

# Impact of *artificial intelligence*: risks and opportunities for the environment

FABIENNE TATOT AND GILLES VERMOT-DESROCHES

On November 30th 2022, the Californian company OpenAI launched its chatbot ChatGPT. Free and accessible to all, this tool made citizens, the media and decision-makers aware that the democratisation of generative artificial intelligence (AI) was going to become unavoidable and experience exponential development worldwide.

In 2023, the 28th Conference of the Parties on Climate Change (COP 28) in Dubai enshrined AI systems as major tools in the fight against climate change. Today, AI is helping to reduce our environmental footprint through systems created specifically for their ecological usefulness - such as measuring air quality and predicting the concentration of fine particles several hours in advance - but also indirectly by improving the energy efficiency of all human activities: controlling road traffic flows, heating buildings, managing waste, etc.



**of the world's electricity consumption is due to AI.**

**That's 1 to 2% for digital technology as a whole (IEA).**



**more electricity consumed for a ChatGPT query than for a Google search (IEA).**

While COP 28 rightly saw AI as an effective tool in the fight against climate change, it did not address the issue of its environmental impact. Before generative AI, most artificial intelligence systems (AIS) required quantities of resources (energy, water, etc.) similar to other digital uses. But this content-generating AI is now marking a break with the past: it requires more electricity, rare metals, water and artificial spaces, both in its material aspect (terminals, networks, data centres) and in all the stages of its life cycle (manufacture, distribution, use and end of life). While this use of resources is still marginal in relation to total consumption, the rapid and massive development of AI points to a trend towards a worsening of its environmental footprint. We need to anticipate a potential rebound effect: as progress in AI saves resources, users could paradoxically intensify their use of AI.

## Six ways to develop frugal AI with an environmental purpose

- 1 Ensure that those involved in initial and continuing training include eco-design and frugal use requirements for AI development and algorithms in their AIS training programmes.

→ *Why ?*

So that engineers and IT experts can limit the environmental footprint of their company's AI-related digital activity, both in the design and use of AIS.

- 2 Concentrate public research and innovation and innovation funding on AI with a direct environmental aim and frugal AI.

→ *Why ?*

Because corporate funding is mainly for AIS in areas such as targeted marketing or finance, and not for running optimisation algorithms that benefit the for the environment

- 3 Systematically assess the environmental footprint of AIs, by requiring the companies concerned to be transparent about their consumption of resources and by developing an assessment benchmark.

→ *Why ?*

Because an assessment of the environmental footprint specific to AIS does not yet exist, and because it is an essential prerequisite for making both companies and consumers more responsible in their use of AI.

- 4 Launch an information campaign aimed at users users to develop their knowledge of the environmental footprint of AI and give them the option of disconnecting AI uses and data collection on their applications.

→ *Why ?*

Because each and every one of us can and must become aware of the environmental impact of our use of AI, and has the power to choose to use it more purposefully, less frequently, and therefore more sparingly.

- 5 Systematically integrating eco-design approaches of equipment, particularly terminals.

→ *Why ?*

Because the renewal of terminals is accelerated by the development of AI, and because this equipment has a significant environmental impact, both in its construction and in its operation.

- 6 Enforce the objective of zero net artificialisation for data centre projects, and incorporate the principle of recovering waste heat for each project.

→ *Why ?*

Because it is possible to build data centres on sites that have already been developed (such as former industrial wastelands) and the heat they emit can be recovered to heat other buildings, thereby offsetting part of the carbon footprint of data centres.

### THE RAPPORTEURS

**Fabienne TATOT**  
01 44 43 64 12  
fabienne.tatot@lecese.fr

Advisor to the ESEC and National Secretary of the CGT General Union of Engineers, Managers and Technicians.

**Gilles VERMOT-DESROCHES**  
01 44 43 64 20  
gilles.vermotdesroches@lecese.fr

ESEC Advisor and Director of Sustainability and Citizenship at Schneider Electric.