

EU Regulation on energy efficiency and energy consumption of data centers.

Daniele PACI – European Commission Joint Research Centre

NEFI Technology Talk – Energy Efficiency in Servers and Data Centres

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Science for policy



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JRC purpose

The Joint Research Centre provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society.

Energy Consumption in the Digital Sector



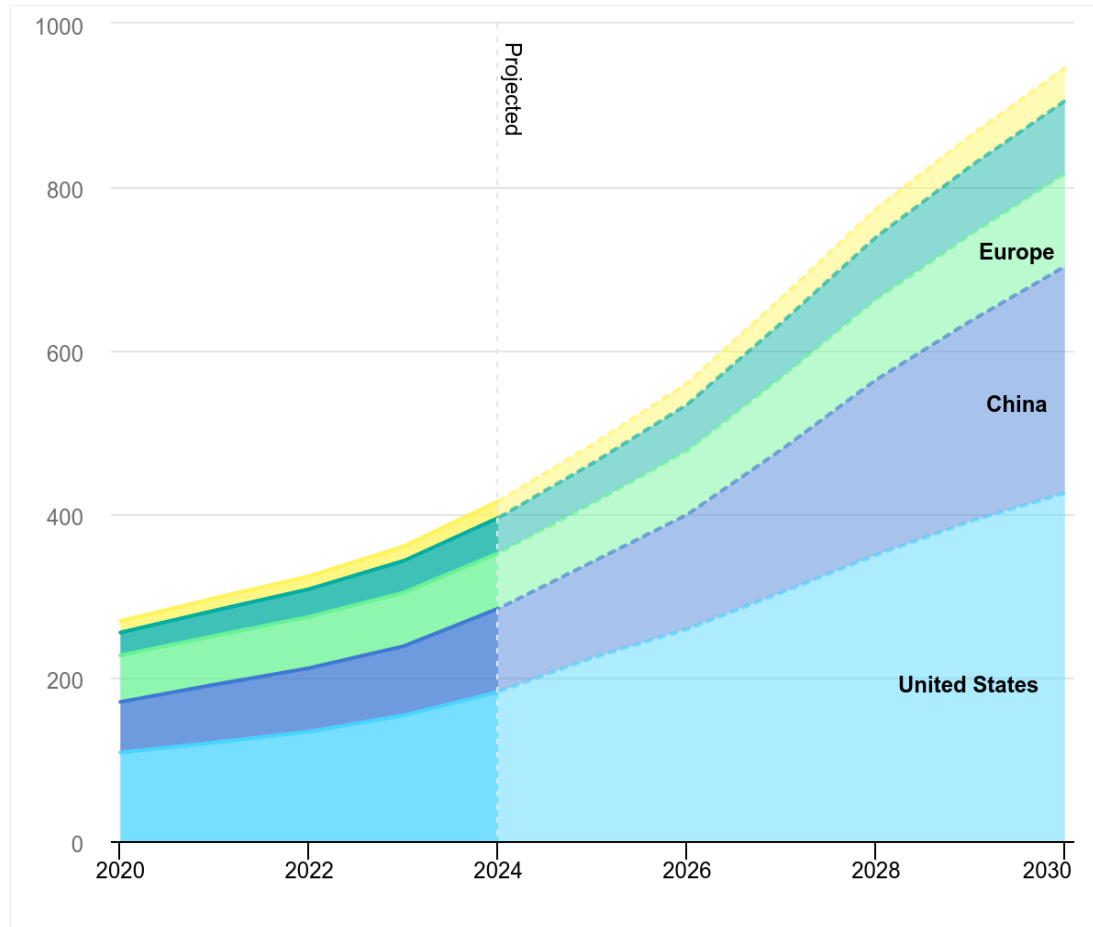
- Demand for digital services is rising rapidly;
- Spatial concentration of data centres in the EU;
- Need of EU official statistics on the energy use of digital infrastructure: literature review to estimate energy consumption from data centres and broadband communication networks.

• Source: JRC, 2024

Data Centres Energy Consumption

- The **top twelve markets**, Germany, France, the Netherlands, Ireland, Italy, Spain, Sweden, Poland, Belgium, Denmark, Austria, and Finland, account for **95%** the region's data centre energy use.
- In **Germany**, data centres used an estimated **18 TWh** in 2022, equivalent to 3.6% of national electricity use. In France, data centres used around 12 TWh of electricity, equivalent to 2.7% of national electricity use.
- Data centres represent a **significant share of national electricity use** in **Ireland** (18%), the **Netherlands** (5.6%), **Luxembourg** (4.9%), Denmark (4.6%), Germany (3.6%), and France (2.7%). In all other countries, data centres represent less than the **EU-27 average of 2.5%**.

Expected evolution in energy consumption



• Source: IEA, 2025

- Despite current and future efficiency gains, ICT energy use will keep rising due to the spread of technologies like IoT, AI, and cryptocurrencies.
- Significant increase in electricity consumption in data centres in all regions, with the US leading, followed by China and Europe

How to tackle the energy saving challenges

- Decarbonisation of ICT with renewable energy integration
- Foster innovation, more energy-efficient technologies and circular economy practices (e.g. data centres' waste heat recovery)
- Voluntary initiatives to advance towards aligned objectives: *EU Code of Conduct for Energy Efficiency in Data Centres*



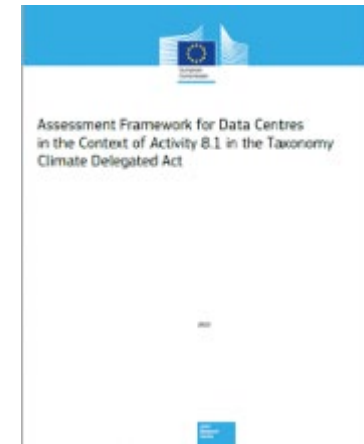
EU Code of Conduct for Energy Efficiency in Data Centres



- Started in 2007 as a JRC initiative.
- More than **400 data centre operators**.
- Data centres of all size and type (colocation, hyperscaler, corporate, etc.).
- **Commitment to adopt a set of best practices** (agreed and updated annually) and to **monitor energy efficiency improvement** over the years.
- From 2009 to 2024, the average **PUE** (power usage effectiveness) of participants was reduced from **1.8 to less than 1.3**.
- **Benchmark for EU policy** (EED art.12, Taxonomy Regulation).

The EU Taxonomy

- The [European Taxonomy](#) for sustainable activities will form the basis of mandatory reporting under the coming [Corporate Sustainability Reporting Directive \(CSRD\)](#).
- The Taxonomy requires that data centres implement the Best Practices of the Code of Conduct to meet the Taxonomy requirements and this is verified by an independent third party.
- The JRC has published a framework for assessing the alignment of data centers with the Taxonomy.
The [Assessment Framework for Data Centres](#) is intended to help determine whether data centers meet the requirements of the Taxonomy.

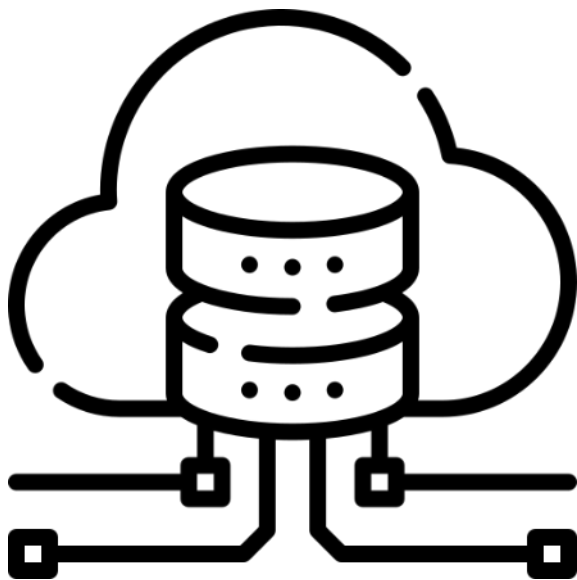


The Energy Efficiency Directive 2023

- Under Article 12 of the recast **Energy Efficiency Directive** (10 October 2023) data centres will be required to publish information on their energy performance and sustainability [as detailed under Annex VII]. This information, along with key performance indicators, will also be communicated to an EU-level database and published in an aggregated form.
- The **Delegated Regulation under the EED** adopted in March 2024 sets out what information and key performance indicators should be reported by data centres. It also defines the first sustainability indicators that will be used for the rating of data centres.

The Energy Efficiency Directive 2023

Owners and operators of data centres on EU territory with an installed IT power demand of at least 500kW to report:



Name of the data centre, owner and operators
date of entry into operation and the municipality
where the data centre is based



Floor area of data centre, installed power, annual
incoming and outgoing data traffic, amount of data
stored and processed

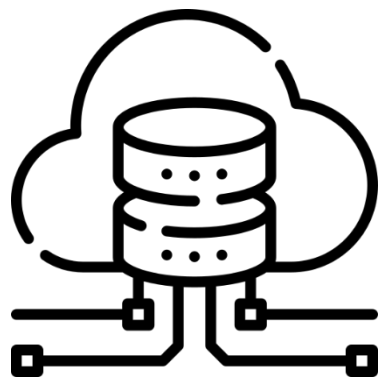


The performance of the data centre during the last full
calendar year (energy consumption, power utilisation,
temperature set points, waste heat utilisation, water
usage and use of renewable energy)

Delegated Act on Data Centres

➤ http://data.europa.eu/eli/reg_del/2024/1364/oj

Operators of data centres on EU territory with an installed IT power demand of at least 500kW to *communicate to the European database*



Information in Annex I



Key performance indicators in Annex II

EU Assessment Report



- Relatively low coverage (36% of the eligible DCs)
- KPI show high variability. PUE and WUE still higher than the industry benchmark
- Deployment of renewable energy
- KPI reporting and assessment is the first step to develop a rating scheme

Conclusions



Reducing energy consumption is crucial to meet EU energy transition and competitiveness goals, especially in the ICT sector, which is energy-intensive and growing rapidly.



Policymakers, scientific advisors, and industry all have a role in adopting energy-efficient measures at a large scale in the ICT sector.



As digital technologies and services evolve quickly, collaboration between policymakers and companies is essential to improve data collection, quality, and availability. Different legislative tools may support this process.

Thank you and keep in touch



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