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Measuring the environmental impact of the digital ecosystem: a new chapter of Arcep's regulation

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Strong increase in worldwide data and energy consumption

- Worldwide fixed broadband traffic X 2,2 in three years (ITU)
- Worldwide electricity demand from data centres could double towards 2026 (IEA)
- Boom of IA (Nature)
- Rapid renewal of devices
- Low recycling rates
- Increased awareness in society (e.g. 5G frequencies)
- Questions from decision makers

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Generative Al's environmental costs are soaring – and mostly secret

"It's estimated that a search driven by generative AI uses four to five times the energy of a conventional web search. Within years, large AI systems are likely to need as much energy as entire nations"

Sources :

- Nature, <u>article</u>
- ITU, <u>Facts and Figures 2023 Internet traffic (itu.int)</u>
- IEA, <u>Electricity 2024 Analysis and forecast to 2026 (iea.blob.core.windows.net)</u>





Global electricity demand from data centres could double towards 2026



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The broad picture: digital GHG emissions could triple by 2050 in France

- The digital sector's carbon footprint in France : 17 Mt CO2 eq., 2.5% of the national footprint, 78% of which corresponds to the equipment manufacturing phase (terminals, servers, boxes, etc.)
- Beyond the carbon footprint : energy consumption could double by 2050
- To reduce all environmental impacts → Challenge of sobriety as well as efficiency by making all stakeholders aware of their responsibilities.
- Better understanding for better action → holistic approach: interdependent multi-components: networks, devices, data centres, services and lifecycle analysis

If no steps are taken, digital's GHG emissions could almost triple by 2050



* Change between 2020 and 2050



Arcep's data collection and annual survey « Achieving digital sustainability » (1/2)

- A common observation gathered from the digital ecosystem and interested parties (experts, private & public sector, associations, etc.) :
 - o A lack of reliable data to assess the environmental footprint of digital technologies
 - o When measurements have been carried out, different values may have been found for the same indicator
- Objectives: build and monitor over time environmental indicators from data directly collected by Arcep from digital players, using robust and transparent methodologies to:
 - Improve measurement to better assess environmental issues, inform decision makers and allow the implementation of appropriate measures
 - o Provide incentives for economic actors to behave virtuously
 - o Empower users and make tools available to the general public



Arcep's data collection and annual survey « Achieving digital sustainability » (2/2)

- Before being given a new legal mandate: environmental data collection from main telco operators (2020) --> Annual survey "Achieving digital sustainability"
 - $\,\circ\,\,$ Annual survey Editions 1 and 2 on telco operators published in 2022 and 2023
- Digital building blocks (terminals/data centers/ networks) and the digital services they support are interdependent and their dynamics influence each other's --> collecting data from the entire digital ecosystem is essential
- End of 2021: legal mandate to collect environmental data from an extended scope of digital players (data centers operators, devices manufacturers, network equipment manufacturers, operating system suppliers, online public communication service providers)
 - Edition 3: scope extended to terminal manufacturers and data centers operators (March 2024)
 - Next steps: mobile equipment manufacturers (Ed.4); fiber manufacturers (Ed.5)



Arcep's approach to environmental data collection

Indicators based on robust and transparent methodologies which are multi-criteria (several types of environmental impact are assessed) and multi-stages (impacts generated by each step of the life cycle from the manufacturing stage to the end-of-life are taken into account)

• Collaborative approach :

- The data collection is **co-build with the entire digital ecosystem** (experts, private & public sector, associations, civil society etc.) through bilateral/multilateral exchanges
- It is the subject of a data collection decision that is submitted for **public consultation**
- The data collected are verified and analysed, drawing on the expertise of stakeholders

Iterative approach :

• The environmental data collection is progressively enriched with new indicators and new categories of actors to cover the whole value chain of the digital ecosystem



Focus on data collection from the four main telco operators: indicators and underlying methodologies (1/4)

Green house gas (GHG) emissions

- Total GHG emissions and the breakdown by scope :
 - Scope 1 (direct emissions)
 - Scope 2 (indirect emissions from energy consumption)
 - Scope 3 (other indirect emissions)
- Calculation of GHG emissions using GHG Protocol standards and guidelines (the greenhouse gas accounting standards most widely used by stakeholders and recognised worldwide)
- Calculation of Scope 2 emissions using both locationbased and market-based methodologies

Telcos' GHG emissions rose in 2022

Progression of telecoms operators' direct (scope 1) and indirect (scope 2) GHG emissions (in thousand tonnes of CO2 equivalent)





Focus on data collection from the four main telco operators: indicators and underlying methodologies (2/4)

Energy consumption of fixed and mobile networks



Network energy consumption

- Total network energy consumption and breakdown by network segments :
 - Mobile local loop
 - Fixed local loop (PSTN, DSL, cable, FttH/O)
 - Collection and core network



Focus on data collection from the four main telco operators: indicators and underlying methodologies (3/4)

independent of the length and intensity of its use

Breakdown of boxes' average power consumption (in watts)



Electric consumption of internet boxes (routers) and set-up boxes

- Total electricity consumption of the internet boxes (routers) and set-top boxes used by the operator's customers
- Instant electricity consumption of internet and set-top boxes in different scenarios



Focus on data collection from the four main telco operators: indicators and underlying methodologies (4/4)

Other indicators collected from telco operators

Indicators on end-user devices which are responsible for 65% to 90% of the digital environmental footprint, depending on the environmental indicator considered*

- Mobile phones :
 - Sales of mobile phones segmented by type of customer (general public, companies), by type of contract (with or without terminal subvention) and by status of the mobile phone (new or refurbished)
 - Volume of mobile phones collected for recycling and refurbishing

Internet and set-top boxes :

- Volume of devices distributed to the operator's customers segmented according to the status of the equipment (new/ refurbished)
- Volume of equipment recycled
- Volume of equipment refurbished



Arcep's indicators : datacenter operators

Datacenter operators

- GHG emissions at organizational level (scope 1, 2 and 3)
- For each datacenter operated :
 - $\circ~$ floor area, ground surface
 - Max power capacity that can be withdrawn by IT equipment
 - Annual energy and electricity consumption by IT equipment / cooling systems / other
 - Total volume of water withdrawn by for DC activities / for tertiary activities), by type of water and total volume of water discharged
 - $\circ~$ Type of cooling system
 - Quantity of refrigerants emitted into the atmosphere





Arcep's indicators : device manufacturers

Terminal device manufacturers (mobile phones, TV, laptops, tablets, desktop computers and computer screens)

- GHG emissions at organizational level (scope 1, 2 and 3)
- For each type of equipment :
 - volumes of rare earths and precious metals used in the manufacture of the equipment sold
 - volume of equipment sold (new/refurbished) segmented, depending on the equipment considered, by screen size, screen technology or network compatibility
 - $\circ\;$ volume of equipment in circulation
 - $\circ~$ total duration of use
 - Average electrical power in use and in standby (only for TVs and computer screens), segmented by screen size and screen technology (only for TVs)

Smaller released volume for every category of new device in 2022

Million units released in 2022 and YoY growth rate





Sustainability indicators collected from others players covered by the data collection decision currently in force

Mobile network equipment manufacturers (base band unit, radio remote unit, active and passive antenna)

- GHG emissions at organizational level (scope 1, 2 and 3)
- Volumes of precious metals and rare earths required to manufacture equipment sold in France
- For each type of equipment :
 - o GHG emissions embodied in equipment sold in France (total, calculated from LCAs and extrapolated)
 - $\,\circ\,$ volume of equipment sold (in units and kg)
 - $\,\circ\,$ volume of equipment sold for which an LCA (in units)
- Volume of components reinjected into equipment sold in France



Let's look up ! Go green to preserve future generations connectivity

- Environmental data collection and survey on telco operators: a necessary condition ...
- ... but not sufficient to address the digital footprint
- → Digital building blocks (terminals/data centers/ networks) and the digital services they support are interdependent and their dynamics influence each other's --> collecting <u>data from the entire digital ecosystem</u> is essential
- ightarrow More data required to monitor trajectories and identify efficient levers of action
- National level:
 - Government roadmap on "Digital sector and environment" with objectives set based on Arcep's indicators
 - Workflows engaged by Arcep : gradual expansion of data collection (e.g. datacenters), General Policy Framework for the Ecodesign of Digital Services, assessment of actual and forecast digital footprint; environmental impact of audiovisual broadcasting modes...
- **European/International levels:** The environmental challenges posed by ICTs require a collective effort and involve the responsibility of everyone (private and public players), at all levels (national and international).
 - Berec reports on sustainability, JRC, etc.
 - > ITU, World Bank



Than you for your attention



To go further on the digital environmental footprint:

Annual survey « Achieving digital sustainability » **ADEME-Arcep press kit**





