

# IMPACT OF AI ON CLIMATE CHANGE

Lawrence Hanson

AI is accelerating climate change today through its incredible resource hunger yet paradoxically also provides the key to significant mitigation in the long term. This article looks at some of these impacts from both a qualitative and quantitative point of view.

- Energy Consumption

There is an explosive energy consumption particularly from data centres (DC). DC will more than double by 2030 to around 945 tera-watt hours (1). **A single AI query uses ten times more power than a search engine** (2) with data centre CO2 emissions **projected to grow 80% by 2030** (3).

- Fossil Fuel Reliance

Around **60% of new DC will be serviced by fossil fuels** (1). This is estimated to add 220 million tons of CO2 by 2030 (1).

- Increase in Water Usage

A single average DC is estimated to consume up to **19 million litres of water daily** (4)

- E-Waste increase

There will be an escalation in E-waste. AI hardware (specifically GPUs) has a short life span of between 2 to 5 years (2). E-waste could reach between **2 and 5 million metric tons by 2030** (2). This will exacerbate the leaking of **toxic materials** into the environment.

- Infrastructure Paradox

AI systems are being used to **monitor climate tipping points and investigate ways to mitigate the climate crisis**. They are energy intensive (impacting carbon budgets) yet could be beneficial in the long term. The fast development of these AI systems is currently **outpacing the sustainable energy systems needed to support them** (5)

## Conclusion

There is a clear and present acceleration impacting climate change through increased emissions, resource depletion and E-waste. Balanced against this, is the promise (somewhat uncertain) that AI can provide a powerful tool for climate solutions such as improved modelling; optimisation of power grids with renewable

energy; and the possibility of new materials (5, 3, 6). A (perhaps optimistic) projection from the IEA suggests that with the **widespread adoption of existing AI applications could potentially reduce CO2 emissions 1.4 Gt by 2035**. This is around three to four times larger than the entire DC sector's current footprint

In summary, through its enormous hunger for resources, AI is accelerating climate change now . Yet it holds the possibility of significant mitigation in the future. The outcome depends on our ability to **deploy AI appropriately using clean renewable resources**.

## References

1. MIT
2. American National Standards Institute (ANSI)
3. International Energy Agency (IEA)
4. Environmental and Energy Study Institute (EESI)
5. MIT Climate and Sustainability Consortium
6. KAIST IAM Group

Note: AI was used in preparing this article