WHERE ARE THE **ENVIRONMENTAL IMPACTS** OF AI HIDDEN?

48 % of people in France were using AI in 2025. Like any digital service, AI runs on **physical infrastructures and hardware**. It generates environmental impacts through AI models **training** and subsequent **usage** ("inference"). Those impacts vary in nature:

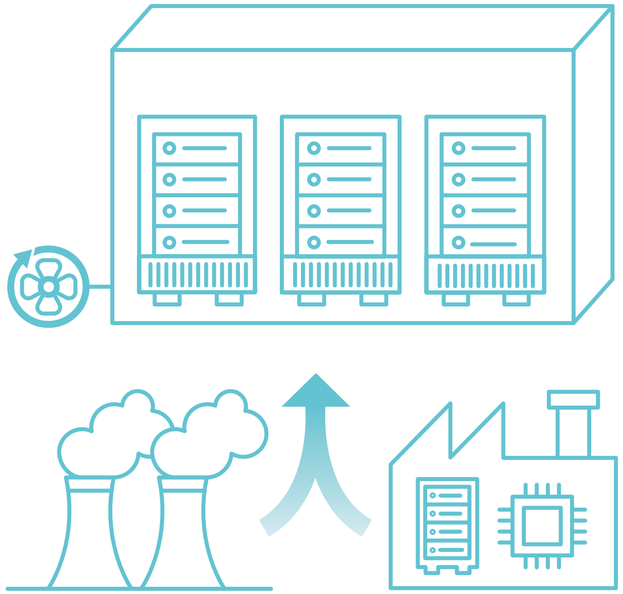
- **Power consumption**
- **Greenhouse gas (GHG) emissions**
- **Water consumption**
- **Soil sealing**
- **Abiotic resources depletion (metals & minerals)**

AI models training requires significant computational power. The impact mainly depends on the size of the models (number of parameters), the electricity mix, and the hardware used (chips and servers). However, both the number of models and their size continue to grow.

The **environmental impact of usage** is linked to the number of prompts submitted by users. It also depends on the type of task requested, such as generating text, images, or videos. The number of prompts continues to grow in line with the number of users and the widespread adoption of these services.

DATA CENTRES

Data centres are at the heart of AI's environmental impacts. Producing and operating specialized servers and chips is driving a sharp rise in power demand, which could double by 2030 according to the IEA.



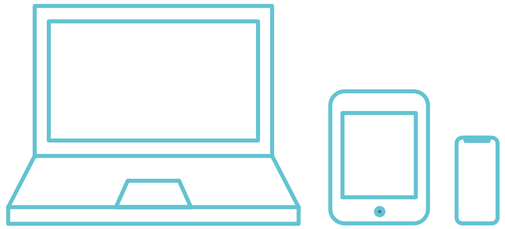
Energy production

Chip and server manufacturing

Interdependencies

END-USERS DEVICES

AI usages can accelerate device obsolescence, lead to earlier replacement cycles and drive the production of new equipment.



NETWORKS

AI's impact on future network capacity requirements remains uncertain.

Crédit: Arcep

9 RECOMMENDATIONS FOR MAKING AI DEVELOPMENT COMPATIBLE WITH PLANETARY BOUNDARIES

Arcep's report on **"The environmental challenges of generative AI"** revealed that the largest models are always the heaviest energy consumers, and that some more energy-efficient models are capable of providing responses that are just as relevant as the large models. Limiting energy consumption does therefore not necessarily means having to compromise the model's performance.

To ensure that AI and its infrastructures are deployed under conditions that are compatible with the nine planetary boundaries, Arcep has formulated four courses of action covering nine recommendations.

IMPROVE THE ASSESSMENT AND UNDERSTANDING OF THE ENVIRONMENTAL IMPACT OF AI

1. **Implement the collection and publication of AI environmental data** by public authorities
2. **Use internationally standardised** environmental impact assessment methodologies to facilitate comparisons between AI systems

PROMOTE THE ECODESIGN OF AI SERVICES AS A STRATEGIC LEVER FOR EUROPEAN COMPETITIVENESS

3. **Integrate the ecodesign of AI services** into European regulation of providers
4. **Strengthen eco-conditionality** in innovation support and public procurement rules

ENABLE USERS TO CHOOSE THEIR GENERATIVE AI SERVICES ON THE BASIS OF THEIR ENVIRONMENTAL IMPACT, THROUGH AN APPROPRIATE EUROPEAN REGULATORY FRAMEWORK

5. **Require greater environmental transparency** from chip suppliers and the main AI model and service providers
6. **Ensure AI services remain open**

CONSTRUCT A DEVELOPMENT STRATEGY FOR DATA CENTRES IN EUROPE THAT COMBINES SOVEREIGNTY AND SUSTAINABILITY

7. **Inform government and investment choices:** make transparency and data-driven regulation assets for the development of data centers in Europe
8. **Strengthen European coordination between digital, energy and infrastructure policies to support the development of data centers**
9. **Encourage a coordinated territorial approach of data centres deployment**

Arcep will continue this work, as well as its dialogue with all of the stakeholders, to work together on eco-designed generative AI services and sustainable digital infrastructures.

Read the full report: