Study on «Telecom Economics»

Press conference

11/12/2024

FÉDÉRATION FRANÇAISE DES TÉLÉCOMS

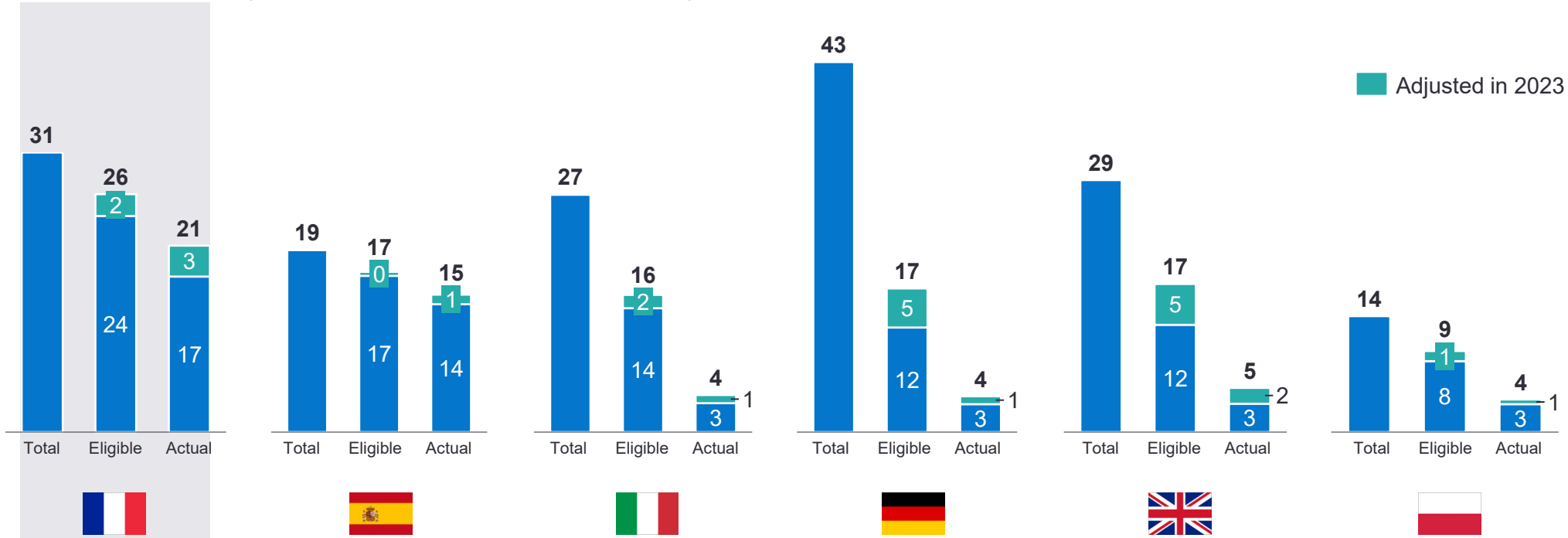
EY Parthenon

Agenda

- **Outstanding connectivity, among the Best in Europe**
- The most competitive pricing offers in Europe to support household purchasing power
- Significant ongoing investments despite already extensive coverage
- A specific tax system that heavily impacts the sector
- A strategic driver for the future of telecommunications: artificial intelligence
- A deeply engaged ecosystem driving the transition toward more sustainable digital solutions

France has the highest number of fiber-eligible households, with a coverage rate greater than 80%

Number of FttH/FttO subscriptions (Europe, millions, September 2023)



Coverage rate of ultra-high-speed broadband fiber[1]	84%	92%	59%	40%	57%	61%
✖						
Adoption rate of ultra-high-speed broadband fiber	81%	88%	25%	24%	29%	44%
=						
Penetration rate of ultra-high speed broadband fiber offer[2]	68%	83%	15%	10%	17%	27%

1. % of the number of households eligible for an FttH/FttO offer
2. = Ultra-high-speed fiber coverage rate × Fiber offer adoption rate

Sources: FttH Council of Europe, IMM, EY-P Analysis

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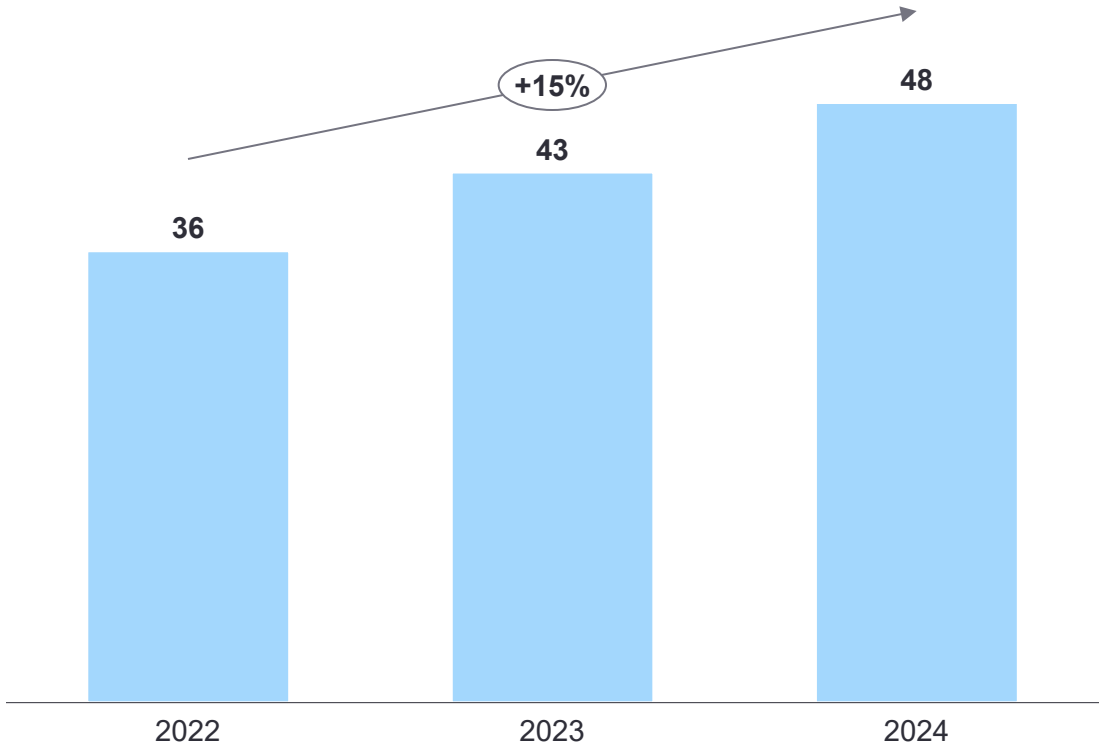
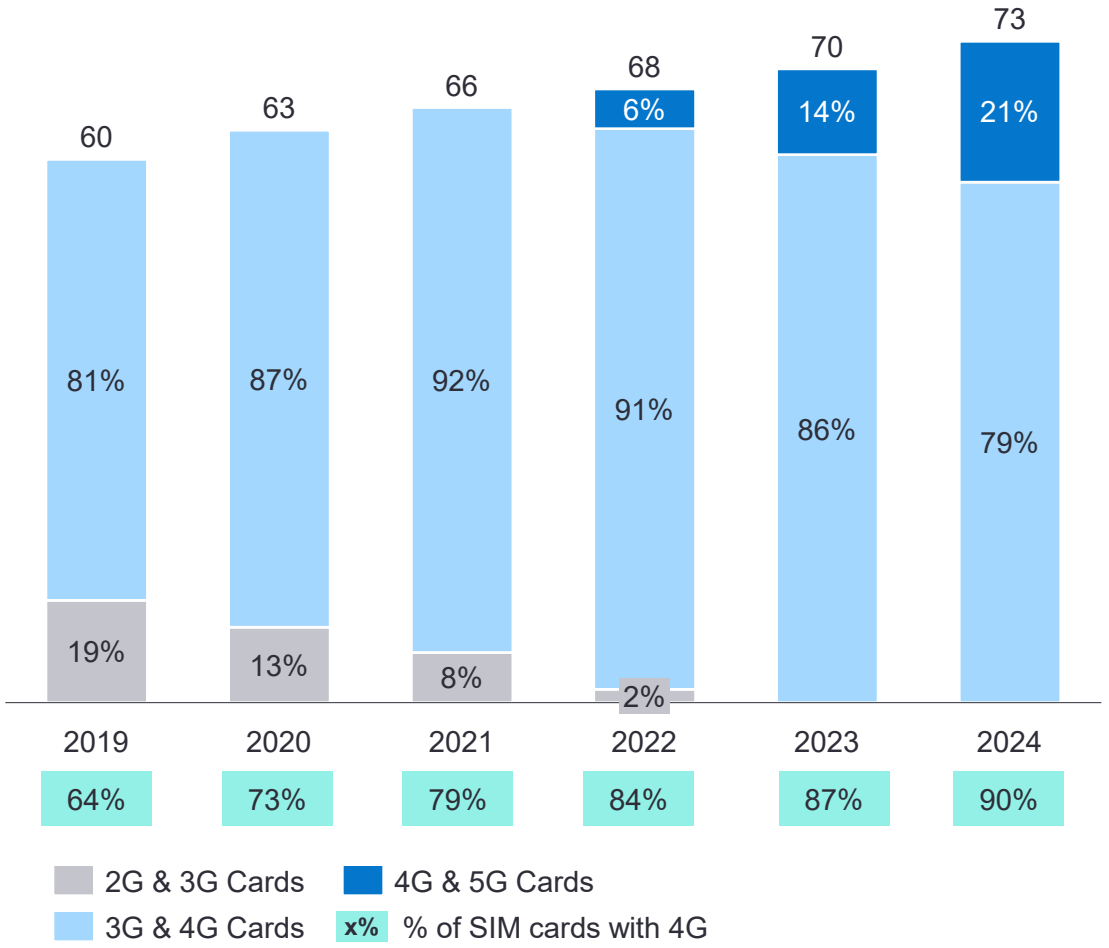
In 2024, 4G is available on 90% of mobiles, while the share of 5G SIM cards has tripled since 2022 reaching over 20%

Evolution of mobile telephony

Number of 5G sites authorised by ANFR
(France, thousands, October 2022 – October 2024)



Active 3G, 4G and 5G cards[1] (France, million, 2019 – 2024[2])



1. Excluding MtoM
2. Data for the first quarter of each year

Sources: ANFR, Arcep, EY-P Analysis

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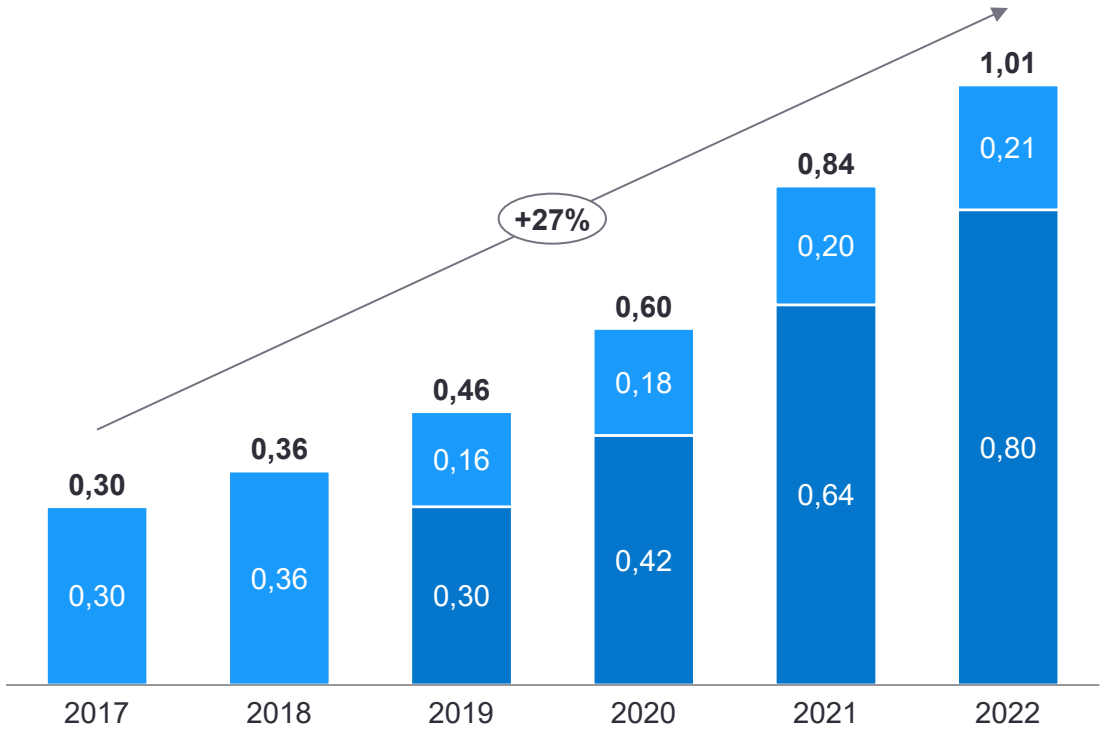
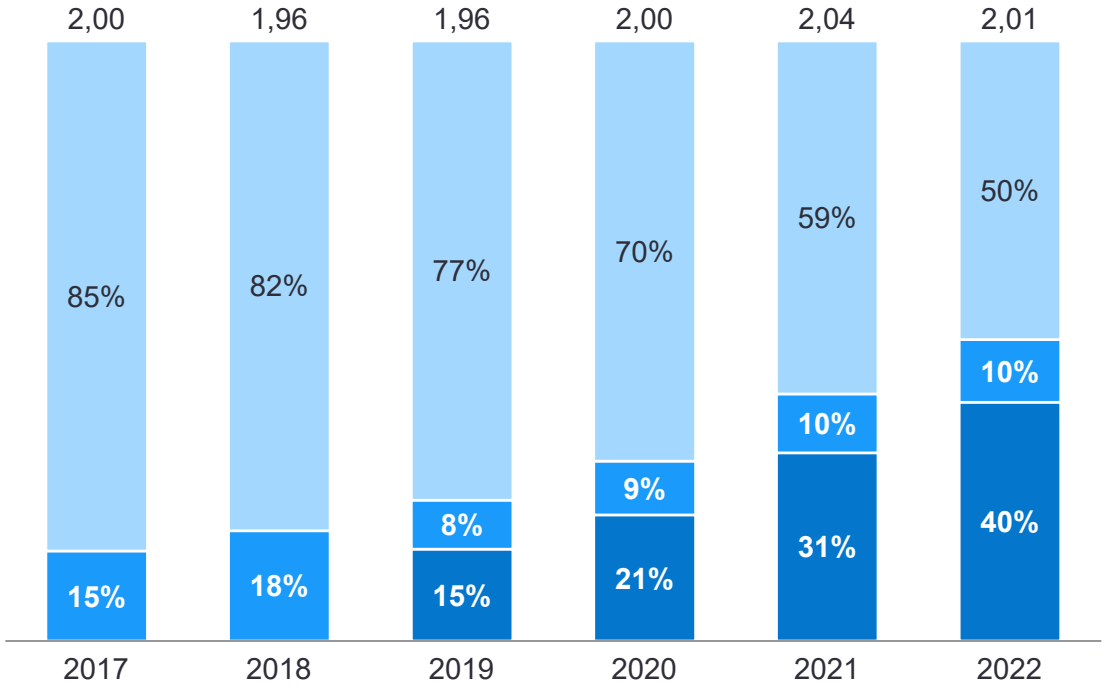
In the enterprise market, ultra-high-speed broadband adoption has grown at a rate of 27% over the past six years and now accounts for 50% of internet access

Adoption of ultra-high-speed broadband in enterprise internet access

Evolution of ultra-high-speed broadband subscriptions
(France, millions, 2017-22)



Distribution of high-speed and ultra-high-speed internet subscriptions
(France, % of subscriptions, 2017-22)



FttH/FttO | Other ultra-high speed subscriptions | High-speed

Sources: Arcep, EY-P Analysis

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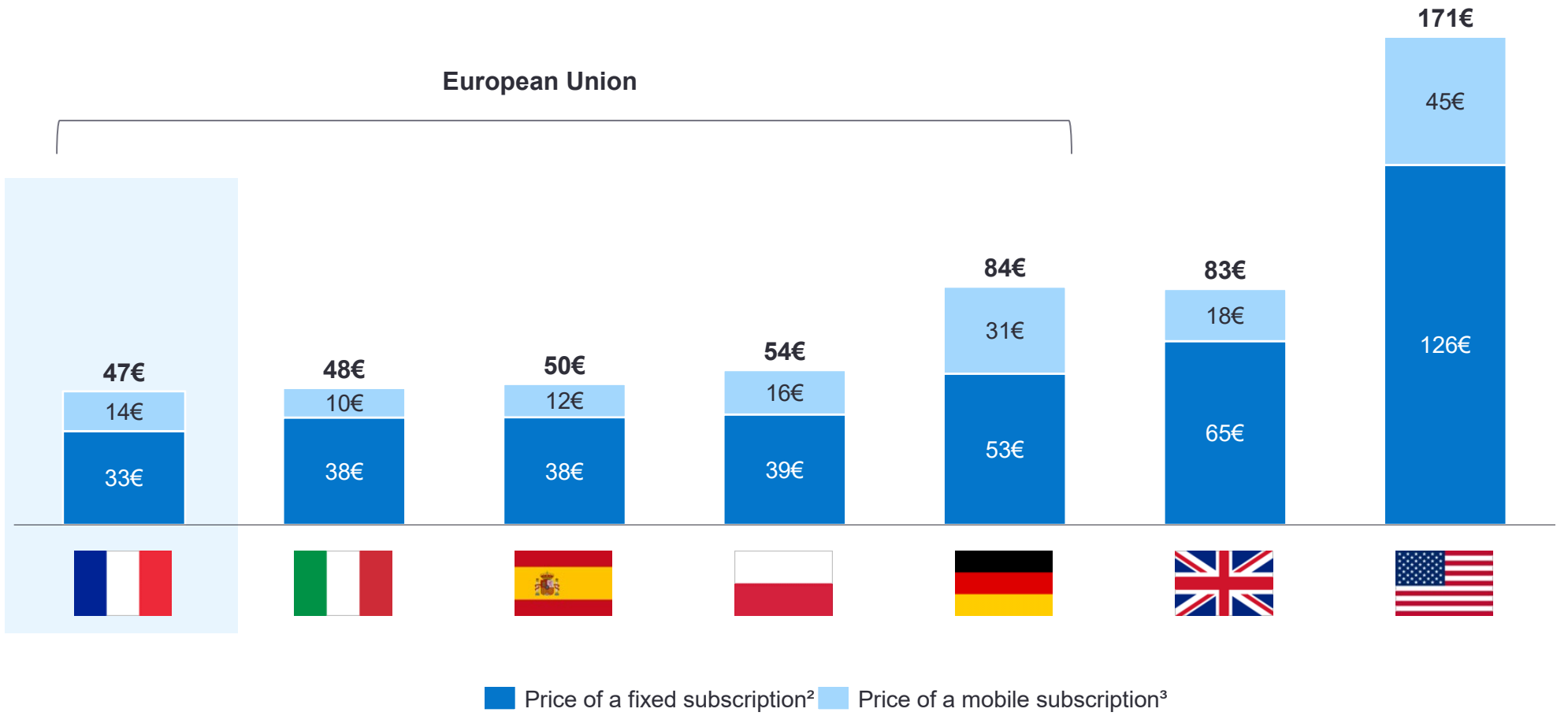
France offers the lowest fixed and mobile rates in Europe, almost twice as cheap as in the UK and Germany

Comparison of fixed and mobile subscription prices (World, € incl. VAT PPP[1], 2023)



1. Purchasing Power Parity
2. Fixed triple-play subscription including fiber, TV, and landline phone, > 1Gbps
3. Subscription including 50GB of data and mobile phone services

Sources: European commission, WorldBank, EY-P Analysis

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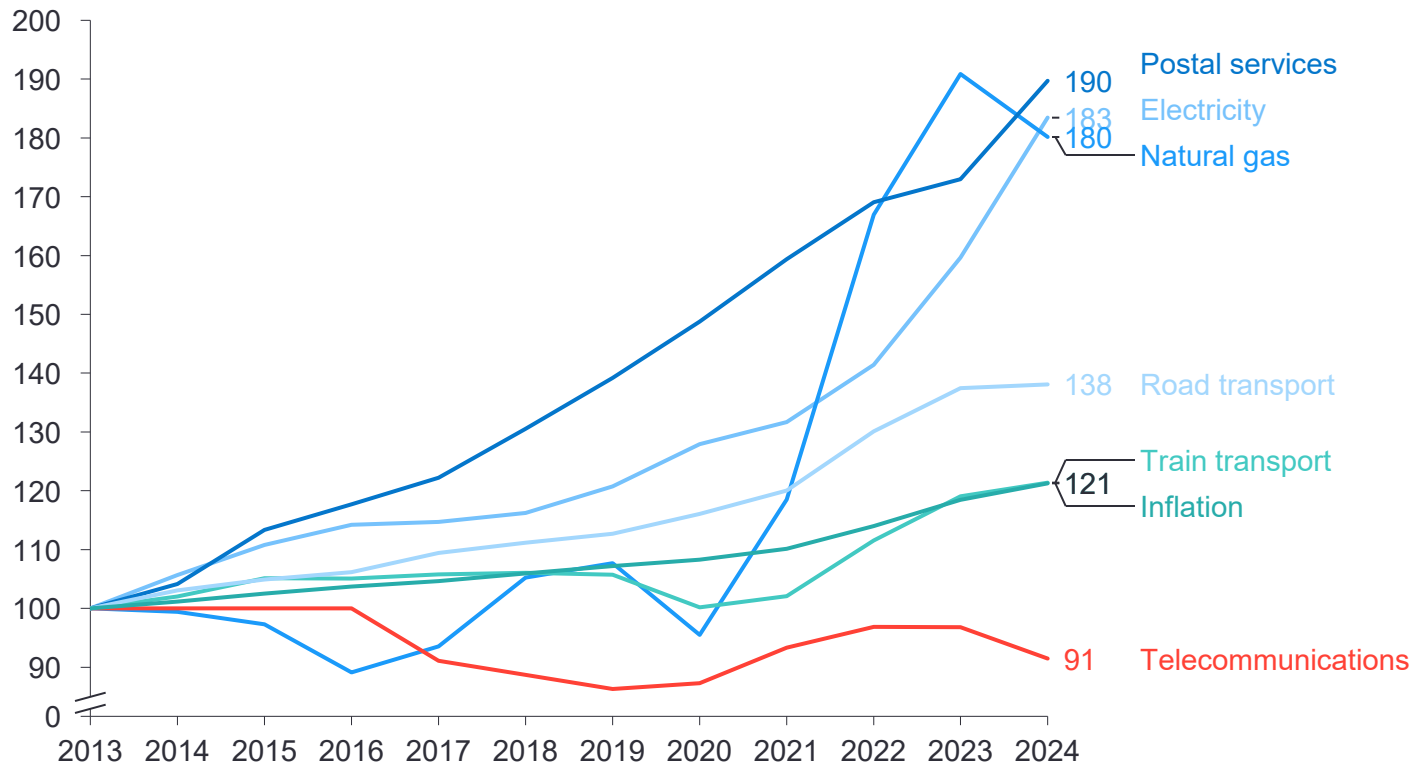
Telecom service prices have been decreasing in real terms since 2013 (-9 points vs. +21 points for inflation)

Evolution of the consumer price index for a sample of products and services (France, Base 100 2013, 2013-24)



- Between 2013 and 2024, **the price index for telecommunications services has decreased by approximately 1% per year**
- **In the last year** (2023-2024), **the price of telecom services decreased by around 5 percentage points on average**

Sources: INSEE, EY-P Analysis

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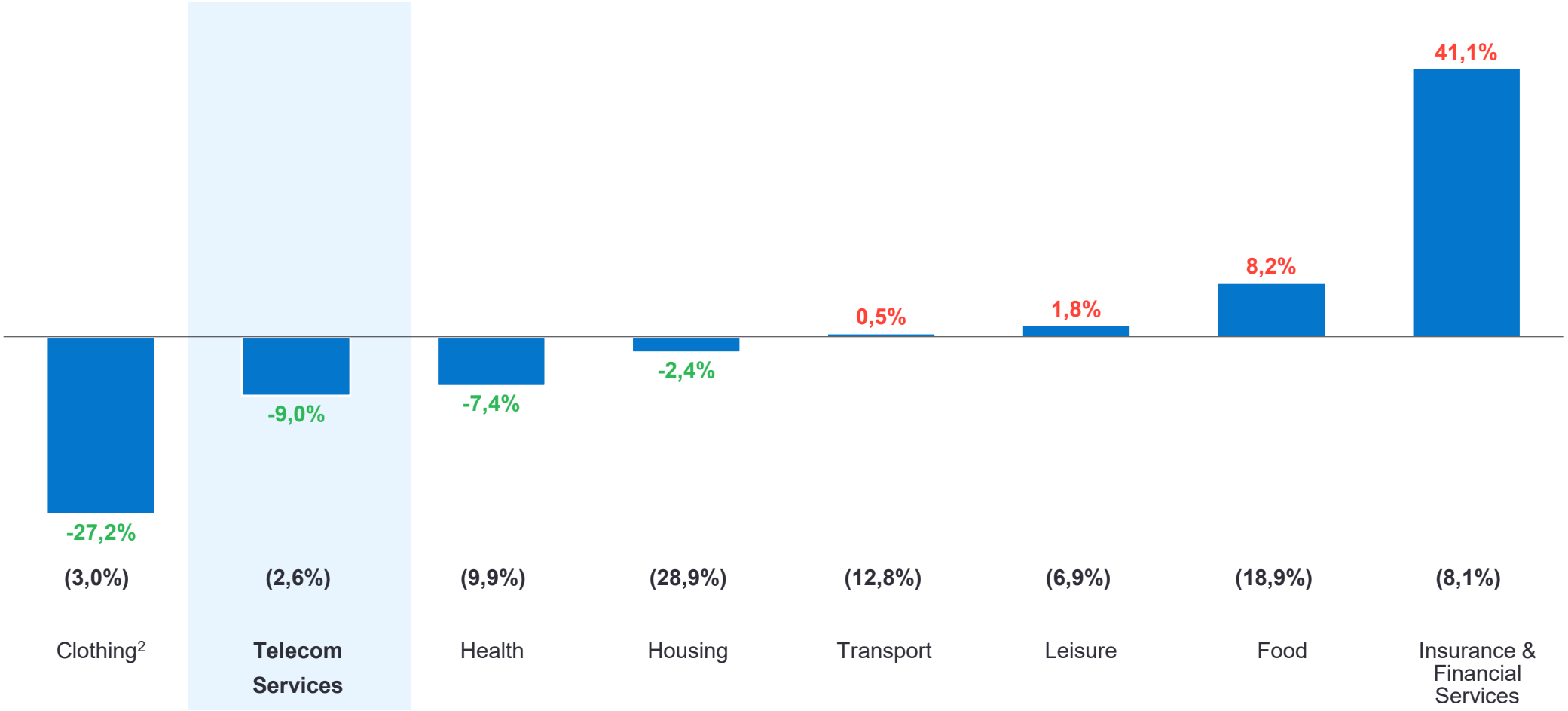
The share of household budget spent on telecom services has heavily decreased (-9% between 2013 and 2023), representing the second largest drop over the period

Evolution of the share of telecoms in household consumption compared to other categories (France, %, 2013-23)

(x%) : share in the annual consumption of a household in 2023



1. The following categories are not represented: telephone equipment, furniture, household items and routine household maintenance, alcoholic beverages, tobacco and narcotics, educational services, and software
2. The significant decrease in the share of clothing is notably related to the rise of fast fashion

Sources: INSEE, EY-P Analysis

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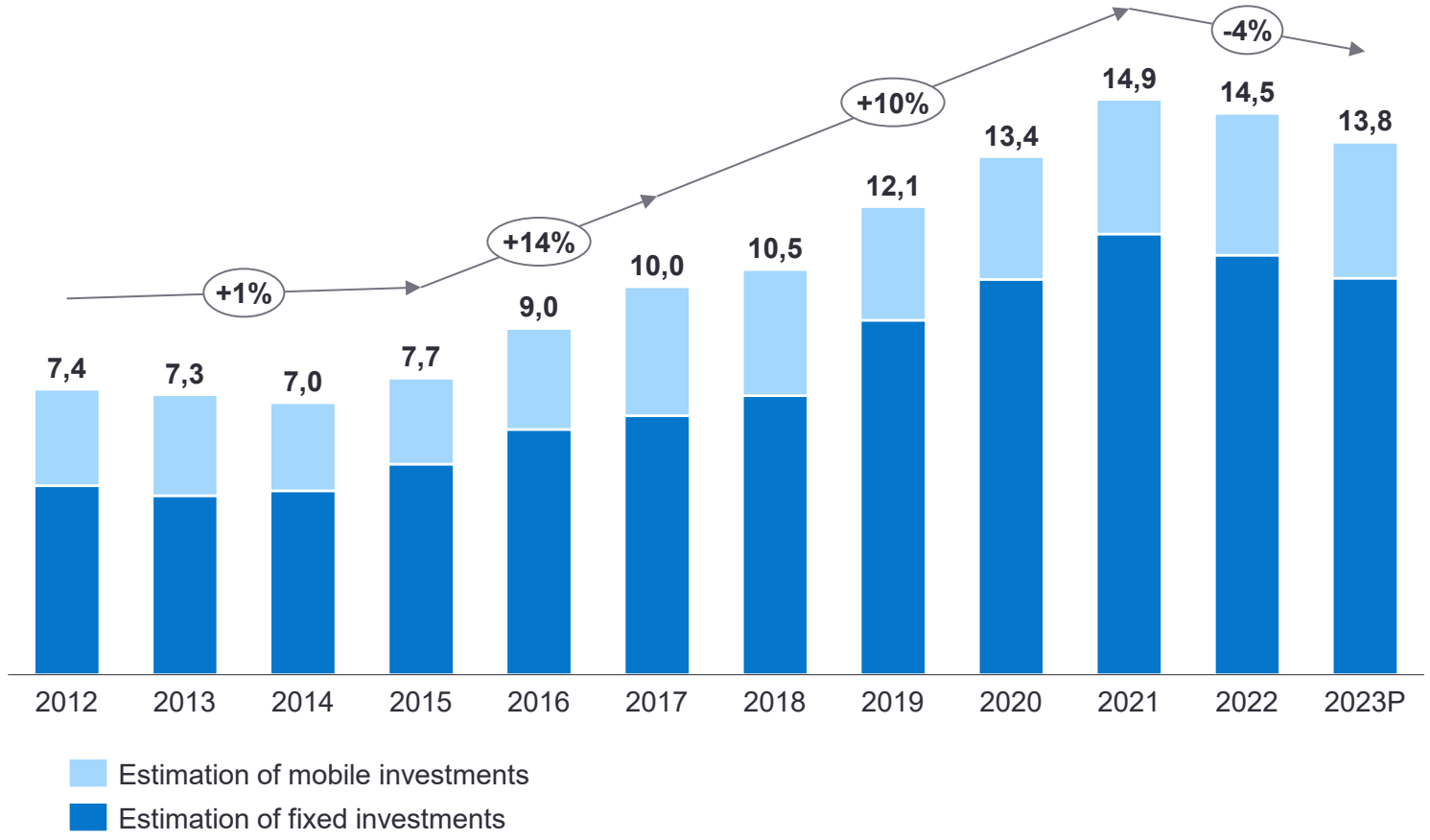
Operators have invested €113 billion over 10 years and continue to heavily invest (€14 billion in 2023), despite the increasing maturity of fixed and mobile networks

Analysis of investments by French telecom operators

Investments by French operators in telecom networks excluding frequency purchases
(France, billions €, 2012-23P)



Commentary

- Between 2015 and 2017, the strong growth in investments can be explained in particular by **the France Très Haut Débit plan, which pushed** operators to **invest heavily in the deployment of optical fiber, as well as starting the deployment of 4G**
- Between 2017 and 2021, the continued growth in investments reflects the significant efforts made by operators to strengthen their networks, particularly with **the deployment of 4G as part of the New Deal mobile**
- Over the last 2 years, **telecom networks have reached an advanced stage of maturity thanks to the PFTDH and the New Deal mobile**
- **+€8.9 billion** in regular purchases over the period, including:
  - 2.6 in 2012
  - 2.8 in 2015
  - 2.9 in 2020
  - 0.7 in 2021

Sources: Arcep, EY-P Analysis

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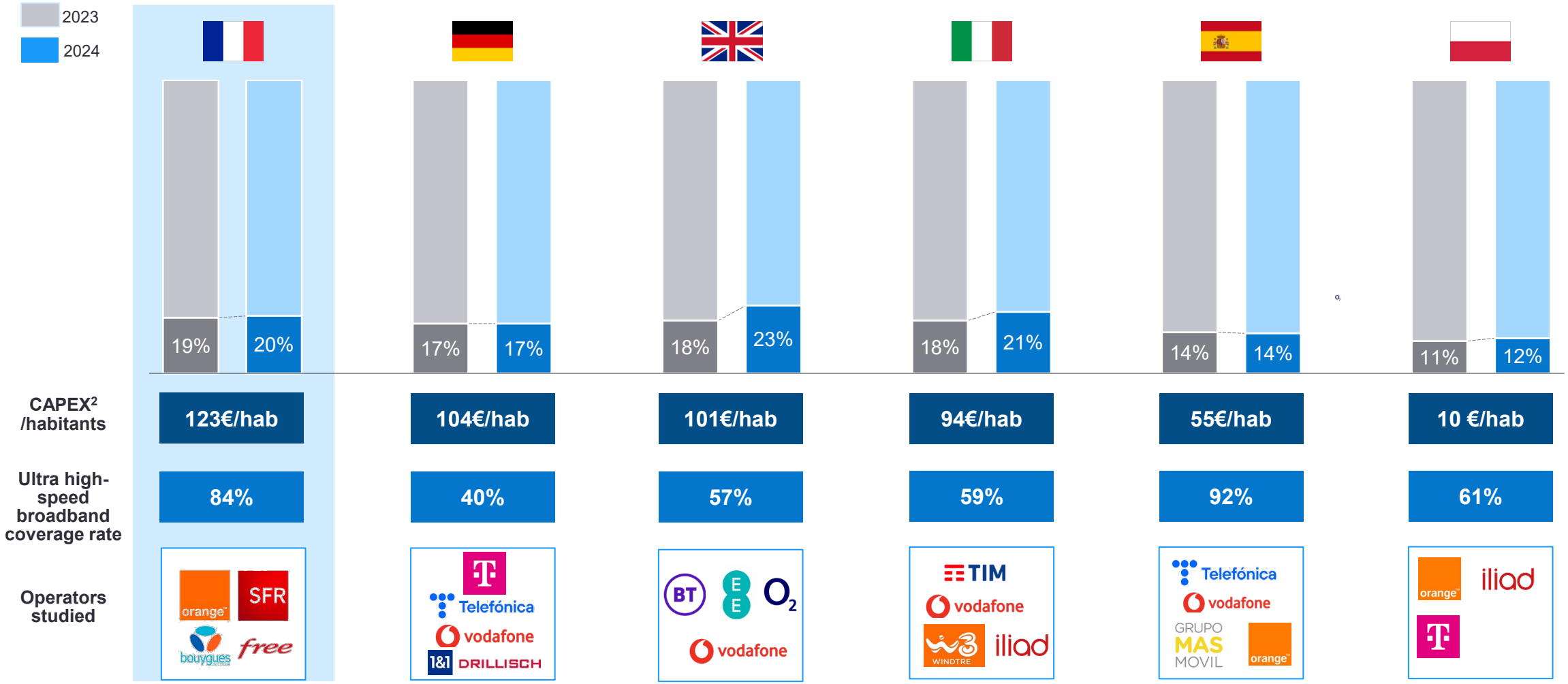
French telecom operators have the highest investment per capita, despite ultra high-speed broadband coverage being already advanced

CapEx/Revenue ratio by country (%)



1. CapEx and Revenue of the 4 largest players per country, except for Poland
2. CAPEX from the ongoing study
3. % of households eligible for an FttH/FttO offer

Sources: Annual Reports, Eurostat, Arcep, European Commission, FFT, EY-P Analysis

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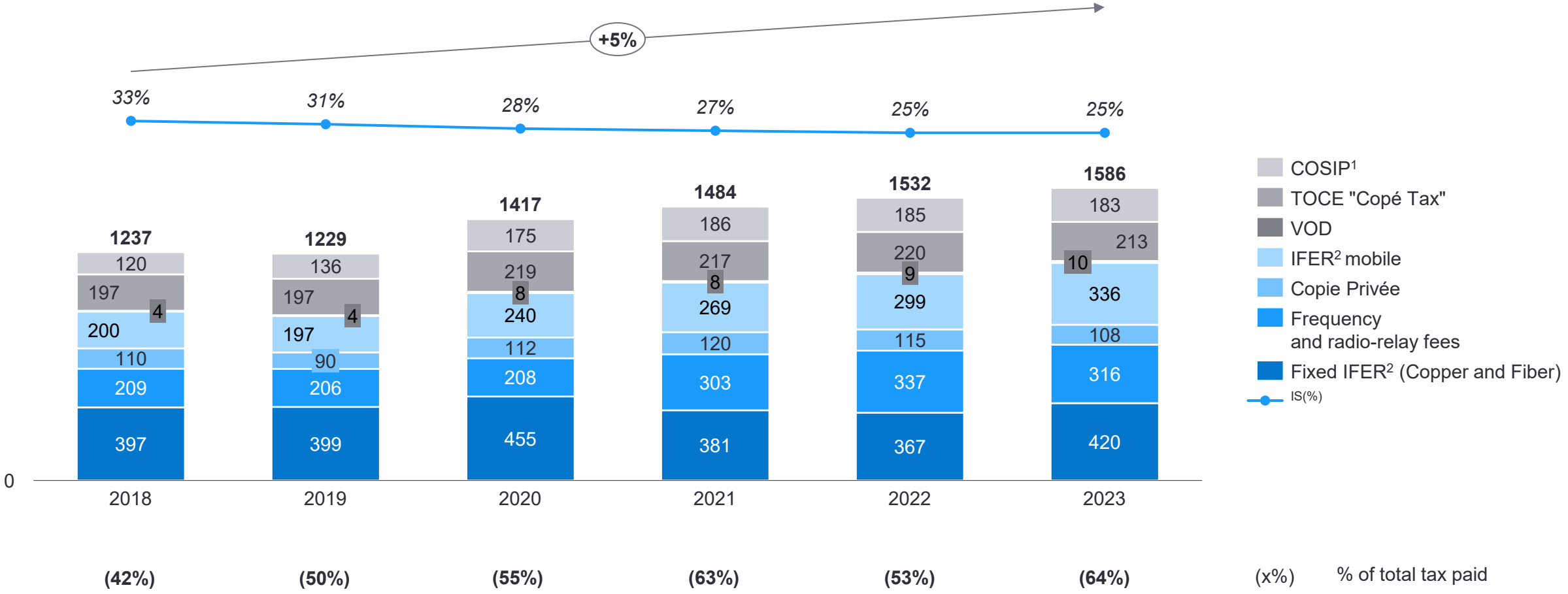
While corporate income tax is decreasing, the specific taxation for telecom operators in France is increasing by 5% per year and will reach around €1.6 billion in 2023

Taxes and duties of telecom operators (France, million €, 2018-23)



1. Tax on television services payable by distributors
2. Flat-rate taxation on network companies

Sources: Annual Reports, EY-P Analysis

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In 2023, telecom operators generate a third of digital revenues, but provide more than half of investments and tax contributions

Telecoms and Infrastructure Equipment Manufacturers

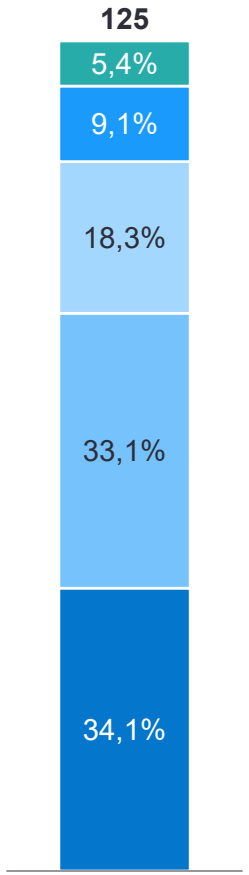
Content Providers

Terminal manufacturers

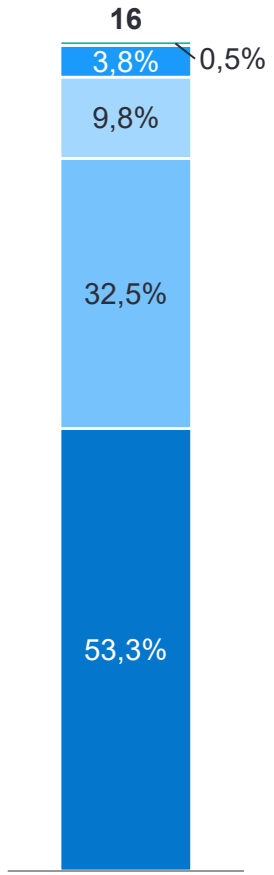
Internet players

Telecom operators

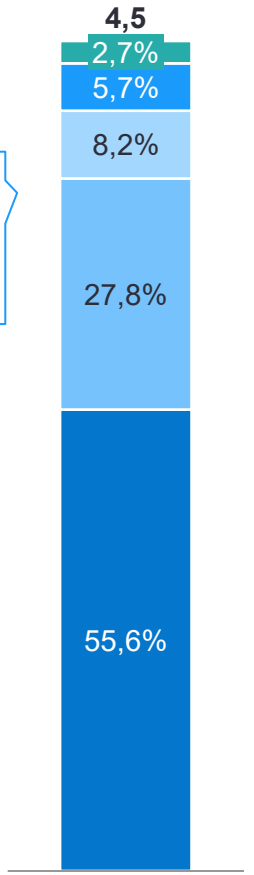
Revenues
(France, Mds€, 2023)



CapEx
(France, Mds€, 2023)



Taxes
(France, €bn, 2023)



Note

- *The GAFAM tax accounts for €800 million in 2023, and €700 million in 2022*

Sources: Capital IQ, Annual Reports, Literature Searches, EY-P Analysis

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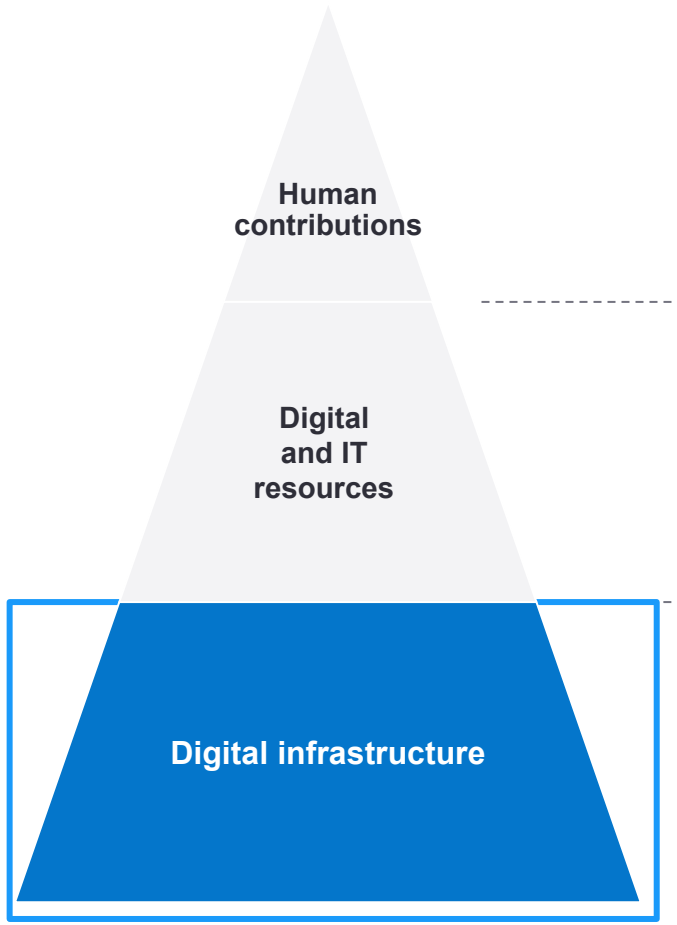
Telecom operators manage the critical infrastructures of Artificial Intelligence, thus playing a fundamental role in its ecosystem

Fundamentals of Artificial Intelligence



Segment	Market Players	Scope and contributions
Human contributions	**Service Providers**	▸ **Algorithm design** : Optimization of AI models, choice of architectures, and selection of performance metrics ▸ **Data Parameterization** : Data preparation, labeling, and cleaning of datasets for accurate results ▸ **Supervision and ethics** : Monitoring biases in models, compliance with ethical standards, consideration of societal impacts
Digital and IT resources	**Technology companies**	▸ **Frameworks & Software** : Integration of frameworks for the development and deployment of AI solutions ▸ **Data Management** : Processing Pipelines and Orchestration ▸ **Computing power** : Using GPUs/TPUs to accelerate the processing of AI models
Digital infrastructure	**Operators**	▸ **Cloud computing** : Flexible deployment of resources to meet AI variable load needs ▸ **Data Centers** : Physical infrastructure for secure and high-performance hosting of AI servers ▸ **Communication networks** : High-speed, low-latency connectivity for fast data transmission

Sources: Expert interviews, EY-P Analysis

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AI can have a significant impact on the operational pillars of telecom operators, including networks, customer relations and cybersecurity

List of the main use cases of Artificial Intelligence among telecom operators

Network optimization	**Anomaly detection**	▸ Immediately identify interruptions, traffic spikes, and anomalies to ensure quality of service
	Investigation of the origin	▸ Determine the causes of the damage, whether material, environmental or other
	Automatic remediation	▸ Automatically propose and apply actions to resolve issues
	Optimization of interventions	▸ Efficiently plan interventions to reduce delays
Relation client	**Customer service**	▸ Automate common responses via chatbots or assist agents
	Hyper-personalization	▸ Recommend customized products
	Employee support	▸ Assist with foreign language understanding and abstract writing
Cybersecurity	**Prevention and detection**	▸ Spot suspicious activity and prevent fraud
	Automated Defense	▸ Apply defensive measures to counter attacks
	Systems Strengthening	▸ Correct flaws and help make security decisions

Sources: Expert interviews, EY-P Analysis

Telecom operators have already undertaken concrete initiatives, with varying levels of progress, to promote the use of Artificial Intelligence

Key actions taken by telcos to develop AI

	Widespread actions	Unevenly adopted actions	Pioneering actions
Infrastructure and technology investments	▸ Investments in **critical infrastructure** (DC, Cloud computing, etc.) ▸ **Technological partnerships** with dominant and/or emerging players to develop AI tools	▸ Creation **of AI development centers and incubators**	▸ Investments in **advanced computing infrastructure** (e.g. supercomputers)
AI Strategy and Governance	▸ Development of **AI roadmaps and long-term strategic plans** ▸ **Contribution to the French and European AI ecosystem** to promote collaborative AI	▸ Setting up **AI governance** ▸ Adopting an **AI-centric data policy**	▸ Creation of an **oversight and oversight committee for AI** ▸ Creating a **compliance framework for AI**, with a risk control policy
Skills acquisition and AI culture	▸ In-house **training** ▸ **Recruiting** AI Talent ▸ **AI communication and awareness**	▸ Strengthening **AI skills in management teams** ▸ Implementation **of AI performance and impact monitoring tools**	▸ **Partnerships and education program** for AI and Data training

Sources: Operators' annual reports, EY-P Analysis

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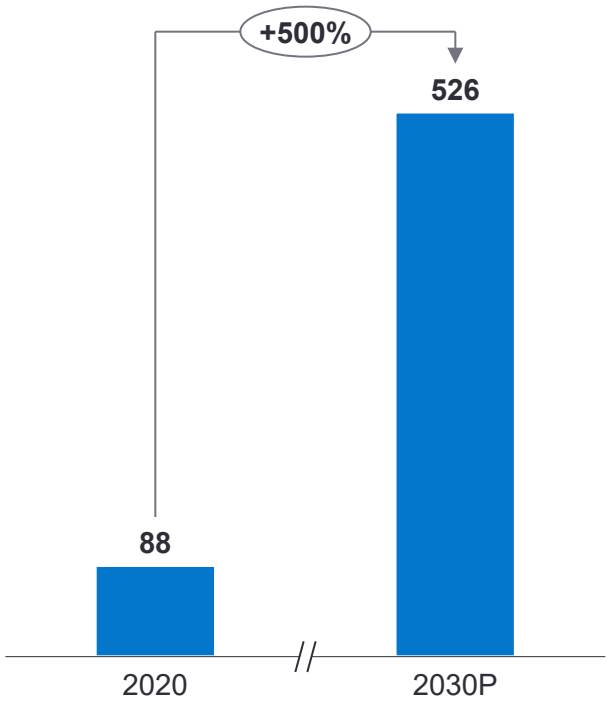
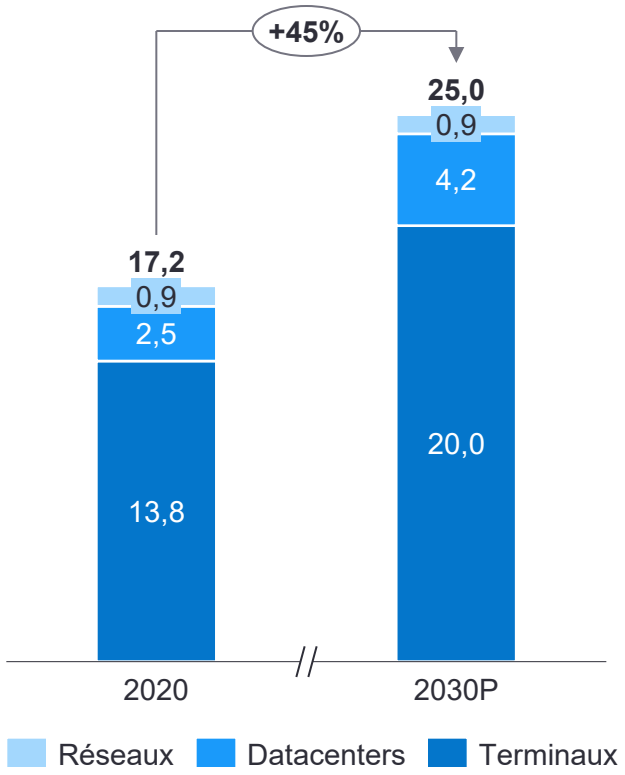
Digital traffic could increase sixfold between 2020 and 2030, while the sector's carbon emissions will increase by 45%, with networks accounting for 5% of the total

Impact of the evolution of IP traffic on the carbon footprint of digital technology

Evolution du trafic IP
(France, Exaoctet, 2020-30P)



Evolution of carbon emissions of digital players
(France, Mt CO2 eq, 2020-30P)



Feedback

- The explosion of IP traffic is the result of **3 main interrelated factors** :
  - The increase in digital use
  - The emergence of new technologies
  - the growth of user equipment
- The level of carbon emissions from networks will remain stable between 2020 and 2030, thanks in particular **to increased energy efficiency of** fixed and mobile networks
- **The entire digital ecosystem is concerned** : telecom and infrastructure equipment manufacturers, terminal manufacturers, telecom operators, but also content providers and service publishers such as GAFAM
- **Within this ecosystem, the carbon footprint of networks accounts for only c.5% of total emissions**

Sources: Ademe – Arcep study 2022, EY-P Analysis

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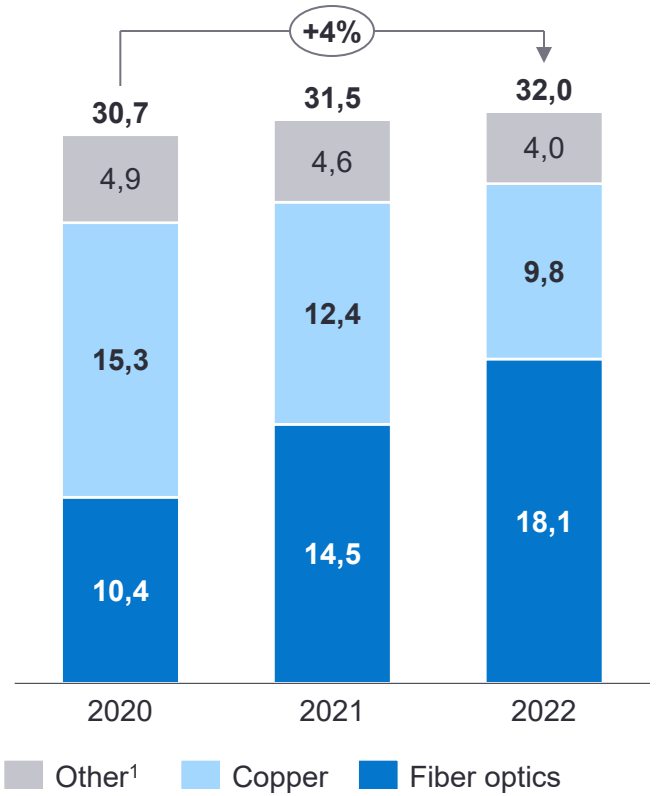
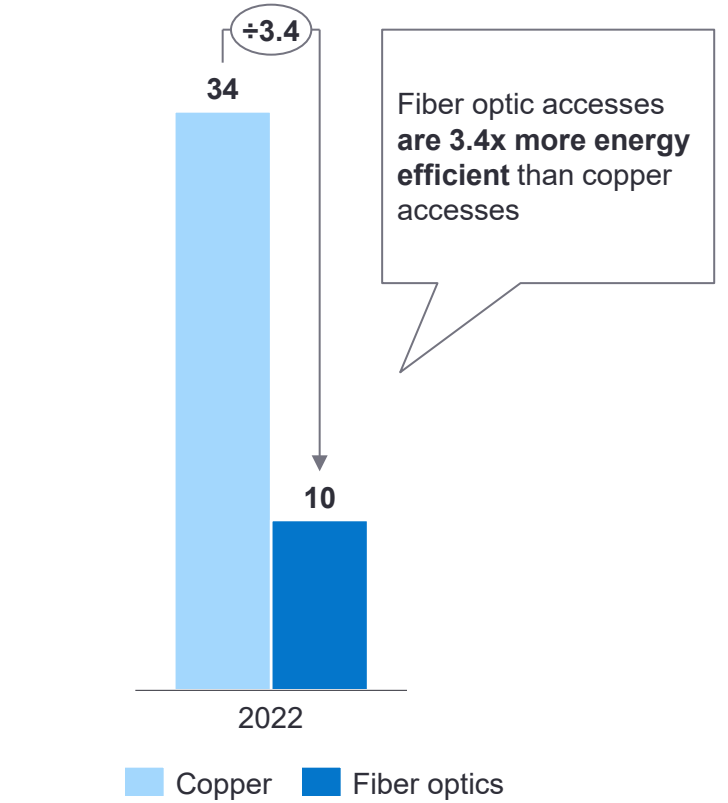
Operators' energy consumption is decreasing by 11% per year, mainly driven by fiber optics, which is 3.4 times more energy efficient than copper

Environmental impact analysis of fixed networks

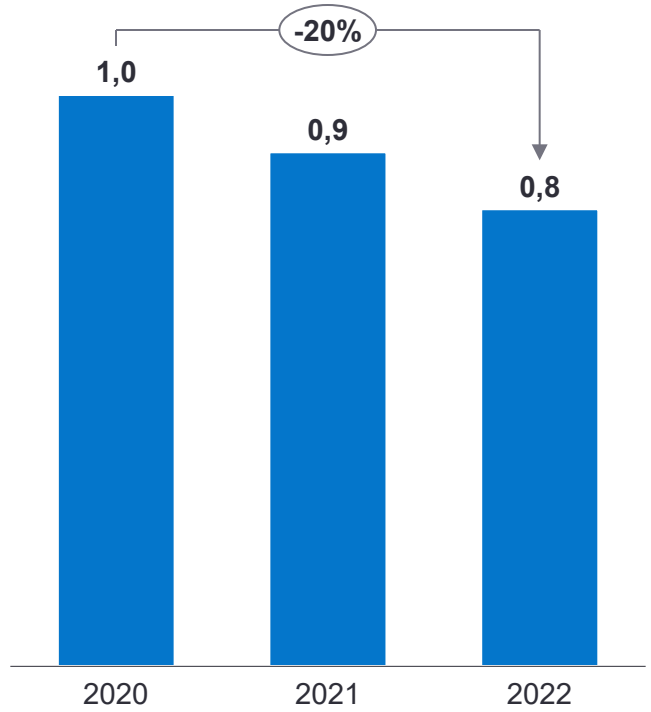
Distribution of fixed subscriptions by type of access (France, millions, Q4 2020-22)



Average energy consumption per subscription by type of access (France, kWh, 2022)



Energy consumption of fixed local loops[3] (France, TWh, 2020-22)



1. Including coaxial cable termination, fixed 4G, superfast radio, satellite, etc.
2. This increased energy efficiency is all the more notable as it takes into account the rebound effect linked to fibre
3. Including copper, fibre and cable access

Sources: Arcep, Nokia, EY-P Analysis

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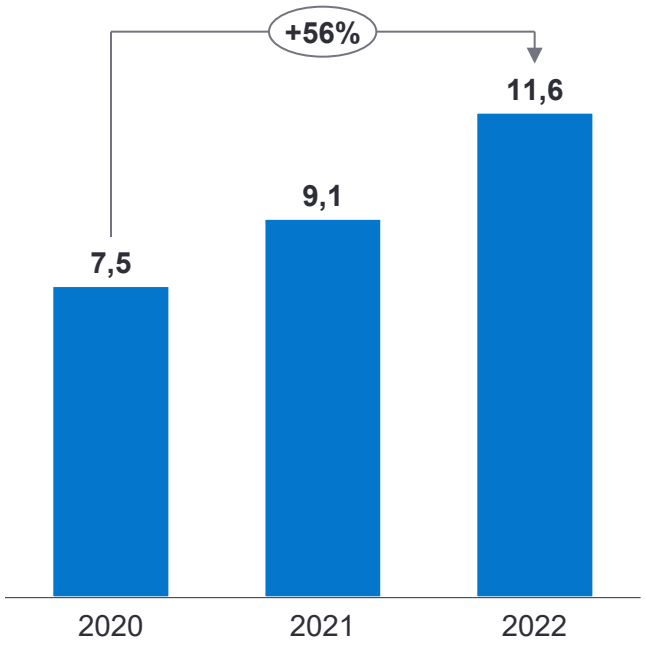
On mobile, the improved energy efficiency of new technologies makes it possible to partially offset the environmental impact of greater consumption

Environmental impact analysis of mobile networks

Total mobile data consumption
(France, Exabytes, 2020-22)

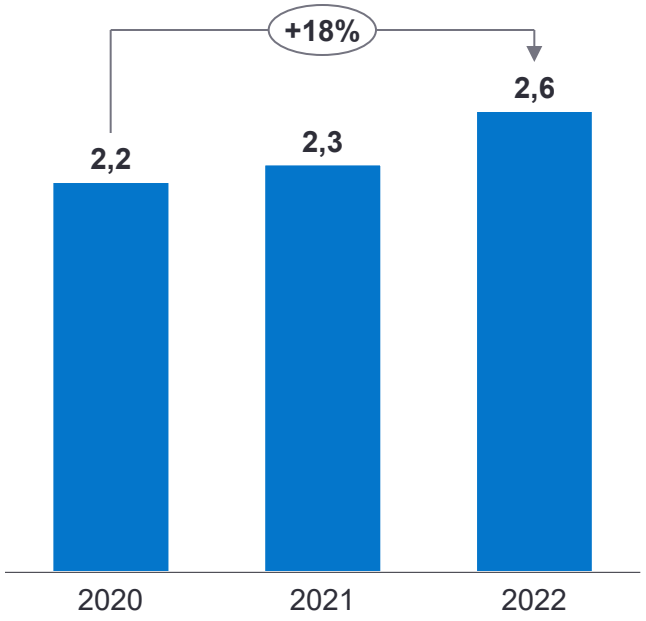


Energy efficiency of 5G technology in the long term

10x more energy efficient than 4G

50x more energy efficient than 3G

Energy consumption of mobile local loops
(France, TWh, 2020-22)



- The energy efficiency gains of **5G depend on a full deployment of infrastructure and growth in compatible equipment**, which could initially increase operators' carbon footprints
- The overall energy consumption of mobile networks is still increasing due to the **continued growth in mobile data traffic**

Sources: Arcep, EY-P Analysis

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In addition, telecom operators are adopting GHG reduction strategies in their operating model

List of the main environmental measures initiated by French telecom operators

Scope	Strategies	Details
Scope 1 & 2	Reduction of direct and indirect emissions	▸ Reduction of energy consumption of fixed networks by -11% per year since 2020 ▸ Limitation of the increase in mobile network energy consumption to +9% (vs. an increase in mobile data consumption of +25% per year)
Scope 3	Equipment life	▸ Eco-design on boxes and set-top boxes ▸ Promotion of refurbishing (9.4m boxes, set-top boxes and refurbished phones sold in 2022 in France) ▸ Proactive repair and maintenance
	Recycling and reuse	▸ Recycling of used equipment (3.7m boxes and decoders recycled in 2022 in France) ▸ Recycling and waste management (including WEEE[1])
	Purchasing Policy	▸ Encouraging suppliers to minimize their negative environmental impacts by participating in extending the life of the equipment supplied, reducing energy consumption, and promoting the implementation of sustainable practices
	Awareness and training	▸ Raising awareness among employees and customers of the challenges of a sustainable and inclusive approach and eco-gestures ▸ Integration of CSR skills into the approaches of the profession to enable everyone to act in their activity ▸ Training of environmental experts

1. Waste electrical and electronic equipment

Sources: Operators' CSR reports, EY-P Analysis


Thank you
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