SURVEY

"ACHIEVING DIGITAL SUSTAINABILITY"

2026 EDITION EXECUTIVE SUMMARY

2024 data

Arcep is publishing the 5th edition of its "Achieving digital sustainability" survey. It presents data collected from digital market actors, providing an annual account of the evolution of their environmental impact in France.

Arcep continues to enhance its survey: this 5th edition includes an initial assessment of the environmental impact of fixed network equipment suppliers that manufacture fibre optic cables (sales, energy and water consumption, embodied greenhouse gas emissions), along with new indicators for device manufacturers and data centre operators. The addition of average energy consumption indicators for certain devices makes it possible, for instance, to obtain an initial assessment of the environmental impact of different display technologies during the use phase.

Information on data centre operators' activities document these actors' growing effect on ICT's environmental footprint, at a time when the generative AI services they host are booming. All of these elements together help to better identify potential levers for reducing the environmental impact of digital technology.

A GROUNDBREAKING PROCESS HERALDED BY THE WORLD BANK AND THE INTERNATIONAL TELECOMMUNICATION UNION (ITU)

The two institutions published a joint case study in 2025 entitled *"Measuring National ICT Sector Environmental Impact: Arcep Case Study – France,"* calling Arcep *"the first and only sectoral regulator today that publishes indicators on the data collected from ICT industry players to assess and track their environmental impact"*.

SUMMARY

PART 1 ENVIRONMENTAL IMPACT OF DATA CENTRE OPERATORS

PART 2 ENVIRONMENTAL IMPACT OF ELECTRONIC COMMUNICATIONS OPERATORS AND NETWORK EQUIPMENT SUPPLIERS

NEW!

PART 3 ENVIRONMENTAL IMPACT OF DEVICE MANUFACTURERS

METHODOLOGY BEHIND THE SURVEY

KEYS TO UNDERSTANDING THE SURVEY'S METHODOLOGY

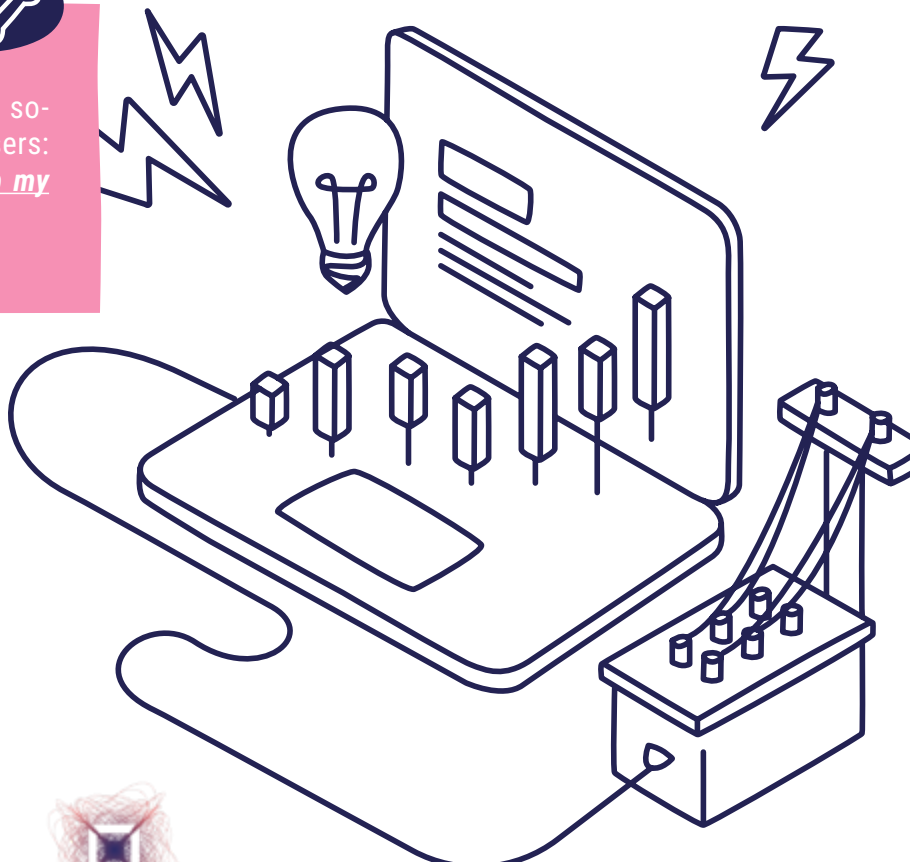
To conduct a complete carbon audit as recommended by the international GHG Protocol (used for this survey), three types of emission are examined:

- **Scope 1 :** covers all emissions generated directly by a company and its activities: e.g. plants, facilities, warehouses, offices, company-owned vehicle fleets, etc.;
- **Scope 2 :** covers all indirect energy emissions associated with the consumption of electricity, heat or steam;
- **Scope 3 :** corresponds to all other indirect emissions generated by sources that are not owned or controlled by the company, such as emissions associated with the goods and services acquired for its activity, or the use that is made of the goods and services its sells.

For the purposes of the survey, only Scope 1 and 2 emissions are assessed.

PRACTICALLY SPEAKING

To find out more about individual digital sobriety levers, Arcep produced an FAQ for users: ***"ICT devices and practices: how can I curb my environmental footprint on a daily basis?"***.



PART 1

ENVIRONMENTAL IMPACT OF DATA CENTRE OPERATORS

For the third year in a row, Arcep delivers the findings from the data collected from France's largest colocation data centre operators (23 in all), which operate close to 160 data centres across the country.

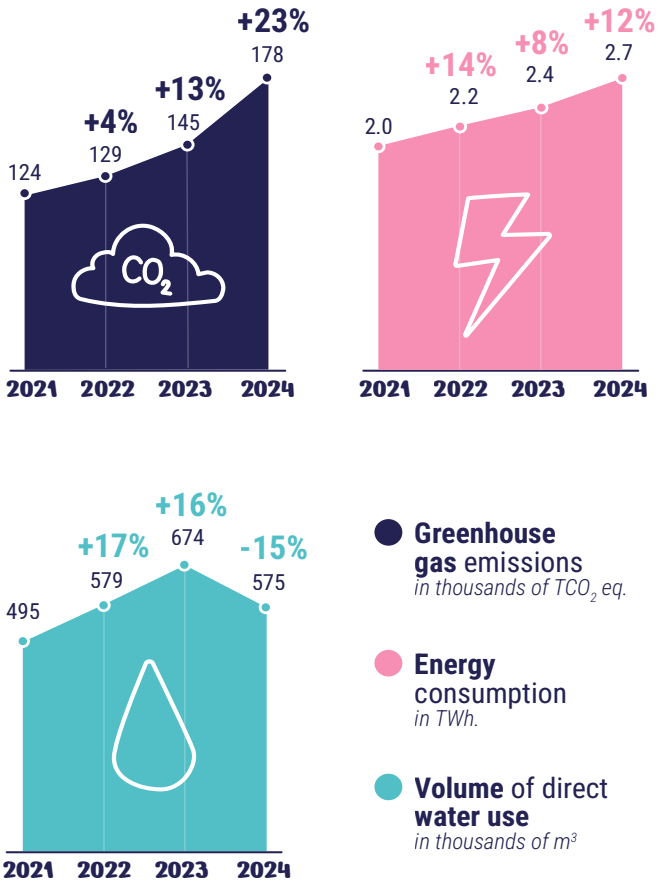
Studying the impact of these actors has become critical as the digital solutions they host are expanding. According to the 2026 Digital Market Barometer, for instance, close to half of the people in France surveyed in June 2025 reported using generative AI solutions, a figure that climbs to 85% amongst 18 to 24-year-olds.

1 GHG EMISSIONS AND ENERGY CONSUMPTION CONTINUE TO INCREASE SIGNIFICANTLY

At a time when ICT use is growing, there has been a steady scaling up of new data centres' computing capacity: data centres opened in 2024 are increasingly powerful[1], with an average capacity of 20 MW per centre, or double that of those opened in 2023 (9 MW), and close to seven times the average capacity of existing data centres in 2023 (3 MW). **Despite a smaller number of data centres being opened in 2024, the total computing power of the examined centres across the country continues to skyrocket**.

There has also been an ongoing substantial increase in data centre operators' energy consumption (+12% in 2024) – most of which can be attributed to newer data centres (put into service between 2021 and 2023). The associated GHG emissions have risen by 23%, due to increased energy consumption, combined with the use of more carbon-intensive energy sources. **The volume of water extracted, which is another key indicator of data centre operators' environmental footprint, is almost back to 2022 levels, after a tremendous surge in 2023** due to work done on old installations. A total of 575,000 m³ of water, virtually all of it potable, was extracted by data centres. This volume remains modest compared to other uses (industrial, agricultural) but can create conflicts over resource use in those places where data centres are located.

Data centre operators' rising GHG emissions and energy consumption



1: *The terms computing "capacity" or "power" refer to the maximum power draw of the IT equipment installed in the data centre.*

SCOPE OF INQUIRY

WHICH COMPANIES WERE QUERIED?

The enterprises queried are those with an annual revenue equal to or above 10 million euros, excl. VAT, or whose installed IT equipment has a power draw equal to or above 100 kW, and whose main business is providing third parties with infrastructure and equipment hosted in data centres, also referred to as colocations data centres. This automatically excludes companies that own and operate data centres for their own internal purposes.

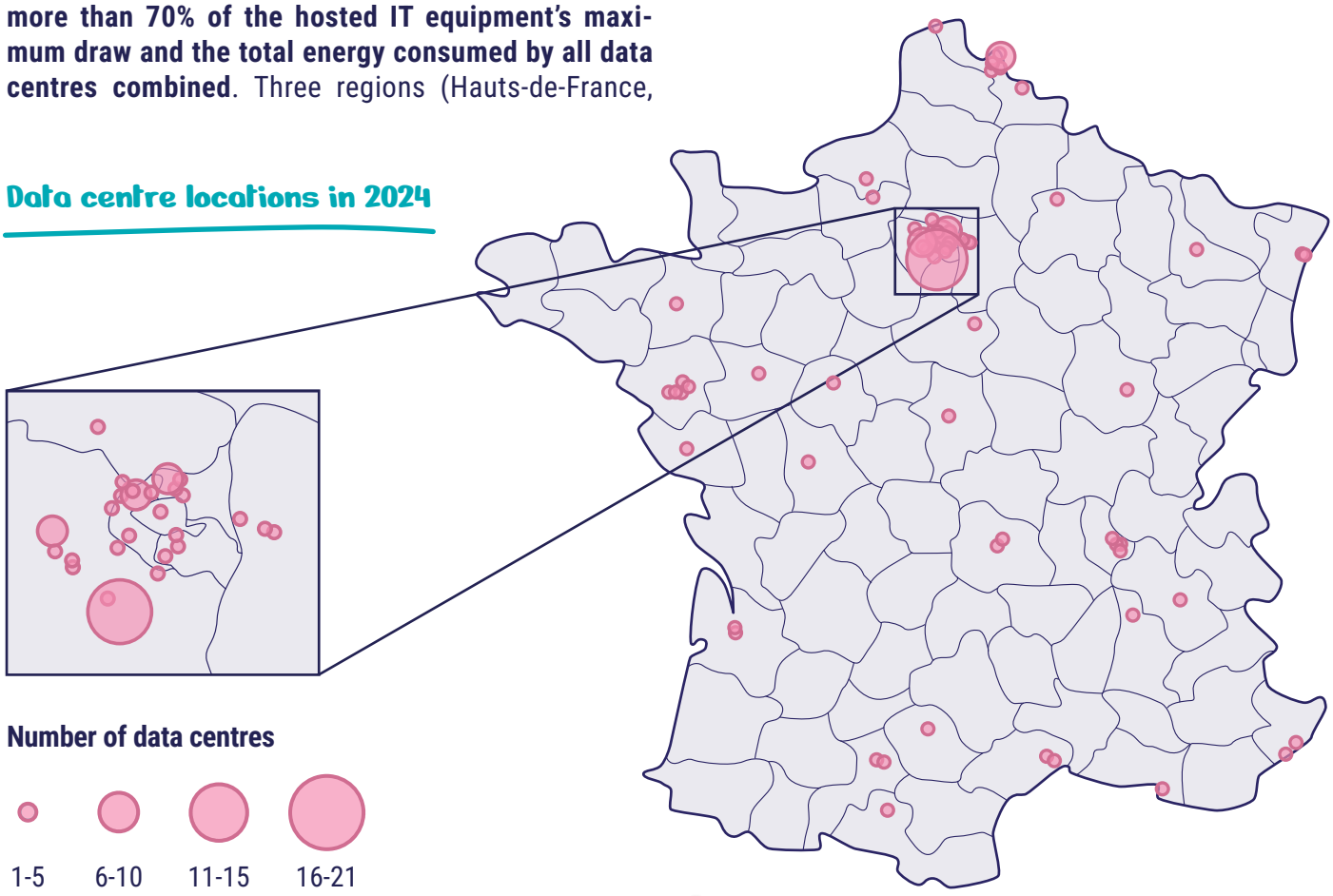
ADEME-ARCEP STUDY

This is data centres' share of ICT's greenhouse gas emissions in France in 2022. **It includes the emissions of all data centres located in France, but also those of data centres located abroad that are solicited for uses in France**. The scope is thus wider than that of the annual "Achieving digital sustainability" survey which covers only data centres located in France.

2 DATA CENTRES' COMPUTING POWER CONCENTRATED IN THE ÎLE-DE-FRANCE REGION

From a geographical standpoint, data centres' activity in France is highly concentrated: **the Île-de-France region alone accounts for 56% of all centres, and for more than 70% of the hosted IT equipment's maximum draw and the total energy consumed by all data centres combined**. Three regions (Hauts-de-France, Provence-Alpes-Côte d'Azur and Île-de-France) together account for 90% of the total power draw and energy consumption of the examined data centres.

Data centre locations in 2024

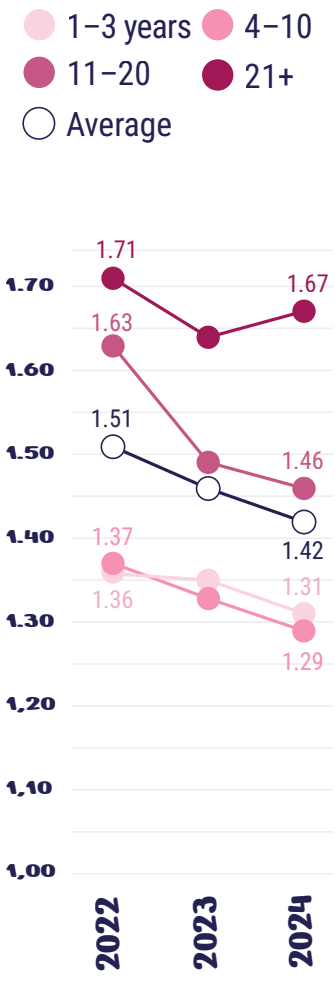


3 DATA CENTRES' ENERGY EFFICIENCY IMPROVING, BUT VARIES DEPENDING ON THEIR AGE AND COMPUTING CAPACITY

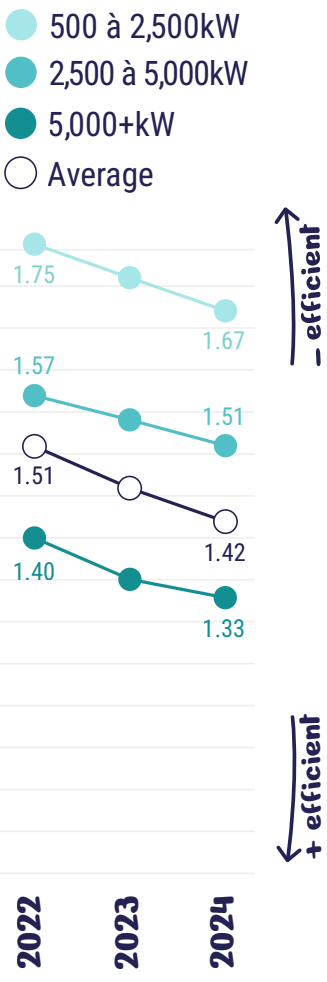
Despite ongoing improvements in their efficiency, data centres' power consumption **continues to surge**. **This efficiency varies depending on the centres' age and computing power: on average, the newer the data centre and the greater its computing power, the more efficient it is**. The most powerful data centres tend to be more recent, which explains to some degree why data centres with the largest computing capacity are the most energy efficient.

On average, the newer the data centre and the greater its computing power, the more efficient it is

Average PUE, by age

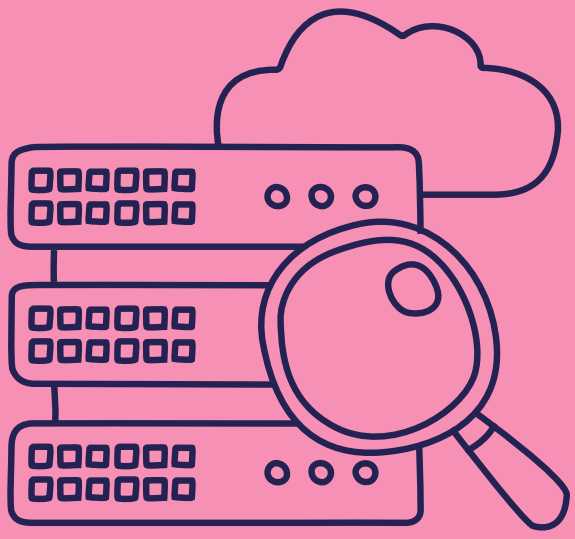


Average PUE, by computing power



DEFINITION

HOW IS DATA CENTRE'S ENERGY EFFICIENCY MEASURED?



To deliver computing, data storage and transport services, data centre operators run infrastructures that consume additional energy on top of what is needed to power the hosted IT equipment (e.g. for cooling systems, backup power and for heating the offices of the staff on site). PUE is an indicator used to measure how effectively energy is used: it is the ratio of the total energy consumed by a data centre to the energy consumed by the IT equipment it houses.

The nearer the PUE is to 1, the more the centre is considered energy efficient. For instance, a data centre with a PUE of 1.5 means that, for 1.5 kWh of electricity used, only 1 kWh went directly to performing its main function (computing, data storage and transport services).

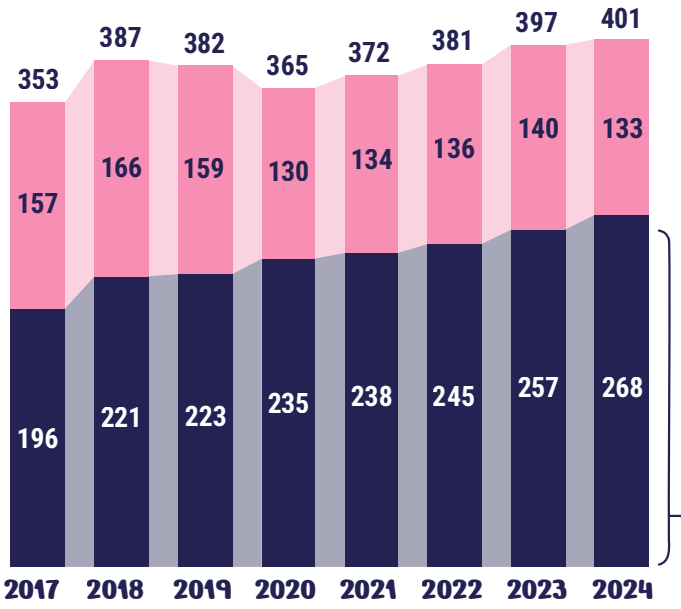
PART 2

ENVIRONMENTAL IMPACT OF ELECTRONIC COMMUNICATIONS OPERATORS AND NETWORK EQUIPMENT SUPPLIERS

Since the first edition of this survey, **Arcep has been publishing indicators on the evolution of the environmental footprint of France's four largest electronic communications operators (Bouygues Telecom, Free, Orange, SFR)**. These indicators cover their networks' greenhouse gas emissions (GHG) and energy consumption since 2017. Arcep also provides an assessment of the environmental footprint of mobile network equipment and, this year for the first time, that of fibre optic cable manufacturers.

Telcos' indirect GHG emissions continue to rise

Evolution of electronic communications operators' direct (Scope 1) and indirect (Scope 2) GHG emissions (in thousands of tonnes of CO_2 eq.)

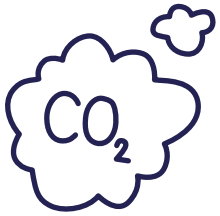


1 TELCOS' GHG EMISSIONS CONTINUE TO RISE, DESPITE NETWORKS' STEADIER ENERGY CONSUMPTION

The main electronic communications operators' GHG emissions reached 401,000 tonnes of CO_2 equivalent in 2024, up 1% YoY, while GHG emissions in France decreased by 0.9%.

Direct emissions (Scope 1) decreased substantially (-5% in 2024), which can be attributed chiefly to reduced natural gas, heating fuel and fuel consumption, along with the steady deployment of more energy-efficient vehicles.

Indirect emissions (Scope 2) rose for the seventh year in a row (+4% in 2024). This rise in 2024 is due to an increase in the emissions factors of France's energy mix, while networks' energy consumption has held steady.



ADEME-ARCEP STUDY

4,4%

This is the share of ICT's greenhouse gas emissions in France in 2022 attributed to fixed and mobile electronic communications networks, and ISP routers and STBs.

Source: *update to the ADEME-Arcep study (January 2025), which takes into account data centers located abroad that are used for digital activities in France.*

2 NETWORKS' TOTAL ENERGY CONSUMPTION STABILISING

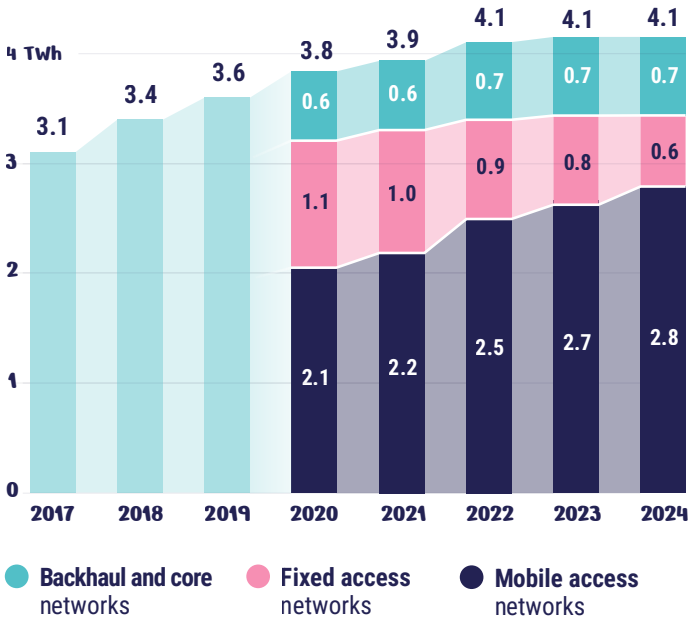
After increasing steadily since 2017, fixed and mobile networks' **energy consumption appeared to be levelling off in 2024 at 4.1 TWh**. **Mobile networks' consumption grew by 4% in 2024** (vs. 6% in 2023) due to a rise in mobile usage (+1.8 Gb per SIM card in 2024) and network buildouts.

This growth is nevertheless being offset by a **sizeable decrease in fixed local loops' energy consumption** (-16% in 2024), stemming from the steady transition from the legacy copper network to more energy-efficient FttH systems.

Backhaul and core networks' energy consumption **held steady for the first time in 2024**, after four straight years of increase.

Mobile networks' energy consumption curving up; fixed networks' curving down

Evolution of networks' annual electricity consumption (in TWh)



3 ENERGY CONSUMED FOR THE PRODUCTION OF FIBRE-OPTIC CABLES REPRESENTS A QUARTER OF FIXED NETWORKS' POWER CONSUMPTION

In addition to the use phase (which enables monitoring of data collected from telcos), according to the ADEME-Arcep study the network equipment production phase accounts for a **sizeable portion of the depletion of strategic metals and minerals, and of the carbon footprint during networks' life cycle**.

This is why the "Achieving digital sustainability" survey also assesses the environmental footprint of mobile network equipment suppliers and of fibre-optic cable manufacturers.

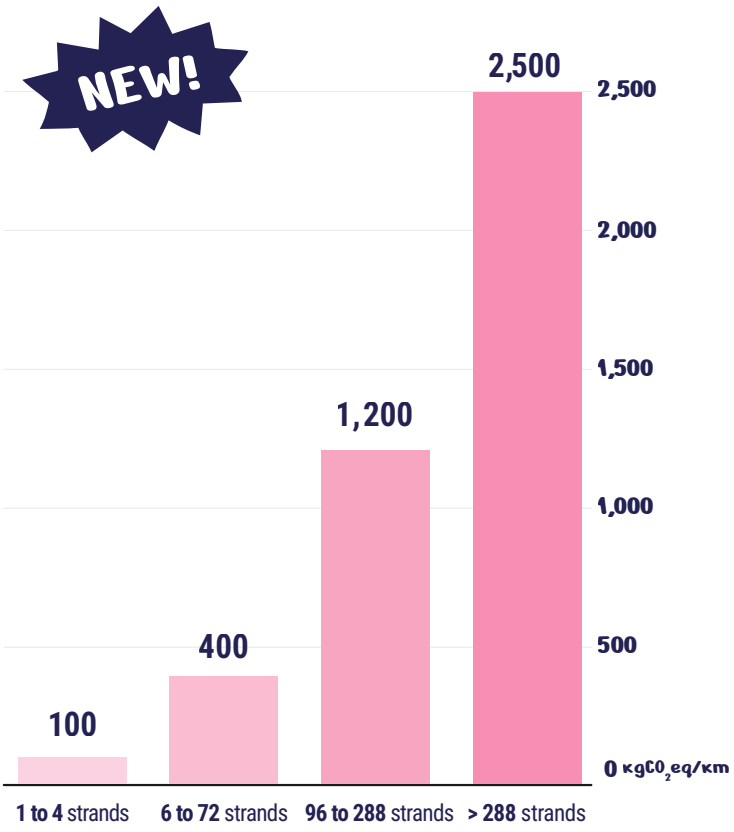
The production of the fibre-optic cables sold in France in 2024, all types combined (from 1 to 288+ strands per cable), **required a total 170 GWh of, chiefly electrical, energy in France and abroad, or 26% of fixed networks' energy consumption in France that year**. The embodied greenhouse gas emissions (which correspond to total carbon emissions across the product's life cycle, excluding the use phase) totalled 108,000 tonnes of CO_2 equivalent.

The scale of these embodied emissions increases with the number of fibre-optic strands: on average, they range from around 100 $kgCO_2e$/km per cable for cables with 1 to 4 strands, to 2.500 $kgCO_2e$/km for cables with more than 288 strands.

Regarding mobile network equipment sold in France, the average use of precious metals (silver, gold, platinum and palladium) per unit of hardware has held steady since 2021 (around 6 g), reflecting an absence of alteration to the equipment's composition. **The embodied GHG emissions for equipment sold in France rose by 5% in 2024 to reach 72,000 tonnes CO_2 eq., which corresponds to the production of close to a million smartphones**[2]. A cell site's total embodied emissions vary depending on the technology deployed. Two generic base station models (multi-technology including 5G in the 3.5 GHz band or multi-technology excluding 5G in the 3.5 GHz band) were used for this survey. The embodied emissions of these models were calculated based on the equipment sold in 2024.

According to a generic model[3]**, the equipment that makes up a 5G base station using the 3.5 GHz band has an embodied carbon footprint that is 72% higher than that of equipment making up the same base station not using the 3.5 GHz band, while corresponding to a 100% increase in the average available bandwidth for an operator.**

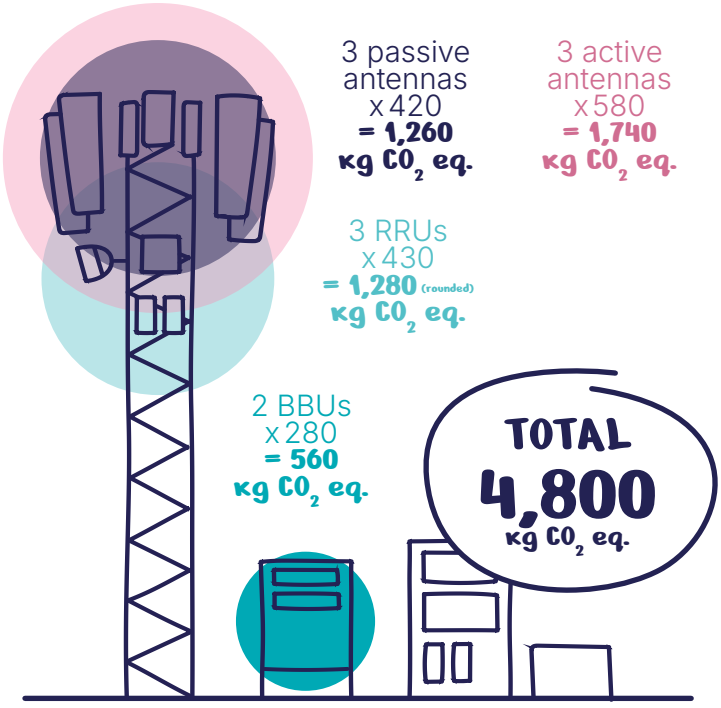
Average embodied greenhouse gas emissions per km of fibre-optic cable sold in France in 2024



Embodied carbon impact of a 5G base station using the 3.5 GHz band and multi-technology on other frequency bands

Composed of 3 active antennas, 3 passive antennas, 3 RRU and 2 BBU

- **Base Band Unit (BBU):** module responsible for processing the base band's traffic.
- **Radio Remote Unit (RRU):** module that handles radio frequency processing, attached to a passive antenna and connected to the BBU. It is used for transmission over frequencies other than the 3.5 GHz band reserved for 5G.
- **Active antenna:** a newer model antenna connected directly to the BBU. It combines the functions of the RRU and a passive antenna (which are physically separate components on a conventional cell site) enabling signal transmission over the 3.5 GHz band reserved for 5G.
- **Passive antenna:** antenna or antenna system without radiofrequency modules. Used to transmit over frequencies other than the 3.5 GHz band reserved for 5G.



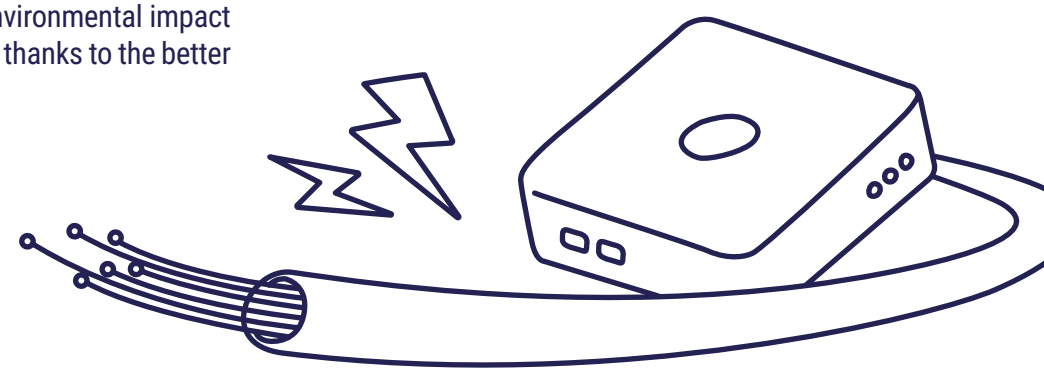
2 : *« Impact CO_2 », ADEME.*

3 : *Assumption of a tri-sector base station, as considered in theoretical studies and in accordance with Appendix 4 of the Mobile Technical Experts Committee study, "Comparative study: energy assessment of a 4G vs. 5G deployment".*

4 ENERGY CONSUMPTION FOR INTERNET ROUTERS AND STBS REMAINS HIGH AND DECREASED VERY LITTLE IN 2024

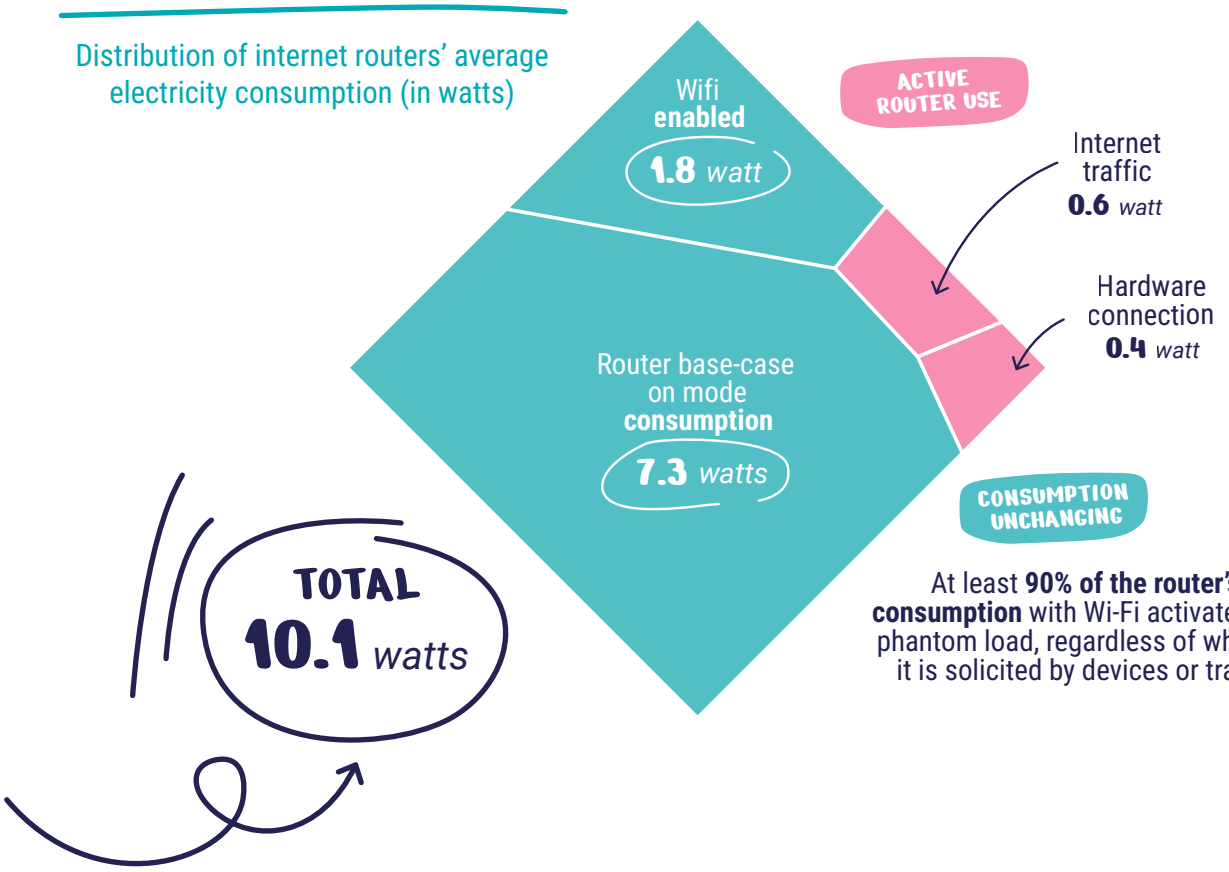
The combined base of ISP internet routers and set-top boxes (STB) in France consumed 3.4 TWh, which marks a 3% decrease YoY, while still remaining high: it is five times higher than fixed networks' consumption and represents 0.8% of total energy consumption in France[4]. As with the total annual energy consumption of ISP routers and STBs, the average consumption for these devices changed very little in 2024. When running, an ISP router consumes an average 9.1 watts, and an STB 7.4 watts. **While more recent models of routers and STBs are more energy-efficient, replacing old models must not be systematic**: because of the substantial environmental impact of their production, the gains achieved thanks to the better energy performance of a newer model during the use phase will be lower than those achieved by extending the useful life of less energy-efficient models.

Another finding: ISP routers' energy consumption depends very little on how much they are used or how much data traffic they relay: **90% of this consumption is unchanging, regardless of whether it is being used. On the other hand, turning a router off or switching to deep sleep mode**[5] **when it is not being used is an efficient way to reduce its energy consumption**.



Close to 90% of router or STB's energy consumption is independent of the length and intensity of use

Distribution of internet routers' average electricity consumption (in watts)



At least **90% of the router's consumption** with Wi-Fi activated is a phantom load, regardless of whether it is solicited by devices or traffic

4: *2023 energy audit, RTE analysis and electricity data.*

5: *Users must have the ability to enable or disable deep sleep mode in order to use connected objects, such as smart thermostats or alarms.*

5 UNLIKE MOBILE NETWORKS, FIXED NETWORKS AND ISP ROUTERS' ENERGY CONSUMPTION DEPENDS VERY LITTLE ON DATA TRAFFIC

Annual energy consumption for ISP routers and STBs, combined with that of fixed networks, brings the total amount of energy consumed by fixed access subscriptions to 4.1 TWh in 2024, or 125 kWh per subscription, per year to a fixed line service. Meanwhile, mobile networks' energy consumption stands at 40 kWh per mobile subscription.

The energy consumed by fixed networks and ISP routers depends very little on the increase in the internet traffic they relay, whereas mobile networks' consumption is rising due to the exponential increase in users' data traffic.

The amount of data consumed by a fixed internet subscription is substantially higher than for a mobile subscription. Using an assumption of 200 Gb a month of traffic for fixed internet subscriptions (vs. an average 20 Gb per mobile subscription[6]), **average annual energy consumption per gigabyte of data on mobile networks is seven times higher than on fixed networks** (0.14 kWh versus 0.02 kWh).

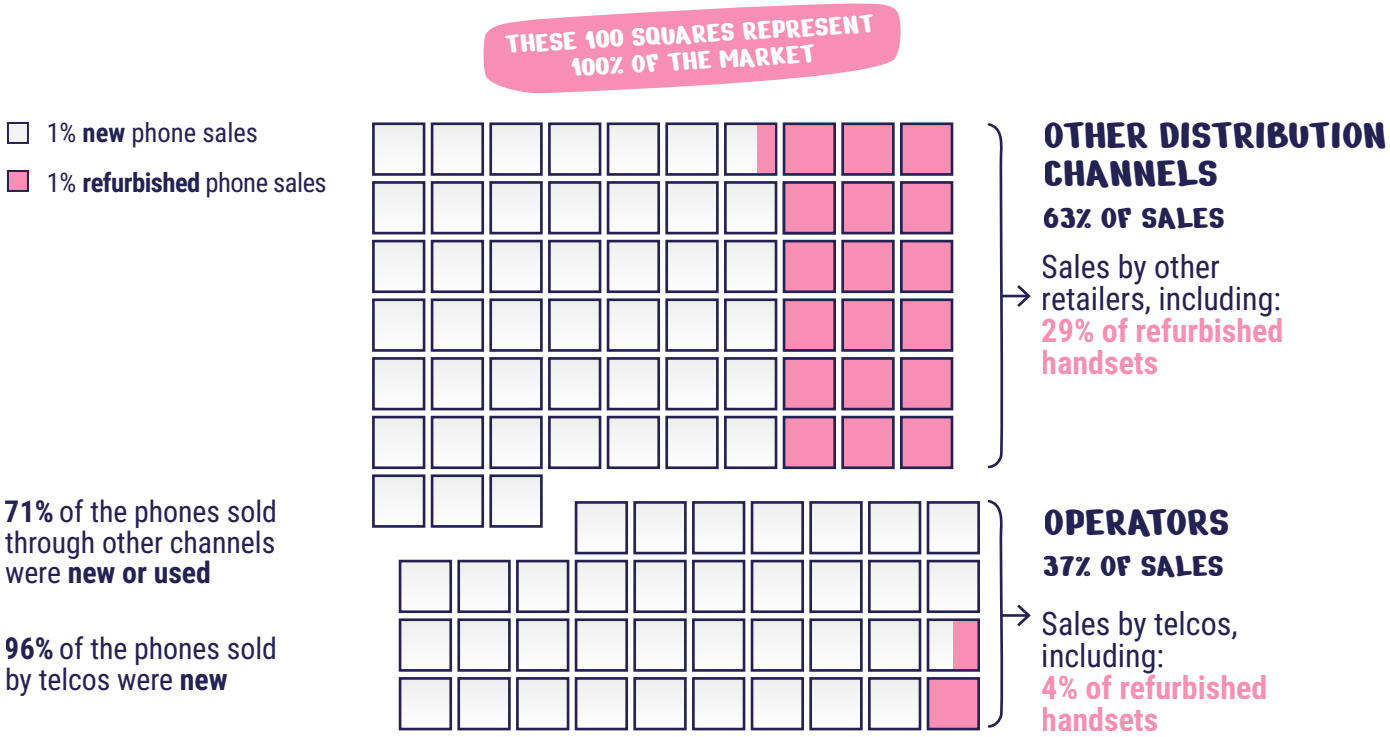
6 REFURBISHED PHONE SALES ROSE IN 2024, BUT STILL RARE FOR TELCOS

After two straight years of decline, **mobile phone sales for the country's four main telcos rose by 2% YoY in 2024**. Totalling 7.1 million units, these sales account for 37% of the French market. Sales for refurbished phones also rose in 2024, both for telcos (+4% YoY) and other retailers (+10%).

They account for only 4% of telcos' phone sales, compared to 29% of other retailers' sales.

4% of phones sold by telcos are refurbished, compared to 29% for other sales channels

Breakdown of mobile phone sales in 2024 by type of phone and distribution channel



6: *"Electronic communications market in in France – 2024 – Final results"*, Arcep, December 2025.

PART 3

ENVIRONMENTAL IMPACT OF DEVICE MANUFACTURERS

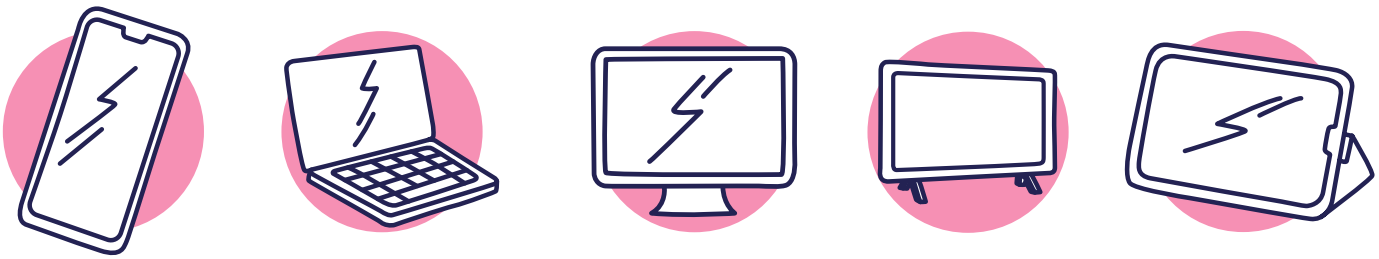
For the third year in a row, the annual "Achieving digital sustainability" **survey examines the environmental footprint of 23 digital device manufactures**. Depending on the type of hardware, these manufacturers' sales represented between 65% and 95% of the market in 2024. **This edition has added new indicators on the impact that display technology has on devices' energy consumption**.

DEFINITION

WHAT DO WE MEAN BY "DEVICE"?

Digital equipment referred to as "devices" include all of the hardware that acts as an interface between us and our digital practices: internet browsing, watching videos on demand on a TV, laptop or desktop computer, listening to a podcast on our smartphone, etc.

In this this edition of the annual "Achieving digital sustainability" survey, **the main categories of digital device were examined, which include**:



Mobile phones | Laptop computers | Computer displays | TVs | Tablets

arcep

ADEME-ARCEP STUDY

50%

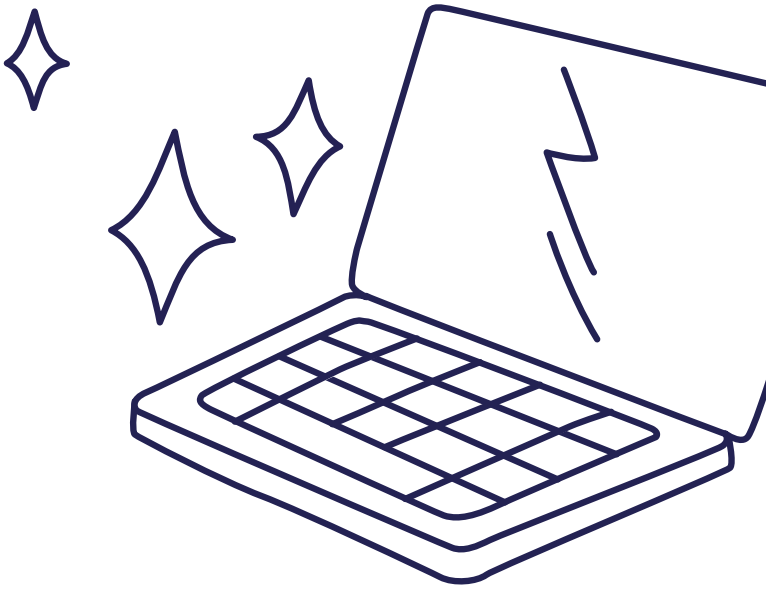
This is the share of ICT's carbon footprint associated with devices.

The vast majority of these emissions are generated during the device manufacturing phase.

Source : *update to the ADEME-Arcep study (January 2025), which takes into account data centers located abroad that are used for digital activities in France.*

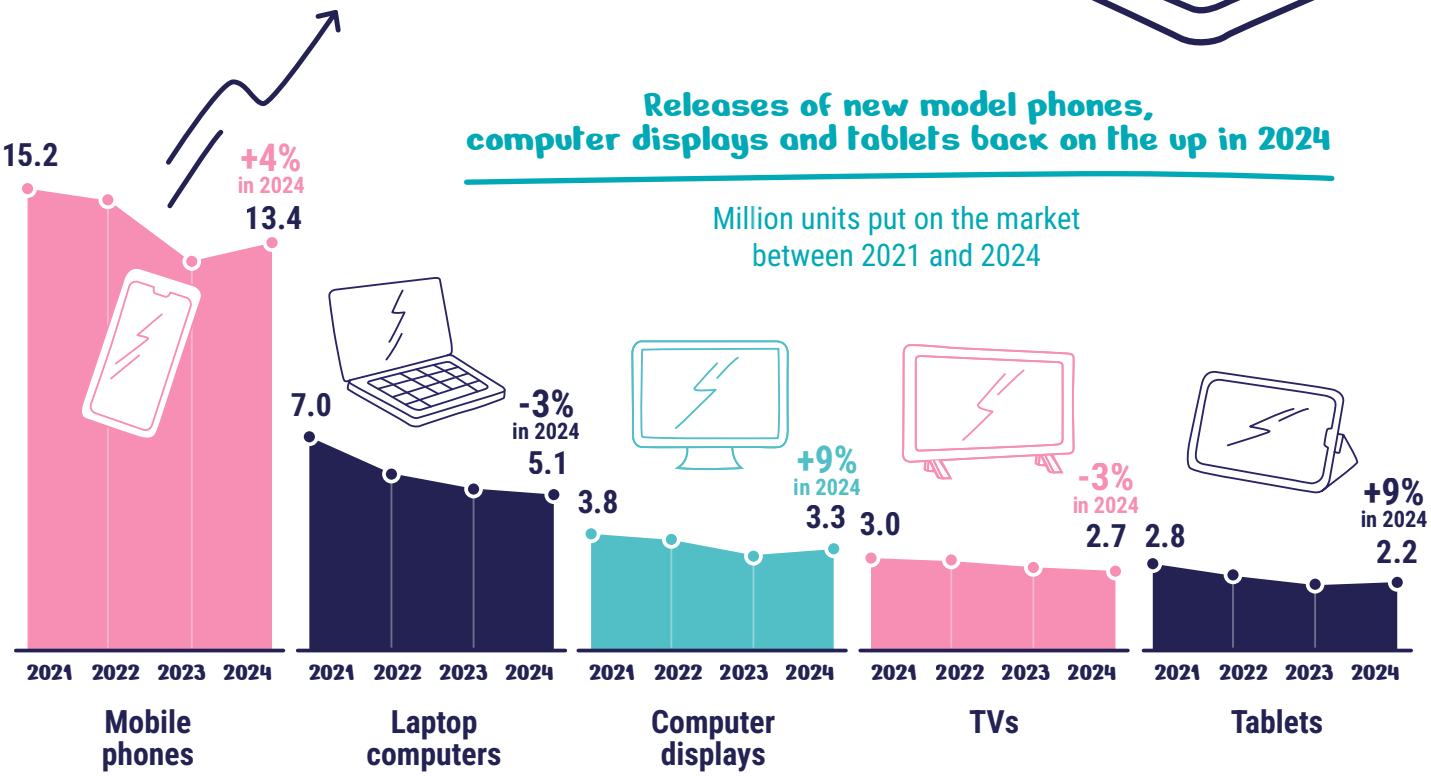
1 NEW PRODUCT RELEASES INCREASING FOR CERTAIN TYPES OF DEVICE...

After two years of decrease in the volume of new devices put on the market[7] in France, all types of hardware combined, **2024 saw an upswing the number of new releases of tablets, mobile phones and computer displays, whereas the release of new models of laptops and televisions continues to shrink**, albeit at a slower pace than before.



Releases of new model phones, computer displays and tablets back on the up in 2024

Million units put on the market between 2021 and 2024



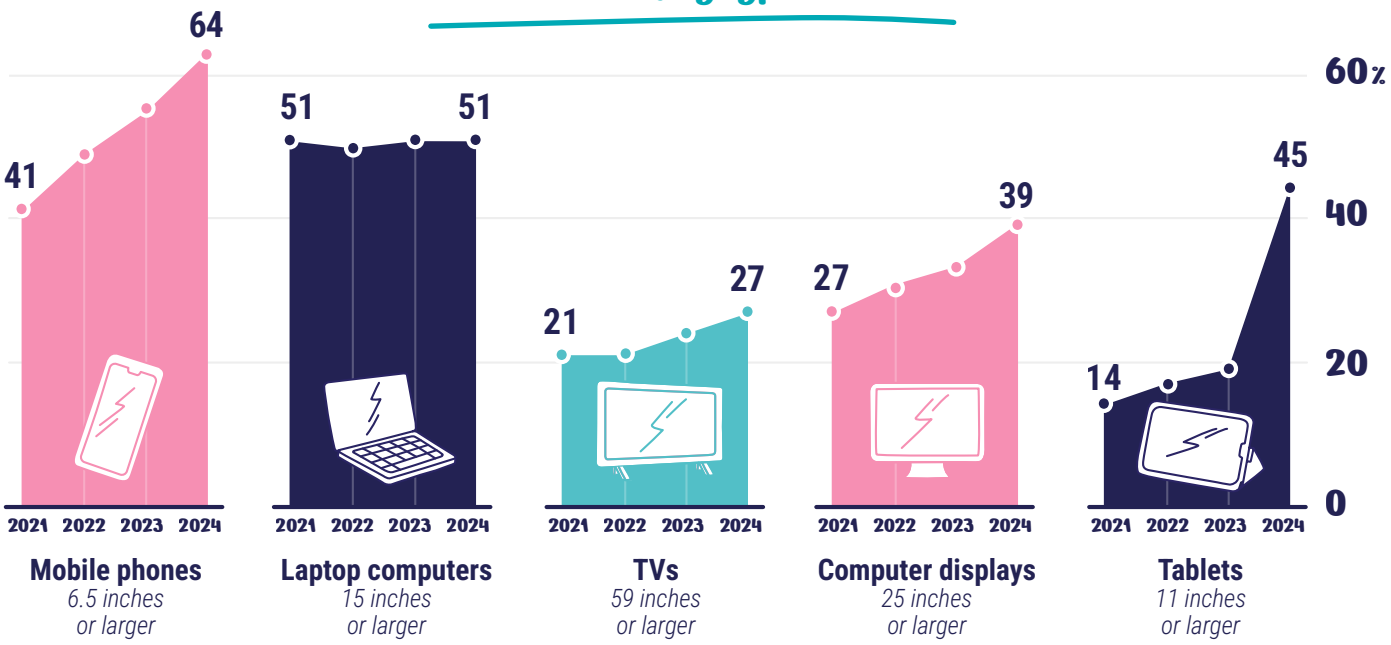
7 : *Put on the market: devices shipped by manufacturers to distributors or resellers, or sold directly to end customers for those manufacturers that sell a portion of their production directly.*

2 ...SCREENS GETTING BIGGER AND BIGGER

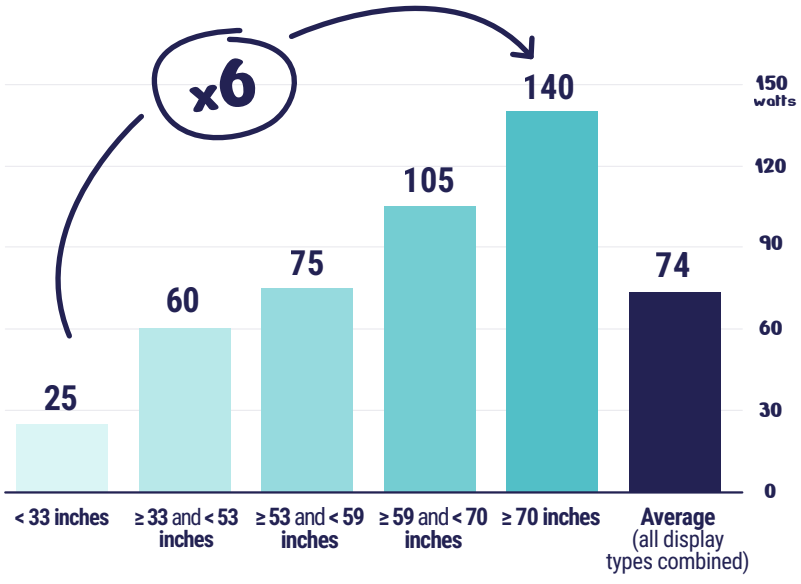
This upswing in products being put on the market has also meant an increase in the environmental impact of digital equipment, further amplified by **the ongoing increase in screen sizes for all of these devices, with the exception of laptop computers**. This increase was especially pronounced with tablets and mobile phones in 2024.

The larger the screen, the larger the device's environmental footprint during the production and the use phase. In addition to screen size, an initial assessment of TVs' average energy consumption reveals that display technology also influences' the devices' environmental footprint.

Evolution of large-screen devices' market share, by type of device



TVs' average energy consumption according to screen size in 2024



Average energy consumption by TV display technology in 2024