well-engineered, energy-efficient AI software for the high-volume tasks run by the NHS, the Ministry of Defense, the Department for Transport, the Met Office and HMRC.

The Result: Software efficiency can prove to be the cheapest and fastest climate win for the UK when it comes to its AI planning and forecasting. It requires no new power stations, no new planning permissions, and no new chips. It is easily

measurable and can be treated as either a climate policy or to continue to keep increasing the grid capacity to power emissions of unnecessary energy waste that better coding can prevent.

Reference: Banerjee, A. (2026). "Green AI or Overlooked Software Costs? Quantifying the Real Impact of Software Stacks on Scientific ML Emissions." *IEEE Computing in Science & Engineering*.

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