

Cloud Computing's Green Revolution



Google, AWS Boast 6x Energy Efficiency Over Average Data Centers

Many global companies have begun to tackle climate change by investing in on-site renewable energy. While Google, AWS and Microsoft Azure are [large purchasers of renewable energy](#) and renewable energy credit offsets, these cloud computing leaders are also tackling climate change by reducing their overhead energy consumption. To be sure, energy efficiency is an often neglected yet incredibly important piece of climate change action. While data centers as a whole have become more efficient over time, hyperscale data centers have outpaced smaller data centers in energy use reduction.



One of the ways to measure data center energy efficiency is by examining a data center's Power Use Effectiveness (PUE) value. The PUE, when multiplied by equipment power consumption, gives an

estimate of the total power needed to run the data center, including the data center infrastructure (i.e. cooling, lighting, controls).

Research has shown that hyperscale data centers [are far more efficient](#) than smaller, local servers. The opportunities to improve data center PUE increase with larger data centers that have the ability to develop better airflow management and employ more efficient cooling equipment. This makes cloud computing giants like Google, AWS, and Microsoft Azure environmentally-friendly data storage options.

Google has been leading the way in energy efficiency. Since 2014, Google has been using machine learning to automatically optimize cooling in their data centers. This AI-powered recommendation system has already delivered [30% energy savings](#) on average. Additionally, Google's data centers raise the temperature to 80°F, use outside air for cooling, and build energy efficient custom servers to lower overhead energy usage.

AWS recently optimized the airflow medium used in their data center cooling systems. This medium allows air to pass through the HVAC system more efficiently, saving fan energy and reducing the energy use of cooling equipment by 20%. Additionally, they use [computational fluid dynamics](#) modeling tools to optimize their data center design for energy efficiency prior to construction.

In 2021, the average annual PUE² for Google's global fleet of data centers [was 1.10](#), compared with the industry average of 1.573. AWS data centers have a similar [PUE of 1.07 to 1.15](#), while Microsoft Azure has an average [PUE of 1.18](#).

As shareholders and board members begin to place more value on sustainability, cloud computing's energy efficiency is a compelling selling point.

