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Data Center Cooling Market - Global Outlook and Forecast 2021-2026

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Abstracts

In-depth Analysis and Data-driven Insights on the Impact of COVID-19 Included in this Global Data Center Cooling Market Report

The data center cooling market is expected to grow at a CAGR of over 4% during 2021–2026.

The global market is witnessing growth due to the high utilization of IT infrastructure, which is increasing the rack density to an average of 6–8 kW across the world. Several developed countries are operating racks at a density of 10–12 kW, whereas developing economies are slowly moving toward rack capacities of over 7 kW. Hence, the growing rack power density has increased the need for efficient cooling systems. The majority of the data centers are deploying artificial intelligence and machine learning workloads, which have further increased the rack power density over the past two years. The deployment of AI and ML workloads has also grown the market for liquid-immersion and direct-to-chip technique. Servers consume more power due to increased data traffic load; therefore, the demand for highly efficient cooling solutions to cool down is growing. Hot/cold aisle containment, adiabatic, liquid, and free cooling are the primary techniques that are observing high adoption in the market.

The following factors are likely to contribute to the growth of the data center cooling market during the forecast period:

The outbreak of COVID-19 boosting Data Center Service Demand

The popularity of District Heating Concept

Growth in Rack Power Density

AI-enhanced Liquid Immersion and Direct-To-Chip Cooling Solutions

The study considers the present scenario of the data center cooling market and its market dynamics for the period 2020?2026. It covers a detailed overview of several market growth enablers, restraints, and trends. The report offers both the demand and supply aspects of the market. It profiles and examines leading companies and other prominent ones operating in the market.

Data Center Cooling Market Segmentation

This research report includes a detailed segmentation by infrastructure (cooling systems & other infrastructure), systems, technique, liquid cooling technique, tier standards, geography. In 2020, data center cooling systems witnessed an investment of over 14% YOY compared to 2019, due to the outbreak of the COVID-19 pandemic. The deployment of artificial intelligence and machine learning workloads increases the demand for liquid immersion and direct-to-chip solutions. Most data centers in developed regions, North America, Europe, China, Japan, and Australia are likely to continue to use air-based solutions, with free chillers, evaporative/adiabatic coolers, and CRAC/CRAH units observing investment. Metrics such as power usage effectiveness (PUE), water-usage effectiveness (WUE), and carbon usage effectiveness (CUE) have gained higher importance in the past few years. Most modern facilities are being built based on the ASHRAE cooling guidelines and the Uptime Institute’s tier standards for redundant designs, which is expected to influence the market growth.

Data centers in Denmark offers 85% free cooling annually, which reduces electricity consumption by up to 50%. The data center market in Denmark is likely to witness the construction of facilities that are designed to transfer waste heat from the facility to nearby local communities under the district heating concept. CRAC and CRAH units are likely to emerge as the largest revenue contributors, followed by evaporative coolers and chillers. The high adoption of evaporative coolers and dry coolers is likely to grow during the forecast period. The US offers free cooling of over 3,000 hours per year, thereby decreasing the operational cost. The adoption of systems namely, free chillers and water-based chillers are likely to increase in the US during the forecast period. The market will witness an increase in the development of data centers with net-zero water consumption.

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Free cooling solutions are gaining momentum over liquid-based solutions. However, chilled water systems have a high prevalence in the market, especially water-based ones. In the US, Europe, Nordic, China, Australia, New Zealand, Canada, and Japan use free solutions. Free chillers with waterless cooling systems with indoor CRAC units are also catching upon among data centers.

Water-based systems are observing high adoption among data centers located in tropical places. Microsoft has successfully experimented under the ocean data center, which will be a significant driver for the growth of water-based solutions. The number of vendors offering direct liquid and immersion solutions has increased in the market. Several operators have adopted these solutions to facilitate the cooling of high-density racks up to 200 kW, reduce data center cost and space, and increase the efficiency of these systems through low power consumption and carbon emissions. China, the US, Japan, Germany, France, and the UK are the leading adopters of such systems. Developing countries are gaining increased traction for liquid-based solutions, adding investments to the data center cooling market share during the forecast period.

Most UK data centers are either tier III or tier IV certified due to their high standard design and construction that includes redundant configuration. The Netherlands data centers are developing tier III and Tier IV design standards, with a minimum redundancy of N+1. Similarly, China and Hong Kong witnessed the construction of tier III and Tier IV facility. Data centers in Japan are likely to adopt tier III or tier IV design with a minimum of N+N redundancy across the infrastructure. In 2020, most facilities developed were Tier III and Tier IV standards.

Infrastructure

Cooling Infrastructure

Other Cooling Infrastructure

Cooling Systems

CRAC & CRAH

Chiller Units

Cooling Towers & Dry Coolers

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Economizer & Evaporative Coolers

Other Cooling Units

Cooling Technique

Air-based

Liquid-based

Liquid Cooling Technique

Water-based

Direct-to-chip Cooling

Liquid Immersion Cooling

By Tier Standards

Tier I & II

Tier III

Tier IV

INSIGHTS BY GEOGRAPHY

North America and APAC are expected to account for the highest investments during the forecast period. Owing to the COVID-19 pandemic, the adoption of cloud and other data center-related services witnessed increased investments in the colocation and hyperscale development in the APAC region. High stress on data confidentiality in the region has also led to investment by local enterprise data center operators operating in regulated industries such as banking and financial services. The increasing demand for

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cryptocurrency data centers in China is boosting the development of facilities with high-performance computing infrastructure. This has increased the rack power density and is expected to increase the demand for energy-efficient cooling infrastructure.

By Geography

- North America
  - US
  - Canada
- Latin America
  - Brazil
  - Other Countries
- Western Europe
  - UK
  - Germany
  - France
  - Netherlands
  - Ireland
  - Other Countries
- Nordic
  - Denmark
  - Iceland & Finland
  - Norway

- Sweden
- Central & Eastern Europe
  - Russia & Czech Republic
  - Poland & Austria
  - Other Central and Eastern Countries
- Middle East
  - GCC
  - Other Middle Eastern Countries
- Africa
  - South Africa
  - Kenya
  - Other African Countries
- APAC
  - China & Hong Kong
  - Australia & New Zealand
  - India
  - Japan
  - Rest of APAC
  - Southeast Asia

Singapore

Malaysia

Thailand

Indonesia

Other South Eastern Countries

INSIGHTS BY VENDORS

The global data center cooling market comprises global and local service providers. Over the past few years, the growing electricity consumption by data center cooling units has led to vendors' multiple innovations in the market. Innovations across infrastructure have led to the development of new products that have increased facilities operations' efficiency by 90% and reduce cooling OPEX up to 50%. The market will witness intense competition as the construction of data center is growing, and service operators are continually looking out for energy-efficient systems that emit low carbon footprints to the atmosphere.

Prominent Data Center Cooling Infrastructure Providers

Airedale International Air Conditioning

Rittal Systems

Schneider Electric

STULZ

Vertiv Group

Other Prominent Data Center Infrastructure Providers

3M

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4ENERGY

Airsys Group

Alfa Laval

Allied-Control

Aqua Cooling Solutions

Aquila Group

Arctic Chiller Group

Asetek

BasX Solutions

Canovate Electronics

Carrier

Chilldyne

ClimateWorx

Cooler Master

Condair Group

CoolIT Systems

Daikin Applied (Daikin Industries)

Data Aire

DCX The Liquid Cooling Company

Degree Controls

Delta Electronics

ebm-papst

Emicon AC

EnviCool

Fuji Electric

Green Revolution Cooling (GRC)

HiRef S.p.A

Huawei Technologies

Iceotope

ION UPS

Johnson Controls

Kelvion Holding

KyotoCooling

Lennox International

LiquidCool Solutions

Manerga

Midas Green Technologies

Minkels (Legrand)

Motivair Cooling Solutions

Munters

Nortek Air Solutions

nVent

Oceanaire

QCooling

Renovo Zhuhai

Shanghai Shenglin M&E Technology

SPX Cooling Technology

Stellar Energy

Submer

Swegon Group

SWEP International

Systecon

Trane (Ingersoll Rand)

United Metal Products (UMP)

Upsite Technologies

USystems

Vigilent Corporation

Wakefield-Vette

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KEY QUESTIONS ANSWERED

1. What is the growth of the data center cooling market during the period 2021–2026?

2. What is the impact of COVID-19 on the global data center cooling market?

3. What are significant innovations observed in hyperscale data center infrastructure adopted by key players?

4. What are key market trends and drivers impacting the growth of data center cooling centers?

5. Which regions are likely to witness investments during the forecast period?

6. Who are the key players in the data center cooling market?

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