

Carbon-Neutral Data Center Market Forecasts to 2034 – Global Analysis By Component (Hardware, Power & Cooling Infrastructure, Renewable Energy Infrastructure and Software & Services), Data Center Type, Energy Source, End User and By Geography

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Abstracts

According to Statistics MRC, the Global Carbon-Neutral Data Center Market is accounted for \$13.39 billion in 2026 and is expected to reach \$65.74 billion by 2034 growing at a CAGR of 22.0% during the forecast period. A carbon-neutral data center functions with zero net carbon emissions by lowering energy demand and compensating for unavoidable emissions using renewable energy and offset mechanisms. Such facilities rely on high-efficiency IT equipment, modern cooling systems, and smart energy monitoring to optimize power use. Clean energy sources like wind, solar, and hydropower are widely adopted to replace conventional electricity generation. In addition, these data centers focus on eco-friendly building practices, efficient water usage, and recovery of excess heat. By supporting sustainability targets and regulatory compliance, carbon-neutral data centers enable organizations to operate digital infrastructure responsibly without compromising performance, scalability, or operational reliability.

According to the IEA, data centers and data transmission networks together accounted for around 1% of global energy-related greenhouse gas emissions in 2022. The agency highlights that efficiency improvements and renewable energy adoption are critical to achieving carbon neutrality in this sector.

Market Dynamics:

Driver:

Growing corporate sustainability and ESG commitments

Increasing emphasis on ESG performance and sustainability initiatives among enterprises is fueling the growth of carbon-neutral data centers. Organizations are committing to carbon neutrality as investors, customers, and regulators demand responsible business practices. Since data centers contribute substantially to operational emissions, companies are targeting them for sustainability upgrades. Transitioning to carbon-neutral facilities helps firms achieve emission targets, strengthen corporate responsibility credentials, and attract environmentally conscious stakeholders. As sustainability becomes a core business priority, investments in green data center technologies continue to rise, reinforcing the expansion of the carbon-neutral data center market.

Restraint:

Limited availability of renewable energy infrastructure

Inadequate renewable energy infrastructure limits the expansion of carbon-neutral data centers. Many locations lack sufficient clean power generation capacity or grid integration to sustain energy-intensive data center operations. The variable nature of renewable sources further complicates reliability, especially where energy storage solutions are limited. As a result, operators often rely on conventional power to ensure uptime, undermining carbon-neutral goals. These infrastructure constraints reduce geographic feasibility and delay investments, making limited renewable energy availability a significant challenge for market growth.

Opportunity:

Technological innovation in energy efficiency and cooling

Ongoing innovation in cooling and energy optimization technologies presents valuable opportunities for carbon-neutral data centers. Solutions like AI-based power management, advanced liquid cooling, and heat reuse systems improve efficiency and reduce environmental impact. These technologies allow operators to support higher workloads while maintaining sustainability goals. As technology matures and adoption costs decrease, data centers can achieve carbon-neutral operations more easily. This progress encourages wider implementation of green infrastructure, driving long-term growth opportunities in the carbon-neutral data center market.

Threat:

Volatility in renewable energy supply and pricing

Fluctuating availability and costs of renewable energy represent a major risk for carbon-neutral data centers. Weather-dependent power generation can cause inconsistencies in energy supply, especially where storage infrastructure is limited. Sudden shifts in renewable energy prices or incentive structures may also affect operational budgets. These uncertainties complicate long-term planning and threaten reliability commitments. As a result, volatility in clean energy supply and pricing can slow adoption and create financial risks for operators pursuing carbon-neutral data center strategies.

Covid-19 Impact:

The outbreak of COVID-19 influenced the carbon-neutral data center market in both positive and negative ways. A sharp rise in digital traffic driven by remote working, online collaboration, and cloud services boosted the need for expanded data center infrastructure, encouraging adoption of sustainable facilities. At the same time, supply chain interruptions, workforce restrictions, and rising component prices delayed projects and affected capital spending. Some organizations postponed green initiatives due to financial pressure. Nevertheless, the pandemic highlighted the need for reliable and sustainable digital ecosystems, strengthening long-term demand for carbon-neutral data centers.

The power & cooling infrastructure segment is expected to be the largest during the forecast period

The power & cooling infrastructure segment is expected to account for the largest market share during the forecast period due to its central role in energy efficiency and sustainability. Data centers rely heavily on optimized power distribution, advanced cooling systems, and smart energy management to reduce carbon emissions. Solutions such as immersion cooling, intelligent UPS systems and AI-powered energy monitoring help lower electricity usage while maintaining high operational reliability. Given the significant energy demands of modern facilities, operators prioritize investment in power and cooling technologies over other segments. This makes the segment the largest contributor to achieving carbon-neutral performance in data centers.

The edge segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the edge segment is predicted to witness the highest growth rate. Driven by rising adoption of 5G networks, IoT devices, and latency-sensitive applications, edge facilities are established near users to ensure quick and efficient data processing. Sustainability considerations are increasingly incorporated, including energy-efficient IT equipment, advanced cooling, and renewable power integration. This convergence of localized computing demand and eco-friendly design fuels rapid expansion. As enterprises and service providers focus on reducing emissions while enhancing performance, the edge segment emerges as the highest growth rate contributor within the carbon-neutral data center market.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share due to its robust IT infrastructure, widespread cloud adoption, and focus on sustainability. The presence of leading hyperscale and enterprise operators drives investment in low-carbon, energy-efficient facilities. Favorable regulatory frameworks, access to renewable energy, and strict environmental standards promote the transition to carbon-neutral operations. Increasing corporate focus on ESG goals and reducing emissions further accelerates market growth. With a well-established technology ecosystem and strong commitment to sustainable practices, North America continues to lead the carbon-neutral data center market, capturing the largest regional share globally.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR. Rapid adoption of cloud computing, digital services, and increasing internet usage in countries such as India, China, and Japan is fueling demand for modern data center facilities. The region is witnessing a surge in newly developed greenfield data centers incorporating renewable energy and energy-efficient designs. Government support for clean energy and growing corporate focus on sustainability further boost adoption. Combined with expanding digital infrastructure needs, these factors make Asia-Pacific the region with the highest growth rate in the carbon-neutral data center market.

Key players in the market

Some of the key players in Carbon-Neutral Data Center Market include 3M Company,

ABB Group, Alibaba Group, Alphabet Inc., Amazon.com, Inc., Cisco Systems, Inc., Dell Inc., Digital Realty Trust, Inc., Eaton Corporation plc, Equinix, Fujitsu Ltd, Hewlett Packard Enterprise (HPE), IBM Corporation, Intel Corporation and Microsoft Corporation.

Key Developments:

In December 2025, IBM and Confluent, Inc. announced they have entered into a definitive agreement under which IBM will acquire all of the issued and outstanding common shares of Confluent for \$31 per share, representing an enterprise value of \$11 billion. Confluent provides a leading open-source enterprise data streaming platform that connects processes and governs reusable and reliable data and events in real time, foundational for the deployment of AI.

In December 2025, Dell Technologies is acquiring the Israeli company Dataloop AI for \$120 million in an all-cash deal, Calcalist has learned. The deal marks a significant strategic step for the American computing giant, which in recent years has expanded its investments in artificial intelligence and is building end-to-end AI infrastructure solutions for corporate customers.

In June 2025, Eaton announced it has signed an agreement to acquire Ultra PCS Limited from the Cobham Ultra Group. Ultra PCS's innovative solutions for safety and mission critical aerospace systems will augment Eaton's portfolio in both military and civilian aircraft. We expect Ultra PCS's strong growth position on high-margin business to be accretive to Eaton. Under the terms of the agreement, Eaton will pay \$1.55 billion for Ultra PCS.

Components Covered:

Hardware

Power & Cooling Infrastructure

Renewable Energy Infrastructure

Software & Services

Data Center Types Covered:

Hyperscale

Colocation

Enterprise

Edge

Energy Sources Covered:

Renewable Energy Sourcing

Hybrid Energy Sourcing

End Users Covered:

IT & Telecom

BFSI

Healthcare & Life Sciences

Government & Defense

Manufacturing

Other End Users

Regions Covered:

North America

US

Canada

Mexico

Europe

Germany

UK

Italy

France

Spain

Rest of Europe

Asia Pacific

Japan

China

India

Australia

New Zealand

South Korea

Rest of Asia Pacific

South America

Argentina

Brazil

Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:

- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

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