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Asia-Pacific Data Centre Cooling Market By Cooling Technology (Air-Based Cooling (CRAH, Chiller & Economizer, Cooling Tower, Others) Liquid-Based Cooling (Immersion Cooling, Direct-To-Chip Cooling, and Rear-Door Heat Exchanger)), By Component (Cooling Units, Services), By End-Use Industry (IT & Telecommunications, Banking, Financial Services, & Insurance, Government & Public Sector, Healthcare, Retail, Others), By Country, Competition, Forecast and Opportunities, 2019-2029F

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Abstracts

Asia-Pacific Data Centre Cooling Market was valued at USD 2.83 Billion in 2023 and is expected to reach USD 4.42 Billion by 2029 with a CAGR of 7.57% during the forecast period.

The Asia Pacific Data Centre Cooling Market involves the technologies and systems used to manage the temperature and environmental conditions within data centres, ensuring optimal performance and reliability of servers and other critical IT equipment. As data centres expand rapidly in the region to meet the increasing demand for data processing, storage, and cloud services, the need for effective cooling solutions becomes crucial. Efficient cooling is essential to prevent overheating, which can lead to equipment failure and reduced operational efficiency. The market is expected to rise significantly due to several factors. Firstly, the proliferation of data-intensive applications, including cloud computing, big data analytics, and the Internet of Things, drives the need for more robust and scalable data centre infrastructures. This expansion

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necessitates advanced cooling solutions to manage the heat generated by densely packed servers and high-performance computing systems. Secondly, there is a growing emphasis on energy efficiency and sustainability within data centres, prompting investments in innovative cooling technologies that reduce energy consumption and operational costs. Air-based cooling systems, such as computer room air conditioners and air handling units, and liquid-based cooling systems, such as direct-to-chip cooling and immersion cooling, are increasingly being adopted to address these needs. Additionally, stringent regulations and standards related to environmental impact and energy efficiency are pushing data centre operators to upgrade their cooling systems. The rise of edge computing and the deployment of smaller, localized data centres further contribute to the demand for advanced cooling solutions tailored to various operational scales and requirements. As these trends continue, the Asia Pacific Data Centre Cooling Market is set to experience substantial growth, driven by technological advancements, increased data centre capacities, and a heightened focus on sustainability and operational efficiency.

Key Market Drivers

Expansion of Data Centre Infrastructure

The expansion of data centre infrastructure is a primary driver of growth in the Asia Pacific Data Centre Cooling Market. The region is experiencing a rapid increase in data centre construction and expansion due to the rising demand for data storage, processing, and cloud services. As businesses and organizations continue to migrate to digital platforms and embrace data-driven strategies, the need for robust data centre facilities has intensified. These facilities require advanced cooling systems to maintain optimal operating temperatures and prevent overheating, which can lead to equipment failures and decreased performance.

The Asia Pacific region, characterized by its rapidly growing economies and burgeoning technology sectors, has seen substantial investments in data centre development. Major technology companies and cloud service providers are establishing large-scale data centres to cater to the increasing volume of data generated by consumers and businesses. This surge in data centre construction drives demand for efficient cooling solutions that can handle the heat generated by high-density server environments and ensure uninterrupted operations. The integration of cutting-edge cooling technologies, such as high-efficiency air conditioning units and liquid cooling systems, is essential to support the expanding infrastructure and meet the cooling requirements of modern data centres.

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Moreover, the trend towards data centre consolidation and the development of hyperscale data centres, which house thousands of servers in a single facility, further amplifies the need for advanced cooling solutions. These large-scale data centres generate significant amounts of heat, necessitating sophisticated cooling systems to maintain optimal temperatures and ensure reliable performance. As data centre infrastructure continues to expand across the Asia Pacific region, the demand for effective and efficient cooling solutions is expected to grow, driving the overall growth of the data centre cooling market.

Rising Demand for Energy Efficiency and Sustainability

Rising demand for energy efficiency and sustainability is a significant driver for the Asia Pacific Data Centre Cooling Market. With increasing awareness of environmental impact and energy consumption, data centre operators are under pressure to adopt cooling solutions that minimize energy use and reduce carbon footprints. Energy-efficient cooling systems not only help in cutting operational costs but also align with global and regional regulations aimed at reducing greenhouse gas emissions and promoting sustainable practices.

Data centres are known for their high energy consumption, and cooling systems are a major component of this expenditure. Traditional cooling methods, such as air conditioning units, often consume substantial amounts of energy. In response, there is a growing emphasis on innovative cooling technologies that offer greater efficiency and lower energy consumption. Solutions such as advanced air management systems, free cooling techniques, and liquid cooling technologies are increasingly being implemented to optimize energy use and enhance overall cooling efficiency.

The adoption of energy-efficient cooling solutions is also driven by regulatory pressures and incentives offered by governments and environmental agencies. Many countries in the Asia Pacific region have introduced regulations and standards that require data centres to meet specific energy efficiency benchmarks. These regulations encourage data centre operators to invest in cutting-edge cooling technologies that reduce energy consumption and comply with environmental standards.

Furthermore, the growing focus on corporate social responsibility and sustainable business practices has led organizations to prioritize energy-efficient operations. By investing in environmentally friendly cooling solutions, data centre operators can enhance their sustainability credentials and demonstrate their commitment to reducing

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environmental impact. This shift towards sustainability not only meets regulatory requirements but also appeals to environmentally conscious consumers and stakeholders, driving the demand for advanced cooling technologies in the Asia Pacific Data Centre Cooling Market.

Growth in Cloud Computing and Big Data Analytics

The growth in cloud computing and big data analytics is a major driver of the Asia Pacific Data Centre Cooling Market. As businesses and organizations increasingly adopt cloud-based services and leverage big data analytics for strategic decision-making, the demand for data centre capacity and performance has surged. This trend is driving the need for sophisticated cooling solutions to support the expanded infrastructure required to manage and process vast amounts of data.

Cloud computing has revolutionized the way businesses access and utilize computing resources. By shifting to cloud-based platforms, organizations can scale their IT operations efficiently and reduce the need for on-premises hardware. However, this shift also requires data centres to handle increased data volumes and provide reliable, high-performance computing services. To achieve this, data centres must invest in advanced cooling systems that can effectively manage the heat generated by densely packed servers and high-performance computing equipment.

Similarly, the rise of big data analytics has led to the development of data centres designed to handle large-scale data processing and storage. Big data analytics involves processing and analyzing massive datasets to extract valuable insights and drive business growth. This data-intensive process generates significant heat, necessitating efficient cooling solutions to maintain optimal temperatures and prevent equipment overheating. Data centres dedicated to big data analytics require specialized cooling technologies that can manage high thermal loads and ensure uninterrupted performance.

As cloud computing and big data analytics continue to expand across the Asia Pacific region, the demand for data centre cooling solutions will grow in tandem. The need for scalable, efficient cooling systems that can support the increased data processing and storage requirements will drive innovation and investment in the data centre cooling market.

Key Market Challenges

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High Energy Consumption and Costs

One of the major challenges facing the Asia Pacific Data Centre Cooling Market is the high energy consumption associated with traditional cooling systems. Data centres are notorious for their substantial energy requirements, and cooling systems are a significant contributor to this consumption. Traditional air conditioning units and cooling methods often consume large amounts of electricity to maintain optimal temperatures within data centres, leading to elevated operational costs and increased environmental impact. This challenge is compounded by the growing scale of data centres and the intensification of data processing activities, which result in higher thermal loads and increased cooling demands. As data centres expand and incorporate more high-performance computing equipment, the need for efficient cooling solutions becomes even more critical.

The high energy consumption of conventional cooling systems not only impacts operational expenses but also contributes to the overall carbon footprint of data centres. This environmental concern is becoming increasingly important as organizations face greater pressure to adhere to sustainability standards and reduce greenhouse gas emissions. The drive towards energy efficiency and sustainability is prompting data centre operators to seek advanced cooling technologies that offer improved performance while minimizing energy use. However, the transition to more energy-efficient solutions often involves significant upfront investment and technical challenges, making it a complex undertaking for many operators.

Addressing this challenge requires a comprehensive approach that includes adopting innovative cooling technologies, implementing energy-saving practices, and optimizing cooling system design. Advanced cooling solutions such as liquid cooling, free cooling, and precision air conditioning offer potential benefits in terms of energy efficiency and cost savings. Additionally, integrating energy management systems and adopting best practices in cooling system operation can help mitigate the impact of high energy consumption. As the demand for data centre cooling continues to grow, addressing the challenge of energy consumption and costs will be crucial for ensuring the sustainability and economic viability of the Asia Pacific Data Centre Cooling Market.

Limited Availability of Skilled Workforce

Another significant challenge facing the Asia Pacific Data Centre Cooling Market is the limited availability of a skilled workforce capable of designing, implementing, and maintaining advanced cooling systems. The rapid advancement of cooling technologies

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and the increasing complexity of data centre operations require specialized knowledge and expertise. However, the shortage of skilled professionals with experience in advanced cooling solutions and data centre infrastructure presents a barrier to effective market growth and operational efficiency.

The growing demand for sophisticated cooling technologies, such as liquid cooling and high-efficiency air management systems, necessitates a workforce that is well-versed in these innovations. Professionals with expertise in areas such as cooling system design, thermal management, and energy efficiency are essential for ensuring the successful deployment and operation of advanced cooling solutions. Despite the increasing need for such expertise, there is a notable shortage of qualified individuals in the Asia Pacific region, which can hinder the ability of data centre operators to effectively address their cooling needs.

The challenge of limited skilled workforce availability is further exacerbated by the rapid pace of technological advancements and the evolving requirements of data centre cooling systems. As cooling technologies continue to evolve, there is a constant need for ongoing training and professional development to keep pace with new developments and best practices. Addressing this challenge requires a concerted effort to invest in workforce development, including initiatives such as specialized training programs, industry partnerships, and educational opportunities. By fostering a skilled workforce, the Asia Pacific Data Centre Cooling Market can better meet the demands of modern data centre operations and support the growth of advanced cooling technologies.

Key Market Trends

Adoption of Advanced Cooling Technologies

The Asia Pacific Data Centre Cooling Market is experiencing a notable trend towards the adoption of advanced cooling technologies. As data centres continue to expand and evolve, traditional cooling methods are increasingly being supplemented or replaced by more sophisticated solutions. Technologies such as liquid cooling and immersion cooling are gaining traction due to their superior efficiency in managing high-density server environments. Liquid cooling systems, which involve the use of liquids to transfer heat away from critical components, offer significant advantages in terms of energy efficiency and thermal management. Immersion cooling, where servers are submerged in non-conductive liquids, provides even greater cooling efficiency by directly removing heat from components.

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These advanced cooling technologies address the growing thermal loads and space constraints associated with modern data centres. They also contribute to reduced energy consumption and lower operational costs, aligning with the broader trend towards sustainability and energy efficiency. The implementation of precision cooling systems and dynamic cooling management further enhances the ability to maintain optimal temperatures and minimize energy use. As data centre operators seek to improve performance and reduce their environmental impact, the adoption of these cutting-edge cooling technologies is expected to continue to rise, shaping the future landscape of the Asia Pacific Data Centre Cooling Market.

Integration of Energy Efficiency and Sustainability Initiatives

Another significant trend in the Asia Pacific Data Centre Cooling Market is the integration of energy efficiency and sustainability initiatives. With increasing regulatory pressure and growing awareness of environmental issues, data centre operators are prioritizing the adoption of cooling solutions that enhance energy efficiency and support sustainability goals. This trend is driven by the need to reduce operational costs and meet stringent environmental regulations.

Data centres are implementing various strategies to achieve energy efficiency, including the use of energy-efficient cooling systems, such as high-performance air conditioning units and advanced cooling management techniques. The incorporation of renewable energy sources, such as solar and wind power, into data centre operations is also becoming more common. Additionally, data centre operators are focusing on optimizing cooling system design and operation to minimize energy consumption and reduce their carbon footprint. By integrating these sustainability initiatives, data centre operators can not only comply with regulatory requirements but also enhance their market competitiveness and appeal to environmentally conscious stakeholders.

Emergence of Edge Data Centres

The emergence of edge data centres is a key trend impacting the Asia Pacific Data Centre Cooling Market. Edge data centres, which are smaller, localized facilities designed to handle data processing and storage closer to the end-user, are becoming increasingly important as the demand for low-latency and high-performance applications grows. This trend is driven by the rise of technologies such as the Internet of Things, 5G, and real-time data analytics, which require efficient data processing at the edge of the network.

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Edge data centres present unique cooling challenges due to their distributed nature and varying environmental conditions. As these facilities are often located in diverse geographical areas, cooling solutions must be adaptable to different climates and operational requirements. The development of innovative cooling technologies and strategies tailored to edge data centres is becoming a focal point in the industry. This includes the use of modular cooling systems, compact and efficient cooling units, and remote monitoring capabilities to ensure optimal performance across multiple edge locations.

The growth of edge data centres is expected to drive demand for specialized cooling solutions that can address the unique needs of these facilities. As the trend towards edge computing continues to expand, the Asia Pacific Data Centre Cooling Market will see increased investment and innovation in cooling technologies designed to support the efficient operation of edge data centres.

Segmental Insights

Cooling Technology Insights

In 2023, the Asia Pacific Data Centre Cooling Market was predominantly driven by air-based cooling technologies, and this segment is anticipated to maintain its dominance throughout the forecast period. Air-based cooling encompasses various methods, including Computer Room Air Handlers, chillers, economizers, and cooling towers, each contributing to the efficient management of thermal loads in data centres. Computer Room Air Handlers are widely used for their ability to effectively distribute conditioned air throughout data centre environments, while chillers provide a reliable means of cooling by circulating chilled water. Economizers leverage outside air to reduce the need for mechanical cooling, enhancing energy efficiency, and cooling towers help dissipate heat from the cooling system. These technologies are favored for their proven effectiveness in managing the thermal conditions of traditional and large-scale data centres.

Despite the increasing interest in liquid-based cooling technologies, such as immersion cooling, direct-to-chip cooling, and rear-door heat exchangers, air-based cooling solutions remain dominant due to their established reliability, scalability, and lower initial investment costs. Air-based cooling technologies are well-suited to handle the diverse and evolving needs of data centres across the Asia Pacific region, including varying climate conditions and data centre sizes. As data centre operators continue to seek cost-effective and efficient cooling solutions, air-based technologies are expected to retain

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their leading position in the market. While liquid-based cooling methods offer advanced cooling capabilities and energy efficiency for high-density environments, air-based cooling remains the preferred choice for many data centres due to its versatility and widespread application.

Regional Insights

In 2023, China emerged as the dominant region in the Asia Pacific Data Centre Cooling Market and is expected to maintain its leadership throughout the forecast period. China's dominance is driven by its rapid expansion in data Centre infrastructure, spurred by significant investments in technology and cloud services. The country's robust digital economy, fueled by a growing number of internet users, increasing data consumption, and the rise of big data analytics, has led to a substantial demand for data centres and, consequently, advanced cooling solutions. China’s large-scale data centre developments necessitate sophisticated cooling technologies to manage the substantial thermal loads generated by high-density server environments.

China's favorable government policies and strategic initiatives to promote digital infrastructure development have accelerated the growth of data centres, further driving the need for efficient cooling systems. The presence of major technology companies and cloud service providers in the region also contributes to the increased demand for data centre cooling solutions. As data centre operations expand and evolve, the requirement for effective cooling technologies to ensure optimal performance and energy efficiency remains a priority.

Other regions, such as India and Southeast Asia, are also experiencing growth in data centre development, but China’s substantial market size, rapid infrastructure expansion, and significant investments position it as the leader in the data centre cooling market. The combination of these factors ensures that China will continue to be a key player in the Asia Pacific Data Centre Cooling Market, maintaining its dominant position through the forecast period.

Key Market Players

Schneider Electric SE.

Vertiv Group Corporation.

Stulz Gmbh

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Johnson Controls International plc

Rittal Pvt. Ltd

Daikin Industries, Ltd.

Huawei Technologies Co., Ltd

Eaton Corporation plc

Mitsubishi Electric Corporation

Airedale International Air Conditioning Ltd

Report Scope:

In this report, the Asia-Pacific Data Centre Cooling Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Asia-Pacific Data Centre Cooling Market, By Cooling Technology:

Air-Based Cooling

CRAH

Chiller & Economizer

Cooling Tower

Others

Liquid-Based Cooling

Immersion Cooling

Direct-To-Chip Cooling

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Rear-Door Heat Exchanger

Asia-Pacific Data Centre Cooling Market, By Component:

Cooling Units

Services

Asia-Pacific Data Centre Cooling Market, By End-Use Industry:

IT & Telecommunications

Banking, Financial Services, & Insurance

Government & Public Sector

Healthcare

Retail

Others

Asia-Pacific Data Centre Cooling Market, By Country:

China

Japan

India

South Korea

Australia

Singapore

Thailand

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Malaysia

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Asia-Pacific Data Centre Cooling Market.

Available Customizations:

Asia-Pacific Data Centre Cooling Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

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