

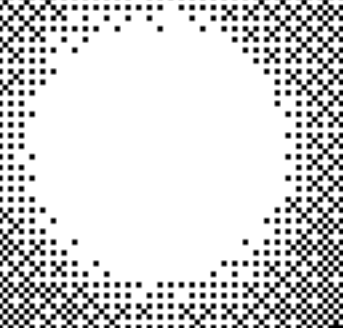
The insatiable hunger of AI

Global emissions from computing

* Computing already caused 4% of global CO2 emissions in 2020, and this is rising steeply.

* Renewables can't save us: they don't replace fossil fuel in time to avoid catastrophic warming.

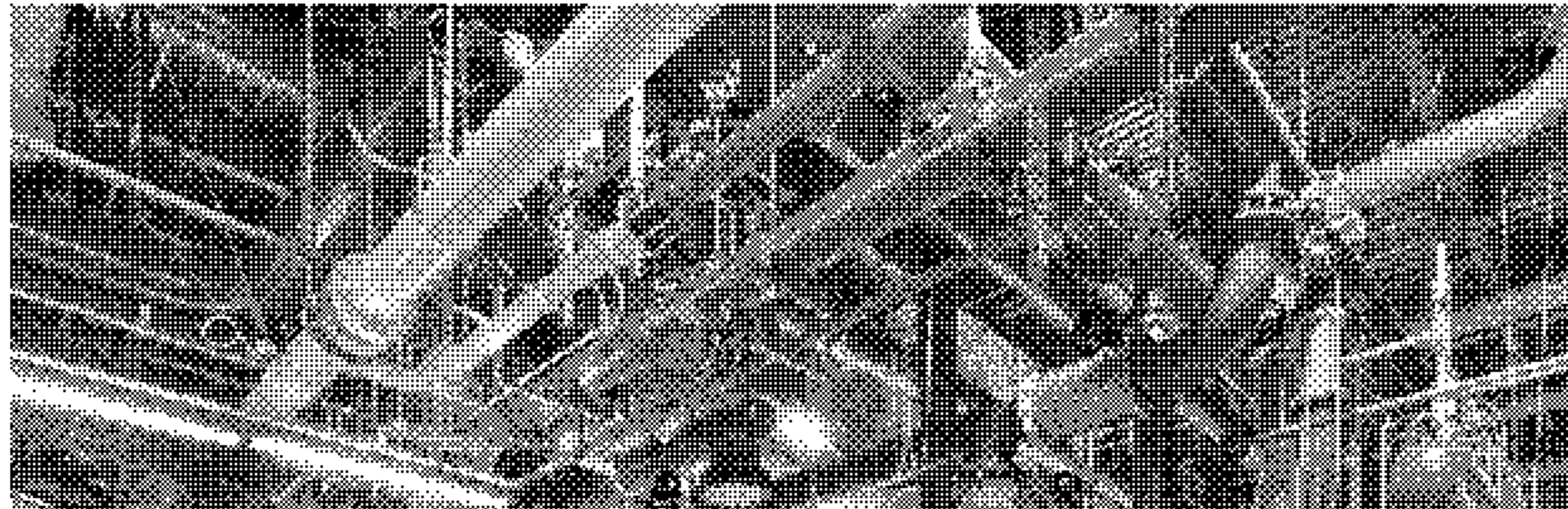
* We need to cut the energy consumption from computing.



AI hype drives emissions

Google's emissions climb nearly 50% in five years due to AI energy demand

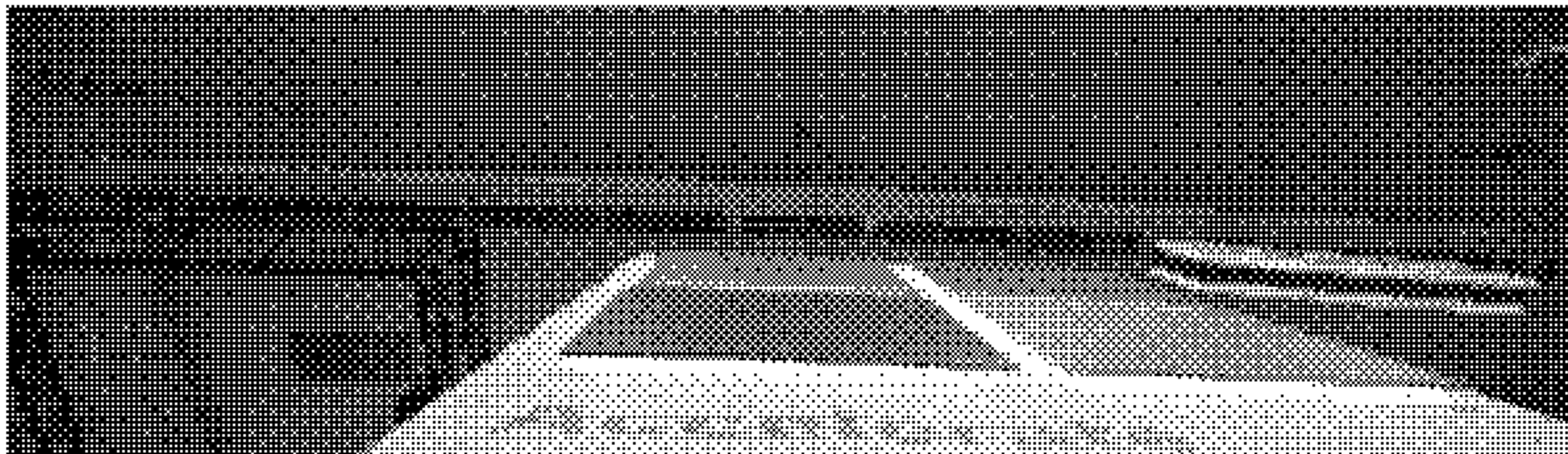
Tech giant's goal of reducing climate footprint at risk as it grows increasingly reliant on energy-hungry data centres



AI hype drives emissions

Microsoft's AI Push Imperils Climate Goal as Carbon Emissions Jump 30%

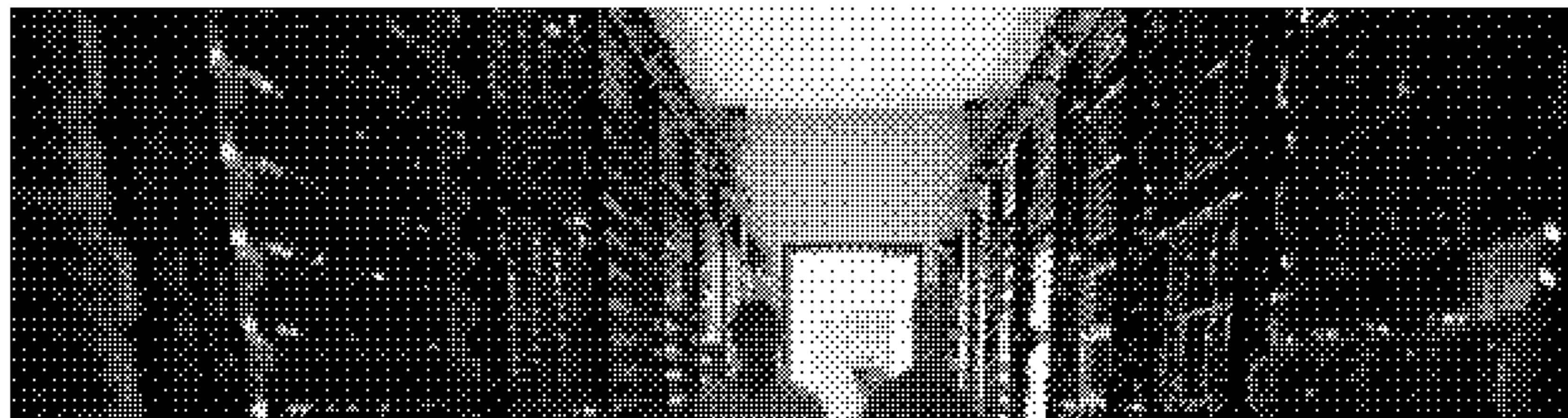
The company's goal to be carbon negative by 2030 is harder to reach, but President Brad Smith says the good AI can do for the world will outweigh its environmental impact.



AI hype drives emissions

Ireland's datacentres overtake electricity use of all urban homes combined

Statistics raise concerns that rise in demand for data processing driven by AI could derail climate targets



How much is too much?

- * Many estimates have been published about the energy and water consumption of training and queries.

- * To highlight a few:

 - * an AI-assisted query takes 60x more energy than a conventional one.

 - * Powering AI assisted search for Bing or Google requires more than 500MW.

 - * The largest wind farm in the UK produces 539 MW and covers an area of 55 square km (about the size of Manhattan).

 - * By 2027, AI demand may require about 5 billion cubic meters of water globally.

OpenAI says "Keep fossil fuels"

* The CEO (Sam Altman) has gone on record to say that there is not enough energy in the world to satisfy OpenAI's needs.

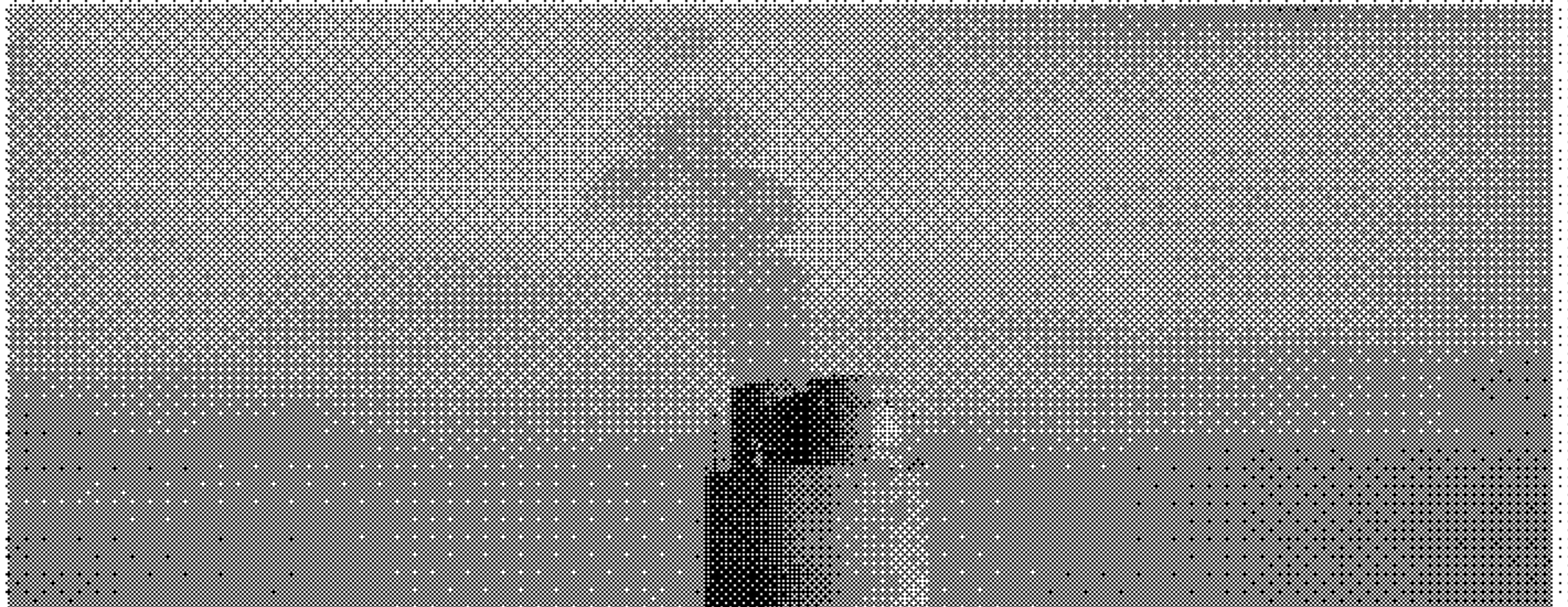
* He does some handwaving about nuclear fusion but he knows of course full well that we are not going to have this at scale any time soon.



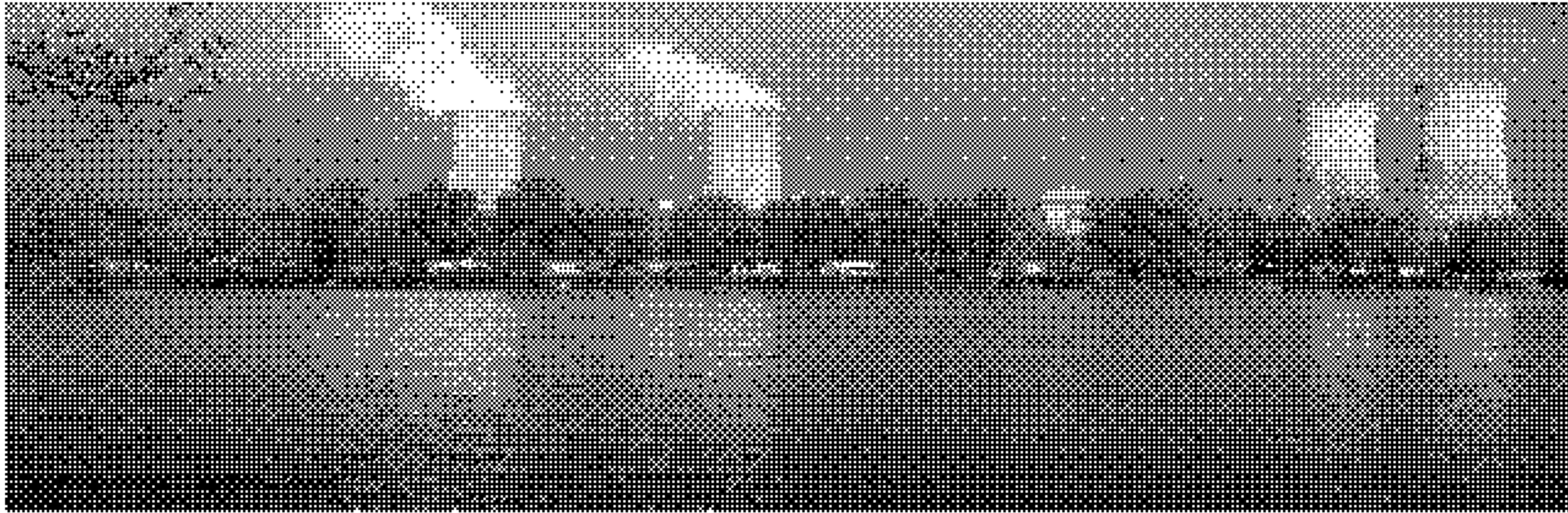
OpenAI

And so it begins ...

US slows plans to retire coal-fired plants as
power demand from AI surges



And so it continues ...



25th

Why Microsoft's move to reopen Three Mile Island reactor to meet AI's energy demands is concerning

Erin Chambers

And so it continues ...

TECH A.I.

OpenAI reportedly wants to build 5-gigawatt data centers, and nobody knows who could supply that much power

by DAVID MEYER

Illustration by JORDAN ROBERTSON



Sam Altman, chief executive officer of OpenAI.

PHOTO BY MICHAEL GOODMAN FOR THE NEW YORK TIMES

But what about energy efficiency?

- * The energy efficiency of computing is still doubling every 2.6 years.
- * If this trend holds for another 20 years, then by 2040, computers would be 64x more energy efficient.
- * So we could double compute capacity every 2.6 years without increasing energy consumption.
- * This is purely hardware efficiency. Software/algorithm efficiency gains would add to this.
- * Which means that Altman wants AI to grow even faster than that.
- * To do all that additional compute, they need a lot more computers, and that requires a dramatic increase in chip manufacturing.

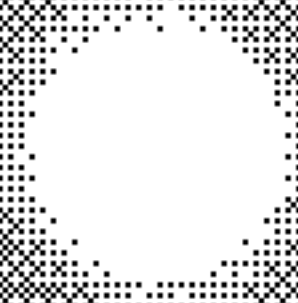
How much chips is too much chips?

- * The hardware is responsible for about 50% of the emissions from ICT.
- * Most of that is the chips (CPU, RAM, SSD, GPU, NPU ...).
- * OpenAI CEO Sam Altman wants 7 trillions dollars investment in the semiconductor industry.
- * For reference, the new 2 nm TSMC gigafab will cost \$34 billion.
- * Seven trillion would allow to build 200 such fabs.
- * currently, 16 fabs such are being built.
- * So Altman's plan could increase this by more than 10x, even if some of the money is used for other



The full scale of the AI madness

- * The planet's carbon budget by 2040 is 20 GtCO₂e/y.
- * Purely making so many chips would take 14% of the global carbon budget.
- * Running them could take again as much.
- * So this plan could see "AI" eating almost 30% of the global carbon budget for 2040.



But maybe it is a bubble

- * The number of articles saying so is growing
- * But there are plenty of articles saying the opposite
- * In any case, investment is still growing
- * And there is a lot of support from governments worldwide
- * So this bubble may be slow to burst



There is hope

- * The high energy consumption means high running costs.
- * As a result, OpenAI makes a loss on ChatGPT.
- * Google and Microsoft's increased emissions also mean increased running costs.
- * This is a motivation to increase the energy efficiency or scale down the activities.
- * Also, the hype is dying down: there are no productivity gains to justify the investments.
- * The financial industry is also getting wary.
- * So even if we get more efficient AI, it still does not deliver on its promises.

Thank you!

