*Press release*

**THE ENVIRONMENT**

# The digital environmental footprint in France: ADEME and Arcep submit their first report to the Government

Paris, 19 January 2022

**In August 2020, the Ministry for the Ecological Transition and the Ministry for the Economy, Finance and the Recovery assigned ADEME and Arcep with a joint 18-month task, to measure the digital environmental footprint in France and identify levers of action and best practices for reducing it.**
**Today, the two organisations submitted their study's first two reports to the Government.**

If often viewed in a positive light, because it creates growth and new business models, digital technology is nevertheless responsible for 2.5% of the carbon footprint in France, and growing fast. To tackle this issue, and to meet the European Commission's targets for 2030 and 2050 and satisfy the commitments made under the Paris Agreement, the Government tasked ADEME and Arcep with measuring the digital environmental footprint in France.
This task force sought specifically to:

- qualify fixed and mobile networks' current carbon footprint, and establish forecasts for 2030 and 2050;
- quantify the digital environmental footprint for the entire system (devices, networks, data centres) by considering consumer and business usage;
- define levers of action and best practices to reduce this footprint.

## A rigorous methodology that assesses the digital environmental footprint in its entirety

It was the life-cycle assessment (LCA) methodology that was chosen for this study, then submitted to a third-party for critical review. This LCA approach is based on international standards and public sector benchmarks, and is at once:

- **Multicriteria**, as digital technology's environmental impact is not confined to greenhouse gas emissions. This assessment of the digital environmental footprint is based on 11 environmental indicators in addition to its carbon footprint;
- **Multi-stage**, to incorporate the impact generated at every stage of equipment's lifecycle (production, distribution, utilisation and end-of-life);
- **Multicomponent**, to understand these complex systems composed of a multitude of equipment, each with its own lifecycles. The study is thus broad in scope, breaking digital technology down into three hardware components, namely devices, networks, and data centres.

## Key findings

- Of the three digital components that constitute the scope of this study, it is **devices** (and displays and televisions in particular) that are responsible for **65% to 90% of the environmental footprint**, according to the environmental indicator considered.

- Of all the environmental impacts, **abiotic resource (fossil fuel) depletion, the carbon footprint, ionising radiation, tied to energy consumption,** as well as the depletion of **abiotic resources (minerals and metals),** emerge as digital technology's predominant effects on the environment.

- Of all the stages of the lifecycle of the goods and services being considered, the **production phase** has the biggest footprint, followed by the utilisation phase – together often accounting for up to 100% of the impact on the environment, depending on the environmental indicator considered.

The study **also confirms the complexity of the exercise and** identifies **the key obstacles** that need to be lifted to quantify these impacts more accurately, along with **courses of action to reduce them.** This work thus marks the first step of a longer work cycle. And indeed confirms:

- the need for more in-depth knowledge of the impacts, for data collection and paving the way for the creation of public databases on this issue;

- the need for reliable data to fine-tune the modelling of digital's different components;

- the need to take action to curb the environmental footprint of "equipment" and "hardware" (extending the life of digital equipment, repairability, durability, reuse, refurbishing, functional and repair economies) without overlooking the interdependence of networks, data centres and devices;

- the need to involve every stakeholder, in other words:
    - the businesses that design digital services, hardware and software, to move towards sustainable design;
    - consumers and business users who need to be made more aware of responsible and sober use of digital services.

***Based on this initial work, ADEME and Arcep have also begun a forward-looking analysis of the digital footprint in 2030 and in 2050 based on the four ADEME scenarios. The results are expected in May 2022.***

**Associated documents:**

- Report on the joint mission to measure the environmental impact of digital technology in France (on annex to the press release)
- Executive Summary produced by ADEME and Arcep
- First part of the report (methodological review)
- Second part of the report (environmental impact assessment)
- Summary of the second part of the report

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## ANNEX

### FINDINGS OF THE ADEME – ARCEP JOINT TASK FORCE TO MEASURE THE DIGITAL ENVIRONMENTAL FOOTPRINT IN FRANCE

**The digital transition profoundly altered the rules governing every sector (e-mail, the cloud, etc.), lifestyle (video games, communicating via smartphones, high quality video on demand etc.) and consumer habits (online shopping, multiple and frequent electronic device purchases, etc.).** From home to work, by way of businesses, the city and government services, digital technology is central to our daily lives. Often viewed as a positive because it creates jobs, generates growth and new business models, it is also responsible for 2.5% of the carbon footprint in France, and a heavy consumer of non-renewable resources. To meet the European Commission's targets for 2030 and 2050 and the commitments made under the Paris Agreement, the Government assigned ADEME and Arcep the task of measuring the digital environmental footprint in France and identifying levers of action and best practices to reduce it.

**Today, ADEME and Arcep are presenting the findings of this research on the digital environmental footprint in France.**

### What are the main environmental impacts of digital services in France in 2020?

**In France as a whole:**

- **Electricity consumption for digital services in France is estimated at 48.7 TWh**, which can be compared to the country's total consumption of 475 TWh[1], which means that **digital services account for 10% of electricity consumption in France, or the equivalent of the annual power consumption of 8,282,000 French households.**
- The carbon footprint of digital services in France stands at 16.9 Mt CO2 eq., which can be compared to the country's total of 663 MT CO2 eq.[2], which means that **digital services account for 2.5% of France's carbon footprint** – slightly higher than that of the waste sector in France (2%).
- **62.5 million tonnes of resources (MIPS[3]) are used annually** to produce and use digital equipment.
- **20 million tonnes of waste produced annually over the entire lifecycle.**

**On the individual level:**

- **Digital's average annual impact on climate change is similar to every person driving a car 2,259 km.**
- **Waste production equals 299 kg per capita** for equipment's entire lifecyle (from production to end-of-life).
- **The mass of materials moved during the production stage equals 932 kg per capita.**

### What are the main contributors to the digital environmental footprint?

**The main contributors to the digital footprint are user devices, i.e. electronic devices (between 64% and 92% of the footprint, with TV screens topping the ranks),** followed by **data centres (between 4% and 22% of the footprint)** and **networks (between 2% and 14%).**

A second level of impact distribution is presented for each stage of the lifecycle (production, distribution, utilisation, and end-of-life). The findings show that **the production phase is the largest contributor for all three tiers (devices, networks and data centres) followed by the utilisation phase.** This last point also

[1] *Source: IEA https://www.iea.org/data-and-statistics/data-browser?country=FRANCE&fuel=Electricity%20and%20heat&indicator=TotElecCons*

[2] *2019 – Source: Ministry for the Ecological Transition https://www.statistiques.developpement-durable.gouv.fr/estimation-de-lempreinte-carbone-de-1995-2019#:~:text=M%C3%A9thodologie-,En%202019%2C%20empreinte%20carbone%20est%20estim%C3%A9e%20%C3%A0%20663%20million,France%20a%20augment%C3%A9%20de%207%20%25*

[3] *MIPS - Material Input Per Service-unit: the MIPS indicator is used to calculate the resources used to produce a unit of a product or service in a life-cycle assessment approach (Schmidt-Bleek, 1994)*

confirms the importance of public policies and regulations geared to extending the life of digital equipment, promoting product durability, reuse, refurbishment, and functional and repair economies.

There are two reasons why production has such a large impact:

- **It takes a great deal of energy to produce the devices that deliver digital services.** This energy is produced chiefly in countries with a carbon-intensive energy mix (such as Asia and the United States) which creates a large carbon footprint.
- **This equipment uses vast quantities of rare earths.** These materials also require a great deal of resources and energy for their extraction and generate a great deal of waste. Which explains the heavy impact on resources and waste production.

**The main impact during the utilisation phase comes from electricity use**

The end-of-life phase for digital equipment creates a negative footprint if these devices are not sorted and collected for processing in recycling and reuse channels, and can therefore have a positive footprint thanks to recycling.

## Details on the environmental impact of digital services

To provide a complete analysis of the causes of the digital environmental footprint, **ADEME and Arcep studied each digital services segment separately: user devices, networks, and data centres.**

- **Segment 1: User devices**

User devices encompass a wide variety of equipment, each with a different kind and degree of environmental impact. Overall, **televisions have the largest footprint (between 11% and 30% of the total)**, chiefly because of the large number of materials and equipment needed to produce them. **Other devices with a significant environmental impact (between 5% and 15%) are:**

  - Laptop computers
  - Tablets
  - Smartphones
  - Desktop computers
  - Set-top boxes
  - Home game consoles
  - Printers
  - Other displays

- **Segment 2: Networks**

Networks can be divided into fixed (xDSL, FTTx) and mobile (2G, 3G, 4G, 5G). Although there is not a complete separation between the two (they share some equipment), a distinction can be made between the individual footprint created by the two types of network.

**In France as a whole, fixed networks have a larger environmental footprint than mobile ones (between 75% and 90% of the total, compared to between 10% and 25% for mobile).** Fixed networks consume more electricity during the utilisation phase, and require more equipment, notably due to the boxes installed on users' premises. However, when calculated by Gb consumed on each network, fixed networks' environmental impact becomes smaller than mobile networks'. Per Gb of traffic, mobile networks have close to three times the footprint of fixed networks for all the environmental indicators studied. **This, however, is an accounting breakdown of the impact per Gb for the purpose of illustration, which in no way compares fixed and mobile networks' efficiency.**

- **Segment 3: Data centres**

Data centres are divided into different types: local public and national public, enterprise, colocation, and HPC (High Performance Computing). The data centres with the greatest environmental impact are:

  - **Colocation centres (between 35% and 50% of the footprint);**
  - **Enterprise data centres (between 30% and 45% of the footprint);**
  - **National and local public data centres (between 5% and 15% of the footprint);**
  - **HPC data centres (between 0.1% and 5% of the footprint).**

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The environmental footprint comes down chiefly to the number of m² in a data centre, the number of servers, storage and power consumption. A more detailed analysis of the hardware that makes up a data centre reveals that it is the servers in particular, and storage to a lesser degree, that generate the greatest impact.

## Main levers of action to reduce the digital environmental footprint

The results of the ADEME and Arcep study demonstrate the importance of using a multicriteria approach to assessing the environmental impact of digital services. Indeed, **although the effects of climate change are considerable, other effects such as the depletion of abiotic resources (minerals and fossils) and ionising radiation also represent major points to consider.**

The analysis of the digital environmental footprint reveals that **the production phase has the greatest impact (78% of the carbon footprint)**, followed by **the utilisation phase (21% of the carbon footprint)**, which confirms the **importance of public policies aimed at extending the life of digital equipment, by promoting product durability, reuse, refurbishment, and the functionality and repair economies.**

The study **confirms the complexity of the exercise and** identifies **the key obstacles that need to be lifted to improve measurement.** This evaluation work is just one stage in a lengthier endeavour to:

- **Fine-tune and disseminate a proven and operational methodology:** certain aspects still need to be refined and the methodology more widely adopted;
- **Enable access to more data** on the multicriteria environmental impact (inventory of required materials and multicriteria impact). Regarding inventory data: they are often protected by business secrecy and include sensitive data for the sector's players. Regarding impact data: a sufficiently exhaustive, fully audited and freely available database does not yet exist. **This is the aim of the ADEME impact database[4].** Added to which, **Arcep's expanded data collection powers should prove an important contributor** to making more efficient progress[5].

The work that is already underway in the two institutions should help lift some of the identified obstacles. In particular, **ADEME continues to work on fine-tuning existing methodologies** for product categories. **Arcep,** for its part, **is working on building a barometer of the digital environmental footprint.**

*NB:* ***ADEME and Arcep have also begun a forward-looking analysis of the digital footprint in 2030 and in 2050 based on the four ADEME scenarios. The results are due to be released in May 2022.***

[4] https://base-impacts.ademe.fr/

[5] The Law gives the Regulatory Authority for Electronic Communications, Postal Affairs and Print Media Distribution (Arcep) the power to collect data on the digital environmental footprint. Thanks to the creation of an environmental barometer, this should open up access to certain data that are needed to achieve a more accurate measurement of the digital environmental footprint in France.

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**ADEME AT A GLANCE**

At ADEME – France's National Agency for the Ecological Transition – we are firmly committed to fighting global warming and resource depletion.

We work to mobilise citizens, economic stakeholders and local players on every front, providing them with the means to transition to a resource-efficient, low-carbon, fairer and more harmonious society.

We advise, facilitate and assist in financing a great many projects in every area – energy, the circular economy, food, mobility, air quality, adapting to climate change, land use… – from research to solutions sharing.

We lend our expertise and forecasting abilities to public policymaking at every level.

ADEME is a public establishment, under the joint authority of the Ministry for the Ecological Transition and the Ministry for Higher Education, Research and Innovation.

**Arcep AT A GLANCE**

The Regulatory Authority for Electronic Communications, Postal Affairs and Print Media Distribution (Arcep), a neutral and expert arbitrator with the status of independent administrative authority (IAA), is the architect and guardian of internet, fixed and mobile communications and postal networks in France.

When it was first created, Parliament assigned the Authority the task of shepherding the electronic communications sector through its opening to competition, so that new operators might emerge alongside the incumbent carrier (France Télécom, which later became Orange), and this for the benefit of end users. Arcep's core mission is to ensure that the networks develop as a common good.

Today, society is questioning the role of new technologies, especially with respect to their environmental impact. Arcep has taken this issue on board by opening a new regulatory chapter. It is listening to these concerns and using its position as a neutral expert on the sector to facilitate discussions over future networks and their place in society.

It oversees the regulated sectors and contributes to the dialogue between all the stakeholders through consultative committees.

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