THE INDIA FORUM
A JOURNAL-MAGAZINE ON CONTEMPORARY ISSUES

February 11, 2025

Counting the Environmental Costs of AI

By: Adam Smith

Ahead of the AI Action summit in Paris earlier this week, civil society groups raised the environmental costs of artificial intelligence.

Hundreds of civil society organisations have called on world leaders and industry heads to reduce the environmental harm of power-hungry, thirsty artificial intelligence ahead of an international summit this week.

The groups, which include European Digital Rights, Amnesty International and Climate Action Network Europe, demanded that AI companies phase out fossil fuels, ensure supply chains are ethical and be transparent about the social and environmental implications of proposed AI infrastructure in a joint statement.

"We call on policymakers, industry leaders and all stakeholders in the AI ecosystem to dedicate all necessary means to phase out fossil fuels across AI's supply chain," wrote Michelle Thorne, a director at Green Web Foundation which tracks how much renewable energy the internet uses.

"We must act now to develop the technology within planetary limits."

The Artificial Intelligence Action Summit in Paris summit aims to address the energy use of AI. A major producer of nuclear power, France wants to reconcile protecting the climate and AI ambitions, with officials saying a "likely" announcement on new developments will come during the event.

Google, Meta, Microsoft and others have pledged to tackle the climate crisis, yet green experts say the sector is not doing enough to mitigate the rising consumption of resources.

Here's how the growth of AI and tech firms' resource use is raising concerns about energy, water shortages and global warming:

How is AI requiring ever-more energy?

The energy required by AI has increased as new consumer products become more widespread, including ChatGPT, Microsoft Copilot, Gemini and Apple Intelligence.

A 2024 report from McKinsey showed that 65% of organisations it surveyed regularly use generative AI, nearly double the percentage from its previous survey 10 months before.

> Tech firms are secretive about the amount of public water used by data centres, and up to half of these centres don't measure water usage.

Amazon, Microsoft, Google and Meta more than doubled their combined energy use between 2017 and 2021, rising to about 72 terawatt-hours (TWh) in 2021, according to the International Energy Agency.

That is equivalent to approximately one quarter of all the energy used by Britain in 2022.

The information and communication technology sector causes between 2% and 4% of all carbon emissions produced each year, according to 2020 research from Lancaster University.

Chinese AI model DeepSeek is seemingly more energy-efficient than U.S. models, but that might lower the barrier to entry for AI companies - increasing overall energy demand.

How much water are tech giants using as AI evolves?

Training models involves feeding vast amounts of data into algorithms called Large Language Models, which are computationally intensive and need powerful hardware.

In Google's 2023 Environmental Report, the company said it consumed 5.6 billion gallons of water in 2022, or about 10 days' worth of water for the entire city of London.

> The number of people in cities facing water scarcity will rise from 930 million in 2016 to between 1.7 and 2.4 billion people in 2050.

Research from University of California, Riverside in 2023 found that ChatGPT consumed 700,000 liters (154,000 gallons) of clean freshwater as part of its training process.

Tech firms are secretive about the amount of public water used by data centres, and up to half of these centres don't measure water usage, according to one survey.

The tech industry's intensive water use comes as global demand soars and supplies dwindle.

The United Nations has predicted that the need for water will exceed supply by 40% by 2030, and estimated that the number of people in cities facing water scarcity will rise from 930 million in 2016 to between 1.7 and 2.4 billion people in 2050.

What are the possible solutions?

Tech companies could choose simpler models rather than large, complex ones to reduce their environmental impact, said Ayse Coskun, an engineering professor at Boston University.

"People have started to think about that: 'Do I need to really throw a large hammer at this little nail, when maybe I can just use a screwdriver?'" Coskun told Context.

> Microsoft plans to restart the Three Mile Island nuclear reactor in Pennsylvania to help power its expanding data centres.

Efficiency improvements and regulation will also be crucial, analysts predict.

The European Commission obliges data centres to report energy use and emissions.

China requires all public organisations to be entirely powered by renewables by 2032, and the U.S. Department of Energy is funding the development of more efficient semiconductors over the next two decades.

More radical approaches could ensure companies develop in line with climate goals, experts say.

"We need to go from viewing energy efficiency (and) lower carbon footprint impact as an 'added value' to making them a first-order constraint for any computer system, especially for large-scale data centers," Coskun said.

Large technology companies are also looking at nuclear energy to power the storage units that fuel products, especially AI.

For example, Microsoft plans to restart the Three Mile Island nuclear reactor in Pennsylvania to help power its expanding data centres.

However, nuclear reactors are expensive, and the waste remains radioactive for hundreds of thousands of years.

This story was updated on Feb 10th ahead of the AI Action Summit in Paris.

(Reporting by Adam Smith; Editing by Kieran Guilbert, Zoe Tabary, and Ayla Jean Yackley.)

Adam Smith is the technology correspondent for the Thomson Reuters Foundation based in London covering the intersection of technology and power.

This article first appeared on Context, powered by the Thomson Reuters Foundation.


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