



THE OVERLOOKED CLIMATE RISKS OF ARTIFICIAL INTELLIGENCE

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Give me an overview!

Artificial Intelligence (AI) is often promoted as a tool to tackle climate change, encouraging its expansion. 🌍 Meanwhile, concerns on AI's climate impacts are limited to the energy consumption of data centres. ⚡

To fully understand AI's climate impact, we map out the direct, indirect, and systemic ways AI can interact with the energy transition pathways beyond the energy use of data centres.

What was the method?

We started with MIT's Taxonomy of AI Risks on the left side of the map. On the right side, we identified the main building blocks of zero-emission energy pathways. 🤖 ➡️ 🌍

We conducted a scoping review of scientific literature, media reports, and grey literature (n=68) to identify links from AI risk domains to building blocks of zero-emission energy pathways. 🔍 📄

Why does this matter?

AI's risks to climate is complex, dense, and diffuse. AI exacerbates many existing threats to the energy transition. The indirect and systemic risks can be more consequential than the direct energy consumption of data centres. 💡

We will need upstream (i.e. AI model development) and downstream (i.e., use of AI) policy and governance to align AI with our climate goals. ⚖️

AI RISK TAXONOMY

socioeconomic environmental harms

environmental harms
S1 data centres' energy needs
S2 lower transaction costs induce demand
power centralisation
S3
S4 AI zones prioritised for economic development
S5 e-government dependence on tech companies
S6
inequality, worse jobs
Q1 lower job security & autonomy
Q2
Q3 job precariousness & anxieties
Q4
Q5
Q6 jobs displaced in culturally conservative groups
Q7

human-computer interaction

loss of human agency
H1
H2 AI-created choice architectures
H3
H4 apathy response to automated decisions

discrimination

unfairness
D1
D2
toxic content
D3 privileging of outrage & incendiary content

privacy & security

system vulnerabilities
P1 concern about data breach
P2 cybersecurity threats to critical infrastructure
P3 shocks to interdependent systems
compromised privacy
P4

misinformation

misleading or false info
I1 genAI hallucinations misinform decisions
I2 more credible misleading info from genAI
I3 emotional amplification of worst case outcomes
polluted info ecosystem
I4

malicious actors

disinformation
A1 deepfakes for large-scale manipulation
A2 advanced phishing attacks

Results (selected examples)

new hyperscalers with large inflexible loads → S1
spatially-concentrated electricity demand → S4
energy-intensive activity → S2
promotion of high-carbon travel → H2
unemployment reduces investment capital → Q1
slower adoption of IoT devices, EVs → P1
slower adoption of heat pumps, EVs → I3
lower perceived self-efficacy to act on climate → H4
regulatory capture of policy enforcement → S5
costs for protecting digitalised energy networks → P2
finite pool of worry reduces climate concern → Q3
fossil fuel support weakens divestment urgency → I2
polarisation prevents cross-party cooperation → Q4
false info on climate risks exploited politically → I1
undermining credibility of climate science → A2
promotion of extreme climate scepticism → D3
synthesised opposition to climate initiatives → A1
cascading failure in digitalised systems → P3

PATHWAYS TO ZERO-EMISSION ENERGY SYSTEMS

