

DATA CENTERS

Five questions on energy

Artificial intelligence can be power hungry. Machine learning and its infrastructure could consume triple the energy of existing data centers by 2030.

1 What is inside data centers that accounts for their energy needs and consumption?

Computer servers that process and store data generally account for 60% of electricity demand in data centers, according to the International Energy Agency (IEA).

Cooling systems to keep servers and equipment from overheating and breaking down can comprise between 7% and 30% of power needs, according to the IEA. Storage systems, networking equipment and backup generators are also part of data centers' electricity footprints.

2 How much power do data centers use now?

In the U.S., data centers accounted for 4.4% of total energy use in 2023, according to the U.S. Department of Energy's Lawrence Berkeley National Laboratory. Globally, data centers use roughly 485 terawatt-hours (TWh) of electricity, 1.5% to 2% of the world's total generation, according to IEA..

3 How much energy are AI data centers projected to use?

Data centers' power needs could total 20% of all electricity use by 2030 or 2035, according to analyses by Penn State University and Bloomberg. IEA projects data centers' global energy consumption to total 945 TWh by 2030 and 1,200 TWh by 2035.

4 Why do new data centers require so much more power?

AI workloads require specialized hardware that consumes significantly more electricity than conventional servers and programs. Traditional CPU (central processing unit) servers are usually 300-500 watts per server, according to energy firm Solar Tech.

By comparison, AI-oriented GPU (graphics processing unit) have a much larger capacity of 3,000 to 5,000 watts per server. AI training processors are even bigger with capacities exceeding 10,000 watts per server.

5 How much energy does AI require and use compared to other technology?

A single AI prompt can require 10 to 15 times as much energy as a Google search, according to estimates from IEA and OpenAI, which operates ChatGPT. Training a machine learning system needs data centers that have as much as 40 times more bandwidth than older data centers, according to the University of Virginia.