Global Data Center Market Report

2025

CLEANBRIDGE

Imprint

About the Report

Our global data center market report adds to our continued series of key energy transition focused industry reports. The collective works are the result of a valued research collaboration between ourselves and Alchemy Research and Analytics, a leading industry research group working actively across the energy transition markets. The report draws on macroeconomic data from multilateral institutions and industry-specific data from sources such as industry associations, government authorities / statistical departments, and the International Energy Agency (IEA). This was supplemented by news reports, trade journals, and related sources.

The report provides a current market overview of the global data center industry, including first-movers, key challenges, policy drivers, economics and outlook in major countries across Europe and the Americas. The structure of the report begins with an introduction to the principals behind the technology and industry. It then delves into detailed chapters on major topics, offering a holistic view of the possible industry directions, and highlighting growth opportunities, demand drivers, and investment considerations.

CleanBridge's INSIGHTS series of industry reports, aims to provide a comprehensive understanding of the key characteristics and trends prevalent in major markets for various technologies that will shape the energy transition over the coming decades. We hope you find our annual review of the Global Data Center market informative and enjoyable to read and we look forward to briefing you on other energy transition technologies in the upcoming months.

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Partner, & Sr. Managing Director

CleanBridge

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Executive Summary

Over the next four to five years, global data center spending could exceed $1 Tn – three times the amount spent in 2024. The sharp rise in expenditure marks an unabated bullish trend to install the critical digital infrastructure needed to enable the mass adoption of Artificial Intelligence (AI) and Machine Learning technologies. The industry's growth has been strong enough to overcome adverse macroeconomic developments and related uncertainties. The expanding project pipeline across the leading markets and the emergence of new demand regions strengthen investor sentiments.

North America dominates the sector, particularly the United States, accounting for over 50% of the global hyperscale data center capacity. The European market is expanding, driven by regulatory mandates for energy efficiency and sustainability, while the Asia-Pacific region is witnessing exponential growth due to cloud adoption, 5G rollouts, and digital transformation initiatives. Key demand drivers include the continued expansion of AI workloads, requiring significant computational power, and the proliferation of 5G networks. Hyperscalers are essential in driving momentum and bringing scale and innovations to the space.

The top cloud service providers, namely Amazon Web Services, Microsoft, Meta and Alphabet, define the hyperscale segment as expanding their infrastructure to support AI-driven applications. AI is not only a demand driver but also a key enabler in optimising data center efficiency, reducing cooling costs, and enhancing operational performance. The growth of edge data centers is another transformative trend driven by the need for low-latency processing in IoT, autonomous vehicles, and smart cities. The rising concern for sustainability is the most critical emerging development in this growth process.

Progressively, data centers' energy intensity is emerging as a constraint. High-end computing chips also entail a significant spike in power consumption, generally measured through the rack density of the data centers. Governments worldwide are tightening energy efficiency regulations, compelling operators to invest in energy efficiency and cleaner energy resources. Many data center operators, led again by the Hyperscalers, are thus actively investing in a multitude of energy resources such as renewable energy, nuclear power and energy-efficient cooling technologies. The push towards sustainability will likely drive further innovation in power sourcing, energy efficiency, and regulatory compliance.

Despite the attractive growth outlook, the industry must circumvent the rising resource challenges, mainly in power and land. Grid constraints have already impacted some markets' data center development schedules. The limited availability of suitable locations due to cost or zoning regulations adds to developers' challenges. The resolution of various impediments will be based on a mix of measures in policy and market-led decisions, such as through a better and streamlined regulatory process and the development of new secondary market locations beyond traditional choices. Stakeholders must navigate sustainability imperatives, evolving regulatory frameworks, and emerging market dynamics to capitalise on the sector's immense potential.

02

Introduction to Data Centers

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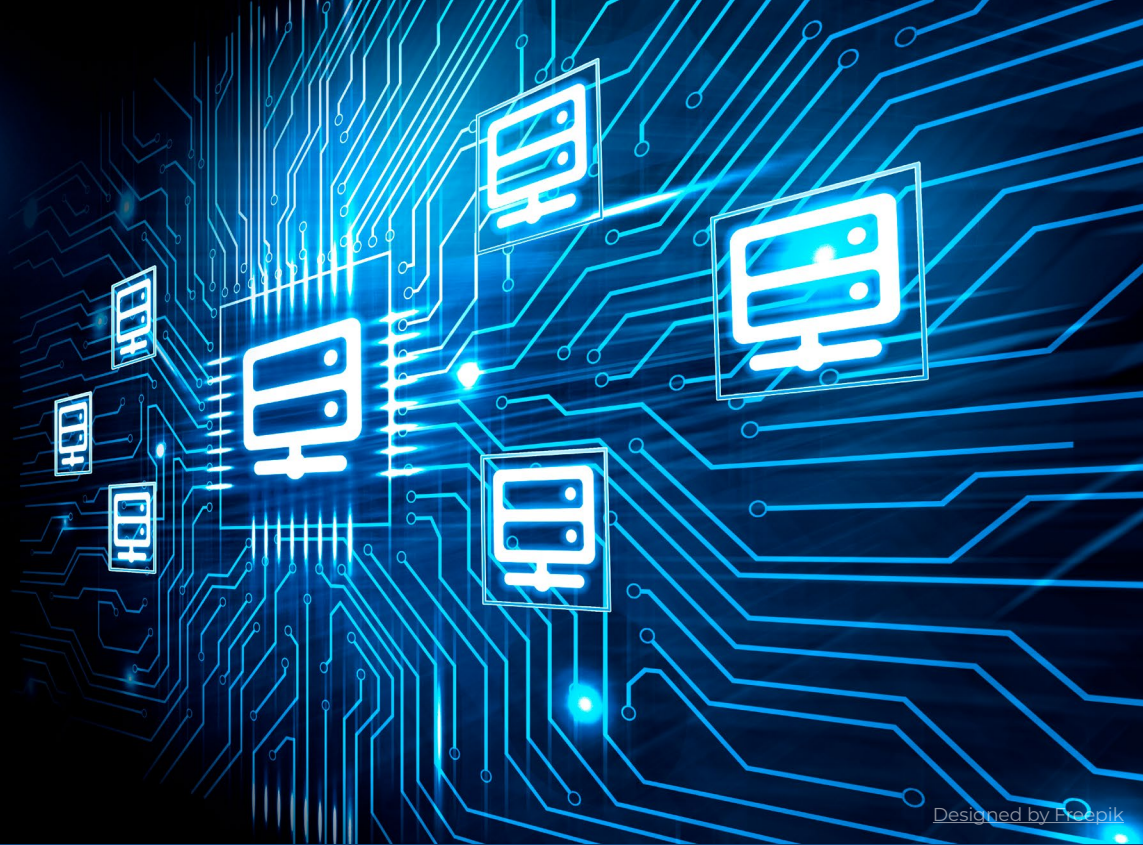
Data Center Evolution

The evolution of the global data center market has been driven by continuous innovation and adaptation in response to the growing demands of digital infrastructure in an increasingly digitalised world. Historically thought of as centralised facilities housing mainframe computers, the role of the data center has transformed over the past few decades to offer much more than local computing power and data storage.

In the 1980s and 1990s, the rise of technologies involving interconnected computer networks like client-server architecture and Local Area Networks ("LANs") decentralised data processing. This shift allowed organisations to manage data more flexibly and efficiently, leading to the proliferation of on-premises data centers. The commercialisation of the internet in the mid-1990s further accelerated this trend, as businesses required reliable hosting solutions for online services. This period saw the emergence of colocation services, where companies could rent space in third-party data centers, offering a flexible and scalable digital infrastructure solution.

The late 1990s and early 2000s were significant turning points for the global data center market with the explosion of the internet, which led to a surge in demand for data centers to support websites, email services, e-commerce platforms, and online applications. It also saw the development of cloud computing, with companies like Amazon Web Services ("AWS"), Google Cloud, and Microsoft Azure revolutionising the industry by offering scalable, on-demand cloud services. These cloud providers had the capability to run multiple virtual machines on a single physical server, optimising resource usage and enhancing scalability. This led to the surge of hyperscale data centers as companies recognised the benefit of offloading their physical Information Technology ("IT") infrastructure and switching to Infrastructure-as-a-Service ("IaaS"), Platform-as-a-Service ("PaaS") and Software-as-a-Service ("SaaS") models.

The mid-2010s saw the continued growth of cloud service adoption, with companies opting for both hybrid cloud models and multi-cloud models, blending public cloud services with their own on-premises data centers, allowing for full control over sensitive data while taking advantage of cloud scalability for non-critical workloads, as well as avoiding vendor lock-in and boosting resilience. However, the rise of edge computing was the key development in the global data center market, which addressed the need for real-time data processing resulting from the proliferation of Internet of Things ("IoT") devices and time-sensitive applications by deploying data centers closer to data sources, reducing latency and improving performance.

More recent developments in the data center market have centered around operational efficiencies and sustainability. As corporates, governments and Intergovernmental Organisations ("IGOs") race towards Net Zero, the sustainability of data centers is becoming an increasingly hot topic, particularly given the significant amounts of energy facilities

consume, leading to the development of green data centers that employ renewable energy sources and energy-efficient hardware.

The need to decarbonise data centers has been particularly prominent, given the growing need to deploy data centers, at scale, to cope with the increasing demands of a digitalised world, driven by the rapid adoption of Artificial Intelligence, big data analytics, the rollout of 5G networks and continued growth in demand for cloud service provision.

Today, the data center market is characterised by rapid growth and intense competition, a trend expected to continue, with further innovations in Artificial Intelligence ("AI"), sustainability, and decentralised data processing. As the digital infrastructure requirements of businesses and consumers continue to grow, data centers will remain a critical component of the global di landscape, inevitably evolving to meet the challenges and opportunities involved.

Data Center Universe

Data centers are physical rooms, buildings, or facilities that house critical IT infrastructure, such as networked computers, computing hardware, and storage systems, essential for developing, running, and delivering applications and services and for processing, storing, and managing associated data.

Historically, data centers have been thought of as privately owned, tightly controlled, on-premise facilities, housing essential IT infrastructure for the exclusive use of one

company, commonly referred to as enterprise data centers. However, following the rise of the internet in the late 1990s, and as the global megatrend of digitalisation has gained momentum, driving demand for computing power, data processing, data storage and low latency communication, data center types, use cases and business models have rapidly evolved.

Broad Outline of the Data Center Types

- An enterprise data center is a traditional, small-scale, company-owned facility, used to store and process internal data as well as host applications, often built on-site at company offices or key location

- With the growth in demand for cloud service provision, which offers both flexibility and scalability, enterprise data centers are making up an increasingly small part of the global data center market

- However, some inherent advantages of enterprise data centers remain, including enhanced control, visibility and security, particularly for companies in possession of sensitive data

- Colocation data centers operate under a leasing model, where companies can rent space, hardware, power, interconnection, security and cooling services for a monthly fee

- The colocated model differs from that of the enterprise model, by offering businesses flexibility and scalability in their IT operations and alleviating the need for significant upfront capital investment associated with on-premise facilities

- Interconnection, involving direct, private data exchange, in a secure, efficient and low latency manner, between businesses is a significant business driver and competitive advantage for collocated data centers

- They can offer one-to-one, one-to-many or many-to-many connectivity between partners, customers and employees, often without the need to traverse the internet (Equinix, What is Interconnection, 2017)

Enterprise   ## Colocation
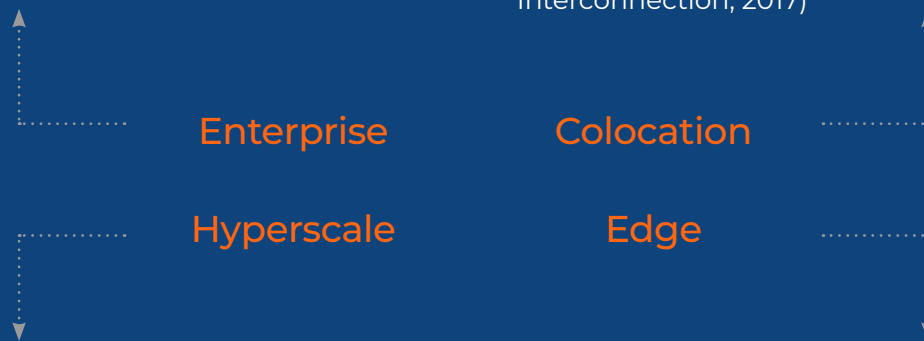
Hyperscale   ## Edge

- Whilst there is no globally recognised metric for a "hyperscale" data center, they are differentiated by both size and scalability. Hyperscale data centers typically cover over 10,000 square feet, house over 5,000 servers and have the capacity to scale, materially, at speed

- Like enterprise data centers, hyperscale data centers are, typically, owned and operated by the company they support

- The growth of cloud computing, AI and big data have all contributed to the rapid expansion of the hyperscale data center market, where the Cloud Service Providers ("CSPs") are dominant, with Google Cloud, Microsoft Azure and Amazon Web Services ("AWS") accounting for ~65.0% of the hyperscale data center market globally (SDxCentral, 2023)

- Located on the "edge" of the network, edge data centers are designed to process time-sensitive data faster, while sending less time-critical information to larger, centralised data centers (Hewlett Packard Enterprise, 2024)

- By processing data services as close to end users as possible, edge data centers allow organisations to reduce communication delay and improve customer experiences

- Edge data centers have been critical in the growth and success of the IoT, which encompasses smart technologies and devices from smart home security systems to automated cars

- Edge data centers reduce latency, improving real-time data analytics and processing, and customer experience

Source: Equinix, SDxCentral

Data Center Value Chain

The evolution of the data center market has spurred material capital deployment across the value chain as developers, constructors, operators and service providers look to capitalise on the market opportunity presented by the growing importance of data centers in an increasingly digitalised world.

Some of the major hyperscalers, including the CSPs, have the size, scale, and skillset to develop, construct, own, and operate their own data centers. However, given the technical, operational, and regulatory complexities involved, most owners require the services of third-party contractors and early-stage developers to bring a project to fruition.

Whilst the development, construction and operation of data centers are nuanced, depending on the size, complexity and location, the below summarises the key activities and milestones to be navigated in each phase:

Major Stages in Data Center Development

| Phase	Key Activities
Development — Site Selection and Acquisition / Leasing **3 – 6** Months	• Site analysis, considering the suitability of the location based on key factors such as power and water availability, connectivity, climate, and real estate costs • Initial permitting (building, environmental etc.) • Land acquisition, or long-term leasing
Design and Engineering **3 – 6** Months	• Creation of detailed blueprints and site layouts • Developing detailed plans for electrical, mechanical, and structural systems • Submitting plans to local authorities and obtaining necessary construction permits
Construction — Construction **12 – 18** Months	• Clearing the site, grading, and preparing for construction. • Building the core structure, including foundations, walls, and roofing. • Installing critical infrastructure such as electrical systems (generators, UPS), cooling systems (CRAC units, chillers), and networking equipment • Installing server racks, cabling, and other internal components • Conducting inspections to ensure compliance with design specifications and building codes
Commissioning and Testing **3 – 6** Months	• Integrating all systems and ensuring they work together seamlessly • Rigorous testing of electrical, mechanical, and IT systems under various scenarios • Obtaining necessary certifications (e.g., Uptime Institute's Tier ratings) that validate the data center's reliability and performance • Final inspections, obtaining occupancy permits, and handing over to the operations team
Operation — Service Provision Contracting and Go-Live **1 – 2** Months	• Training staff, setting up operational protocols, and establishing monitoring systems • Contracting of support function, dependent on existing capabilities of the platform (Security, Operations & Maintenance ("O&M"), Asset Management etc.) • Officially launching the data center operations

Major Players

Hyperscalers

Whilst enterprise data centers have historically dominated the data center market, the hyperscale market is experiencing rapid growth and will soon dwarf on-premise sites, given the proliferation of digitalisation trends across cloud computing, AI and big data analytics.

Hyperscale data centers are primarily operated by leading cloud service providers (CSPs) such as AWS, Google Cloud, and Microsoft Azure, which deliver scalable cloud computing services, supporting everything from simple data storage to complex machine learning, 5G rollout and big data analytics.

Data Center Power Capacity of Major Hyperscale Players (Capacity in GW)
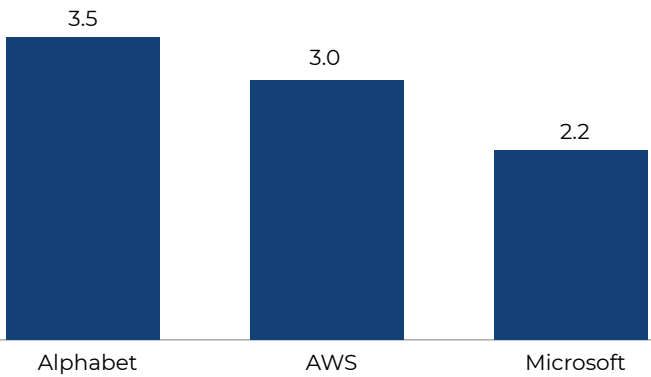
Source: Data Center Magazine, Equinix, and Digital Realty

Company	Role of Data Centers	Recent Transactions
Amazon Web Services (AWS)	Operates a vast network of data centers worldwide, providing cloud computing services to businesses of all sizes. AWS's data centers support a wide range of services, including computing power, storage options, and networking capabilities.	• **Transaction:** Land acquisition in the Georgia state of the US • **Deal value:** $11 Bn • **Date:** January 2025 • **Details:** Expansion of the US-based data center capacity
Google Cloud	Leverages its global network of data centers to deliver scalable cloud services, including data storage, machine learning, and data analytics. Their infrastructure is designed for high performance and energy efficiency.	• **Transaction:** Equity investment in Energy Parks for data centers • **Deal value:** NA • **Date:** December 2024 • **Details:** Equity investment in startup Intersect Power for renewable power-based data center capacities
Microsoft Azure	Operates a comprehensive network of data centers that provide a wide range of cloud services, including computing, storage, and databases. Azure's infrastructure supports both hybrid cloud solutions and on-premises data management.	• **Transaction:** Investment in the Wisconsin region of the US • **Deal value:** $3.3 Bn • **Date:** May 2024 • **Details:** Development of data center infrastructure towards promoting Wisconsin as a hub for AI-based services

Colocation Service Providers

Major colocation service providers such as Equinix and Digital Realty also play a pivotal role in the data center ecosystem. While these companies are traditionally known for offering colocation and interconnection services, they have expanded into the hyperscale market, providing tailored solutions to meet the needs of large-scale cloud providers. Equinix's xScale program, for instance, is a dedicated initiative aimed at supporting hyperscale deployments, with an investment pipeline of over $3.0 Bn (Equinix, 2021). Meanwhile, Digital Realty has also made significant investments in hyperscale facilities, particularly through joint ventures, like their recent $7.0 Bn partnership with Blackstone to deliver 500.0MW of hyperscale IT capacity (Blackstone, 2023)

However, despite the strong push into hyperscale, colocation services continue to be essential for both firms. Digital Realty operates 300+ data centers with colocation and white space services (Dgtl Infra, 2023) (Digital Realty, 2023). Equinix, with a network of 260 centers, maintains colocation as a major revenue stream (Dgtl Infra, 2023) (Equinix, 2024)

Major Colocation Providers

Company	Role of Data Centers	Recent Transactions
Equinix	Leading global provider of colocation and interconnection services. Their data centers enable businesses to securely deploy their IT infrastructure and connect with a vast ecosystem of partners and providers.	• **Transaction:** Equinix's Acquisition of BT's Ireland data center business • **Deal value:** $61.4 Mn • **Date:** December 2024 • **Details:** BT's two carrier-neutral facilities to help capitalise upon the Irish demand
Digital Realty	Provides colocation, interconnection, and custom data center solutions. Their facilities support mission-critical applications and deliver scalable infrastructure for enterprises and service providers.	• **Transaction:** Digital Realty's Joint Venture with Brookfield • **Deal value:** $1.8 Bn • **Date:** September 2023 • **Details:** Joint venture to develop data centers in India, catering to the growing demand in the region

Source: BT and Data Center Dynamics

03

Industry Size, Growth and Key Drivers

Globally, the promised demand for AI-led technology solutions is far greater than the existing installed digital infrastructure, especially the data centers. This vast market opportunity remains largely untapped as various market players strive to build their capacity. The US market leads the race, as observed in the country's predominant share in existing hyperscale data center capacity and the project pipeline. The industry's strong demand drivers are unlikely to moderate any time soon, even with temporary challenges in the macro economy or global trade fluctuations. Some of these points are discussed in this chapter, covering the market size estimates and the major demand drivers.

Industry Size

Estimates of the size of the global data center market vary due to differing assumptions and related parameters. However, all align on the sector's trajectory, involving significant growth in the medium term and a few regions dominating the space. Global data center size (by revenue) is estimated to be $125.4 Bn in 2024, which is forecast to grow at an 11.3% Compound Annual Growth Rate (CAGR) to $364.6 Bn by 2034, largely driven by the continuation of the global megatrend of digitalisation (Precedence Research, 2024).

Continued adoption of cloud computing by enterprises globally will be a key driver in the hyperscale market, as businesses continue to move away from on-site enterprise models to flexible and scalable IT solutions. Digital transformation, namely AI-based solutions and big data analytics will continue to demand significant computing power, particularly as machine learning improves and evolves. An expansion of the edge data center market is also expected, as the IoT universe expands, and consumers demand lower latency and improved real-time data processing through their devices.

Global Data Center Market Size by Revenue ($, Bn)
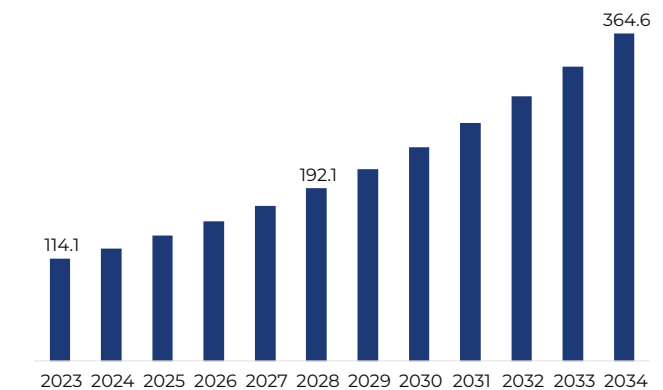
Source: Precedence Research

The optimistic outlook for the global data center market is a testament to its essential role in enabling the modern digital world. It supports the seamless operation of digital services, from cloud computing to online transactions, and plays a crucial role in the roll-out of transformative technological advancements, such as AI.

North America, being the largest market by revenue, plays a pivotal role in the global data center landscape. The US market has seen a significant surge in data center capacity, driven by the proliferation of cloud service providers, the rise of the IoT, and advancements in AI technologies. Between the second half of 2020 and the second half of 2023, the data center capacity under construction in the US increased nearly ninefold, from 611.0MW to 5,341.0MW (JLL, 2024). The Northern Virginia region, in particular, has become a focal point, with a data center vacancy rate of less than 1.0% in 2023, reflecting the rampant demand for data center capacity (Statista, 2024) (Statista, 2024). The region's popularity is driven by its strategic location near major internet exchange points, access to a highly educated workforce, favourable business climate with tax incentives, ample land and reliable power availability. Additionally, proximity to federal government agencies and the growing demand for secure, low-latency data services further improve its appeal as a data center hub.

This rapid expansion in the North American region is also supported by the high penetration of 5G technology and the widespread adoption of digital services. The US leads in 5G mobile connections, expected to rise from 15.0% in 2021 to 68.0% by 2025, driving significant data usage and, consequently, the growing need for data centers.

The European data center market, following closely behind North America, has also seen significant growth over recent years. The FLAPD regional markets—Frankfurt, London, Amsterdam, Paris, and Dublin—remain central hubs due to their excellent connectivity, infrastructure and strategically important locations, despite headwinds in the form of declining land availability and, correspondingly, increasing land cost. This has expedited the emergence of secondary data center locations, such as Berlin, Milan, and Madrid, which are increasingly being seen as a viable alternative due to cost, speed of development and connectivity.

Data Center Market by Region
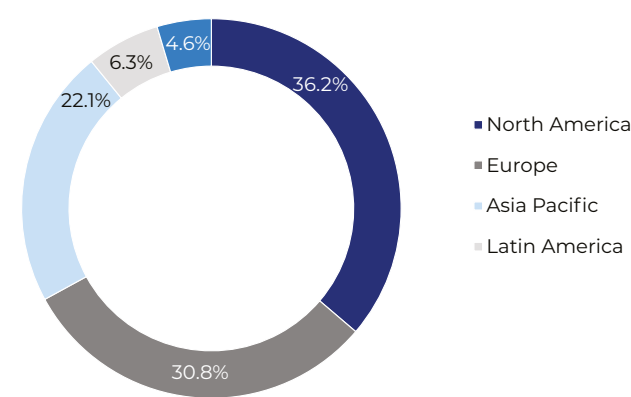
Note: Regional share is based on market size by revenue of 2023.
Source: Precedence Research

In particular, the European market has led the way in the decarbonisation of data centers, an increasing focus of governments and organisations as the world grapples with the challenge presented by climate change. This has largely been EU-led, with the Energy Efficiency Directive ("EED"), which was implemented in 2023 and aims to reduce Europe's energy consumption by 11.7% by 2030, supporting the EU Green Deal's objective of cutting carbon emissions by 55.0% by the same year. Under the EED, data centers within the EU that exceed 500kW will be required to report their energy use and emissions as a first step, which encompasses floor area, installed power, data volumes, energy consumption, PUE, temperature set points, waste heat utilisation, water usage, and use of renewable energy.

Amidst competition and rising regulatory requirements, developers and investors are progressively shifting attention to the Asia-Pacific (APAC) region. Its currently lagging position in the global data center market share is compensated by exponential growth. In terms of installed capacity, the APAC region is anticipated to reach more than double the existing levels within the next 3-4 years (Aurex, 2025). Collectively, the region's emerging market economies and their public/private digitalisation projects, innovation hubs, and 5G rollouts are shaping the market contours.

Latin America, the Middle East, and Africa hold the residual market share. This is largely driven by Latin America, which has benefitted from strong economic growth, rapid adoption of digitalisation trends, and favourable policies promoting digital economies and innovation hubs, particularly in Brazil, Mexico, and Chile.

Within regions, primary markets, characterized as those with at least 600MW of supply, continue to see robust growth as colocation and hyperscale providers consolidate their positions in key metros due to their connectivity and advanced infrastructure. However, secondary markets, with 100-600MW of supply, have gained attention from investors, developers, and lenders seeking new opportunities in less crowded markets where land can be more readily available, and cheaper.

Some key industry dynamics outline the changing landscape of the data center market. One of them refers to hyperscale data centers, which are mostly associated with the top and well-entrenched players in the cloud services market. Hyperscale data centers, particularly in the US, dominate the global capacity, followed by significant contributions from Europe and China.

Hyperscale Data Center Capacity by Region
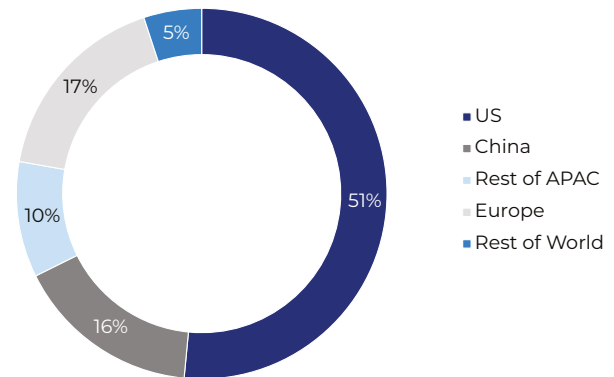
Note: Data is as of Q4 2023.
Source: SDx Central

According to the first chart, the US holds 51.0% of the hyperscale data center capacity, reflecting its leading position in the market. Colocation markets are expanding in both primary and secondary regions, reflecting the growing demand for flexible and scalable data center solutions. These trends collectively indicate a transformative period for the data center industry, characterized by a shift towards more efficient, scalable, and strategically located facilities that meet the evolving needs of the digital economy.

Global Data Center Colocation Market

North America

- Vancouver 26
- Los Angeles 265
- Salt Lake City 176
- Northern California 693
- Denver 108
- Northwest 620
- Dallas-Fort Worth 737
- Las Vegas/ Reno 180
- Boston 160
- Houston 109
- Phoenix 698
- Toronto 506
- New York 152
- Austin/San Antonio 433
- New Jersey 410
- Queretaro 41
- Chicago 784
- Atlanta 390
- Northern Virginia 3,640

LATAM

- Campinas 410
- Rio de Janiero 76
- Barueri 221

Europe

- Amsterdam 488
- Berlin 92
- London 912
- Frankfurt 660
- Dublin 227
- Madrid 99
- Paris 387

Africa

- Cape Town 29
- Johannesburg 221

Asia and Oceania

- Seoul 545
- Tokyo 898
- Chennai 87
- Hong Kong 576
- Singapore 1,000
- Mumbai 392
- Kuala Lumpur 233
- Sydney 637
- Melbourne 324

Legend:
- Primary Market
- Secondary Market
- Emerging Market

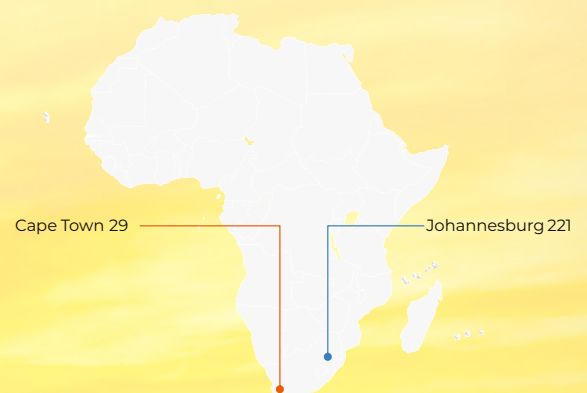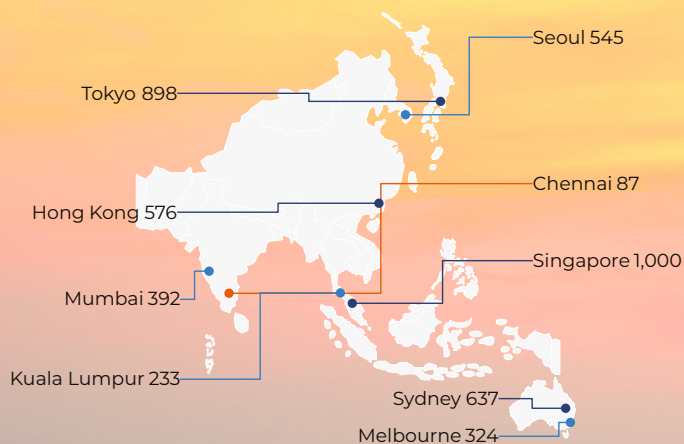Note: Data refers to MW of built-out critical IT load capacity, as of June 2023 (based on JLL's report of 2024)
Source: JLL

Data Centers Market by Type

Global data center dynamics continue to evolve due to technological innovations, regulatory changes, and growing consumer demands, all of which are impacting the type, size and number of data centers required to support an increasingly digitalised world.

The changing composition of the global data center market is most stark when analysing the historical and forecast decline in enterprise data center capacity, which totalled 58.3% in 2017 but just 40.3% in 2022 and is expected to decline further to 28.1% by 2027. This is primarily a result of the roll-out of hyperscale data centers, driving both absolute growth in the data center market and, therefore, a declining share of enterprise data centers, but also a reduction in enterprise data centers that they have replaced, as companies continue to opt for scalable, affordable cloud solutions.

Resultingly, hyperscale data centers are expected to account for over 50.0% of global data center capacity by 2027, up from 20.1% in 2017 and reflecting a 9.6% CAGR (can we show a CAGR of market share?). Worldwide, the capacity of hyperscale data centers has doubled since 2020, and further expansion is forecast, with over 440 hyperscale data centers in the pipeline as of April 2024 (DCD, 2024). This trend is fuelled by the growing cloud adoption detailed above, but also the rise in AI, the rollout of 5G, big data analytics and crypto mining, all of which require significant computing power, storage capacity and advanced security systems provided by Hyperscalers.

Global Data Center Capacity Share by Type
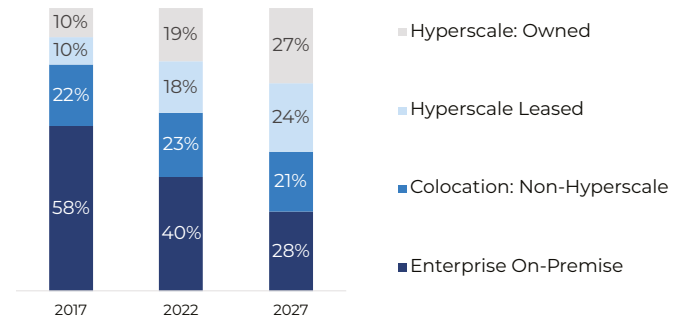
Source: Synergy Group

Despite the decline in relative importance, on-premise data centers still play a vital role in the digital infrastructure landscape. Enterprises continue to invest in on-premise facilities to support hybrid cloud strategies that combine internal IT resources with third-party cloud infrastructure. Factors such as resiliency, cost economics, and existing investments influence the decision to maintain or expand on-premise data centers.

Colocation data centers have also grown substantially from about 6.0GW in 2019 to over 19GW by 2023, albeit dwarfed by that of the hyperscalers but reflecting a forecast increase in absolute terms (Citi Research, 2024). Many enterprises that previously operated on-premise data centers are now opting for colocation services to leverage cost efficiencies, scalability and the advanced infrastructure offered by colocation providers, supported by a Uptime Institute survey, which revealed that 79.0% of colocation providers reported growth in demand for colocation capacity in 2023 (Data Center Frontier, 2024).

However, colocation facilities have also been impacted by hyperscale expansion. Previously considered a more dynamic, cost-effective and scalable solution to enterprise data centers, some inherent disadvantages of colocation facilities are driving consumers to go one step further and transition to a full-scope cloud service provision. Increased scalability, pay-as-you-go models, geographical reach, technology integration and reduced maintenance expenses offered by hyperscale cloud service providers can deliver both cost and operational efficiencies to consumers that are otherwise difficult to achieve through a more centralised IT solution.

The global colocation data center market was valued at approximately $66.3 Bn in 2023 and is projected to reach around $221.9 Bn by 2032

(Expert Market Research, 2023) (GlobeNewswire, 2023). Meanwhile, the global hyperscale data center market was valued at $37.1 Bn in 2023 and is anticipated to grow from $44.9 Bn in 2024 to $262.1 Bn by 2032, with a higher CAGR of 24.7%, indicating stronger growth potential (Fortune Business Insights, 2024).

In conclusion, the data center market is experiencing robust growth driven by the shift towards hyperscale and colocation facilities, technological advancements, and the increasing need for scalable, efficient, and sustainable data storage solutions. The evolving landscape presents numerous opportunities for investors, developers, and businesses to capitalize on the expanding demand for digital infrastructure.

Rise of AI-driven Solutions

Artificial intelligence is a major force behind the increasing demand for data centers, given the significant infrastructure required to support its computational power and data storage needs. Whilst the AI industry is still in its nascent stages, it has developed rapidly, growing from $95.6 Bn in 2021 to $214.0 Bn in 2024 transforming industries and enhancing operations, with 42.0% of enterprise-scale organisations now having AI solutions integrated into their business models according to multinational IT company, IBM (Acropolium, 2024) (NMSC, 2024) (Forbes Media, 2024).

AI's success is largely driven by its diverse use cases, spanning nearly every industry. These transform processes, enhance efficiency and decision-making, improve customer experiences, drive automation, and enhance security. The impact of these has been so profound that companies not adopting AI solutions are increasingly finding themselves at risk of being rendered obsolete and irrelevant.

For example, Estée Lauder, a global cosmetics company, released a voice-enabled makeup assistant designed to assist visually impaired people with applying makeup, enhancing their customer experience and, resultingly, its global brand. Meanwhile, companies such as Pentagon Credit Union (PenFed) are using chatbots and conversational AI to help customers get answers to common questions faster, reducing the load on customer service reps and improving employee satisfaction (CIO, 2023).

At General Electric ("GE"), AI is leveraged regularly for predictive maintenance purposes, analysing data directly from aircraft engines to identify problems and required maintenance. Rolls-Royce has also found use for AI in identifying predictive maintenance, improving the efficiency of jet engines and reducing the amount of carbon planes produce, while also streamlining maintenance schedules through predictive analytics (CIO, 2023).

Whilst these examples highlight some of the flagship AI solutions being implemented by multinational organisations, the democratised nature of AI enables small, medium and large enterprises to implement AI-based products, helping to streamline everyday business functions, including accounting, marketing, process automation and recruitment.

In addition to existing use cases, several emerging trends are creating new pockets of computing workloads driven by AI, including autonomous vehicles, which rely on real-time data processing for navigation and safety, personalised medicine, creating tailored treatment plans for patients, and deepfake technology, which allows for the creation of realistic visual effects and character animations by synthesising faces and voices.

These emerging AI-based applications can capture demand almost overnight, leading to unexpected spikes in computing capacity requirements. Most notably, ChatGPT, the popular chatbot from OpenAI, is estimated to have reached 100 Mn monthly active users in January 2023, just two months after its launch (Reuters, 2023).

The speed of deployment, extensive use cases and rapid evolution and uptake of AI solutions mean that demand for computer processing power, data storage and connectivity is growing at an unprecedented rate and underscores the crucial role that data centers continue to play in the global digital infrastructure landscape. Resultingly, global AI infrastructure spend —including data centers, networks, and other hardware that supports the use of AI applications—is expected to reach $422.6 Bn by 2029, growing at a CAGR of 44.0% over a six-year period. (WSJ, 2023).

As AI continues to evolve, advance, and integrate into various aspects of our daily lives, the supply of data centers capable of supporting these computationally intensive applications will need to follow suit. This will highlight the interdependent relationship between AI development and the expansion of the data center market and reaffirm data centers' position as essential infrastructure in the era of digitalisation.

The Application of AI across Business Enterprises

Application	Percentage
Automation of IT Process	33%
Security and Threat Detection	29%
Automation of Business Processes	28%
Marketing and Sales	26%
Business Analytics or Intelligence	26%
Fraud Detection	23%
AI Monitoring and Governance	22%
Sensor Data Analysis	22%
Conversational AI or Virtual Assistants	22%
Financial Planning and Analysis	22%

Source: Acropolium

5G Networks

The global growth of 5G technology has been transformative, reshaping industries and enabling innovative applications by offering substantially faster data speeds, reduced latency, and enhanced connectivity. This makes it a catalyst for the continued rollout and evolution of data centers, reshaping their architecture, operations, and role in the digital ecosystem.

In particular, 5G technology has had a profound effect on the demand for edge computing. 5G networks utilise a more decentralised architecture, which distributes computing and data processing closer to the edge of the network, reducing the load on centralised servers and enhancing the ability to handle numerous connections simultaneously. This trend requires the establishment of smaller, localised edge data centers, which can handle the data processing requirements without impacting the user experience through higher latency.

However, it is not just reduced latency that is driving data center deployment through the rollout of 5G. The high volume of data generated by 5G applications necessitates significant storage and processing capacity as well. 5G enables a substantial increase in the number of connected devices at any given time, having been specifically designed to support large-scale IoT deployments, allowing up to 1 Mn devices per square kilometre. This results in significantly more data being generated, necessitating robust processing and storage solutions in the form of data centers, meaning businesses must invest in scalable storage solutions to accommodate both short-term and long-term data retention, whilst ensuring accessibility and compliance.

Whilst 5G networks have already been rolled out globally, its growth story is far from over. According to Ericsson's mobility report, approximately 50.0% of the world is now covered by 5G networks, marking a significant milestone in global connectivity, but also highlighting some notable regional disparities. Whilst North America, Europe, India and China each have achieved significant market penetration of between 70.0% and 95.0%, Latin America, Middle East and Africa and APAC have achieved 20.0% or less, representing a significant scope of 5G expansion and underpinning the need for infrastructure across these less developed markets (Ericsson, 2024).

The global 5G infrastructure market, projected to reach $517.2 Bn by 2030 with a compound annual growth rate (CAGR) of 10.5% from 2021 to 2030, underscores this potential increase in demand for enhanced data center capacity (Allied Market Research, 2021). Furthermore, by the end of 2023, it is expected that 1.5 Bn devices will be connected to 5G networks worldwide, necessitating robust data center infrastructure to manage the surge in high-speed data traffic (GSMA, 2024).

This adoption of 5G technology is positioned to significantly boost the data center networking market, which is projected to reach a revenue of $38.3 Bn by 2030, growing at a CAGR of 7.5% (Data Centre Magazine, 2024). This growth is fuelled by 5G's capabilities, including low latency, high-speed connectivity, and large bandwidth, which improve operational efficiency within data centers (Data Centre Magazine, 2024). Following the development of this technology, it is projected to contribute almost $900.0 Bn to the global economy by 2030, significantly impacting the manufacturing, service, and ICT sectors (GSMA, 2024).

5G Coverage by Region
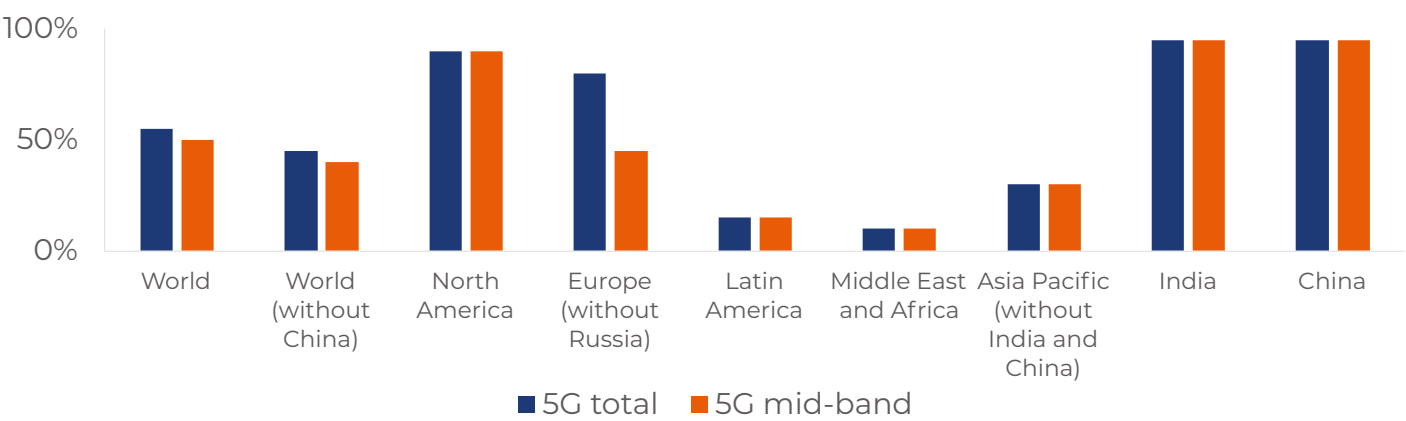
Source: Ericsson Mobility Report 2024

Additionally, in 31 of the 39 markets analysed in a GSMA Intelligence report, the median price per gigabyte for 5G plans is lower than that for non-5G plans, with most having a 5G unit price that is less than half of 4G (GSMA, 2024). This affordability is likely to accelerate 5G adoption, further increasing the demand for data center services. This article also mentioned that 123 operators in 62 markets worldwide had launched 5G fixed wireless access (FWA) services by the end of 2023, indicating significant growth potential (GSMA, 2024).

Another growth indicator is that approximately 64.0% of enterprises plan to deploy private 5G networks by the end of 2024 to leverage the enhanced security and performance for critical applications (GSMA, 2024). This trend highlights the importance of 5G in enterprise environments, where data centers play a crucial role in supporting these private networks.

Moreover, 5G networks are expected to be up to 90.0% more energy-efficient per unit of traffic compared to 4G networks, contributing to overall sustainability goals in telecommunications (Nokia, 2020). This energy efficiency is vital as the industry strives to reduce its carbon footprint while expanding its infrastructure to meet growing data demands.

Cloud Computing

Additionally, another key driver of the data center market is the development of cloud computing, which requires a significant amount of computing power to operate and is gaining importance across sectors. There is a clear trend towards adopting this technology to make operations more efficient, as reflected in the McKinsey Global Survey of 2022, where 90.0% of respondents confirmed pursuing at least one large-scale digital transformation in the past two years (McKinsey, 2022).

Another indicator of the growth of this technology adoption is provided by Gartner's estimates on global IT spending. By the end of 2024, over $5 Tn was spent globally across various segments of the technology sector, marking a 9% year-on-year growth (Gartner, 2025). Importantly, the data center segment had the highest annual rise in spending at 35%. The estimates are indicative of the accelerated capex cycle in the overall digital infrastructure space.

The transition to a cloud computing environment is a central part of the digital transformation initiatives. Cloud computing's advantage relative to in-house IT systems is driving exponential growth in its adoption. Spending with the three largest cloud companies (Amazon, Microsoft, and Alphabet) rose by 337.0% in the five years up to 2023 (BCG, 2024). The tight relationship between cloud computing and data centers is clear as the same leading cloud service providers are also some of those with the maximum footprint in the global data center market through their hyperscale infrastructure.

Worldwide IT Spending Estimates
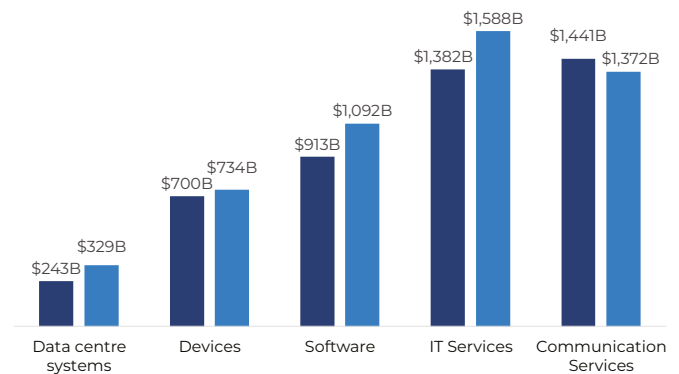
Source: Gartner (press releases of 2024 and 2025)

Due to the importance of this technology in creating efficiencies within businesses, there is a rapid and steady growth in its adoption. In 2023, global end-user spending on public cloud services stood at $563.6 Bn. Gartner's projections point to a 20.4% growth in global spending by the end of 2024 (Gartner, 2023). The cloud computing industry is divided into different segments focusing on various ways to provide its services. All these segments are experiencing a buoyant growth outlook, but the infrastructure-as-a-service (IaaS) is the most prominent, followed by the platform-as-a-service (PaaS) segment. Additionally, an important trend is the rise of industry cloud platforms—a combined whole-product offering including IaaS, PaaS, and software-as-a-service (SaaS) services. Such platforms address specific industry requirements and are gaining popularity in the market.

Moreover, cloud services have a bilateral relationship with other technologies and trends such as AI and machine learning technologies, where their development is tied to each other's performance. The infrastructure must adapt to meet the demand. Most companies use the cloud for training and running large AI applications. Cloud service providers must align the computing infrastructure and facility to address the AI boom. Most of the existing cloud infrastructure may not be fully ready to cater to this demand, especially for generative AI (GenAI) applications. This is because they were originally meant as an alternate solution to on-premise infrastructure (WSJ, 2023). Hence, there will still be an increased demand for the development of cloud computing services, which may lead to the need for further data center capacities.

To keep things in perspective, it should also be pointed out that the rise of public cloud adoption does not necessarily mean an end to on-premise data centers/infrastructure by companies. As of the end of 2022, expenditure on such data centers crossed $100.0 Bn (The Economist, 2023). Some characteristics about it are still regarded in the market. For example, industries find on-premise facilities advantageous for their increasingly connected factories and products. On the other hand, the public cloud has downsides in some applications. One of them is regarding the required data transfer, which, when needed, almost instantaneously becomes a constraint for centralized data centers.

Notable cases of critical real-time data requirements are in industrial automation, where digital twins of factories and related product developments need constant and real-time data analysis. For this matter, industrial/manufacturing companies such as Volkswagen (German automotive), Caterpillar (US-based earth-moving equipment), and Fanuc (Japanese industrial robot manufacturer) are notable examples of entities devoting resources to on-premise data centers while hiving off the less sensitive parts to hyperscale cloud service providers.

The surge in hybrid cloud strategies is also noteworthy, with companies opting for a combination of public and private clouds to optimize performance, security, and cost. This hybrid approach allows businesses to maintain sensitive operations in private clouds or on-premise data centers while leveraging the scalability and flexibility of public clouds for less critical workloads.

In conclusion, cloud computing is a pivotal driver of the data center market, pushing forward the development of all types of data centers—on-premise, colocation, and hyperscale. The continuous evolution of cloud technologies, coupled with their integration with AI and other advanced technologies, ensures sustained growth and expansion in data center capacities worldwide. As businesses increasingly rely on cloud computing to enhance efficiency and drive innovation, the demand for robust, scalable, and efficient data centers will continue to rise, solidifying their role as critical infrastructure in the modern digital economy.

Edge Computing

Building on the momentum of cloud computing, edge computing is emerging as another key driver of the data center market. The global edge computing market, valued at $10.1 Bn in 2022, is projected to reach $140.0 Bn by 2030, reflecting a significant CAGR of 38.8% (Polaris Market Research, 2022). This surge is fuelled by the need for real-time data processing and reduced latency, crucial for applications such as autonomous vehicles and industrial automation. By 2025, it is estimated that 75.0% of enterprise-generated data will be created and processed at the edge, outside of traditional centralized data centers (Gartner, 2018).

The proliferation of IoT devices, expected to reach close to 30.0 Bn by 2030, further underscores the importance of edge data centers in managing the massive influx of data (Statista, 2024). The synergy between 5G and edge computing enhances the performance of edge applications and services, providing high-speed, low-latency connectivity essential for modern digital infrastructure (STL Partners, n.d.).

Edge computing not only optimizes bandwidth usage and reduces data transmission costs but also improves security and compliance by processing data locally. This local processing power is particularly beneficial for sectors such as healthcare, retail, manufacturing, and telecommunications, which are rapidly adopting edge computing and data center technologies to enhance operational efficiency and deliver better customer experiences (Forbes, 2024).

Furthermore, edge computing offers scalable solutions that can be expanded as the volume of data and the number of connected devices grows, providing significant cost savings and advanced analytics capabilities (McKinsey, 2024). It also extends the reach of digital services to remote and rural areas, offering local processing where traditional data centers are not feasible.

In response to these benefits, demand for edge data centers continues to grow. According to a 2023 survey conducted by DCD, the most compelling factor for deploying edge data centers is the low latency and high bandwidth they provide, cited by 41.0% of respondents. This is closely followed by concerns over data security and privacy, which 38.3% of respondents identified as critical, highlighting the importance of secure data handling at the edge. Other factors, accounting for 20.7%, also contribute to the increasing need for edge data centers, reflecting the diverse benefits that these facilities offer in enhancing overall data center performance (JLL, 2024).

Overall, the integration of edge computing with existing data center infrastructure is driving the market forward, enabling real-time data processing, enhancing efficiency, and supporting the growing demand for digital services. This trend is solidifying the role of data centers as critical infrastructure in the global digital environment.

The Need for Edge Data Center Deployment – Surveyed Responses

- Low latency and high bandwidth
- Data security and privacy
- Others

21%
41%
38%
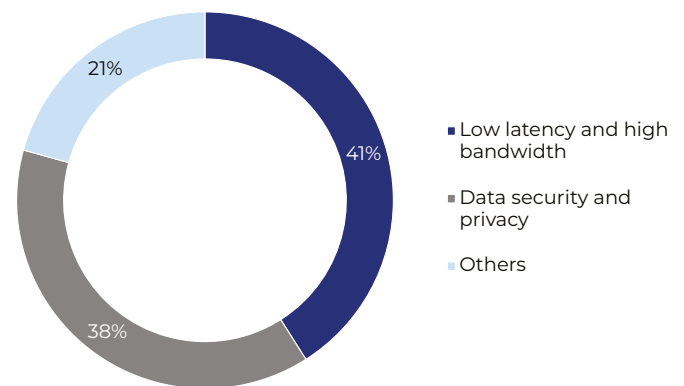
Source: JLL

Crypto Mining

Following the discussion, crypto mining, which is the CPU-intensive process of creating new crypto tokens like Bitcoin, is gaining an important role as a demand driver for data centers. The intensiveness of computer power required for this process results in significantly higher investments in data centers and data center hardware compared to other businesses outside this industry. Furthermore, the mining process necessary for the upkeep of most major cryptocurrencies demands more investment in computing power. To respond to this high demand, a common solution is turning to hyperscale server farms in the data center market. In addition, crypto miners typically need to lease or own at least 1.0MW to 5.0MW of data center power to mine effectively (Datafloq, 2022).

As a result of these requirements, there is an increasing number of dedicated data centers in the pipeline for crypto mining around the globe. The particularities and power capacities of each vary by project, but there is a clear impact of the crypto mining industry on the data center market.

Photo by MD Molla

Dedicated Data Centers in Pipeline for Crypto Mining

	Location	Particulars
Genesis Digital Assets (GDA)	South Carolina, US	Three new data centers are to be connected to renewable energy sources
Bit Origin	Wyoming, US	Securities purchase agreement in December 2023 for a 25.0MW crypto data center.
Bitdeer Technologies	Norway	Construction is underway for a 175.0MW data center for targeted completion by mid-2025.
Ethiopia Investment Holdings	Ethiopia	The government's strategic investment arm signed a $250.0 Mn MoU for data center infrastructure to support the crypto surge

Source: Data Centre Magazine, Digital Infra Network, Bitdeer, and Reuters

The global cryptocurrency mining market is facing a CAGR of around 12.2% between 2023 and 2032, reaching a total revenue of $8.3 Bn by the end of 2032. The attached chart from Expert Market Research illustrates this projected growth trajectory, starting at $2.9 Bn in 2023 and rising steadily each year. The market size for 2024 is estimated at $3.3 Bn, followed by $3.7 Bn in 2025, and continuing this upward trend through the decade. This growth reflects the escalating investment and expansion in crypto mining operations, driving further demand for data center capacities globally.

Another critical factor is crypto mining's energy consumption. Bitcoin mining alone consumes approximately 110.0TWh per year, similar to the energy consumption of some entire countries, such as Malaysia or Sweden. This substantial energy requirement is leading to innovations in data center energy efficiency and the adoption of renewable energy sources to power these operations (Cambridge Centre for Alternative Finance, 2023).

Overall, the cryptocurrency market is driving further demand for data center capacities around the globe, and there is an expectation for incremental growth in the sector. As cryptocurrencies continue to gain mainstream acceptance and their underlying blockchain technology evolves, the demand for specialized data centers equipped to handle the unique requirements of crypto mining will likely continue to rise, solidifying this industry as a crucial driver of data center market growth.

Global Cryptocurrency Mining Market
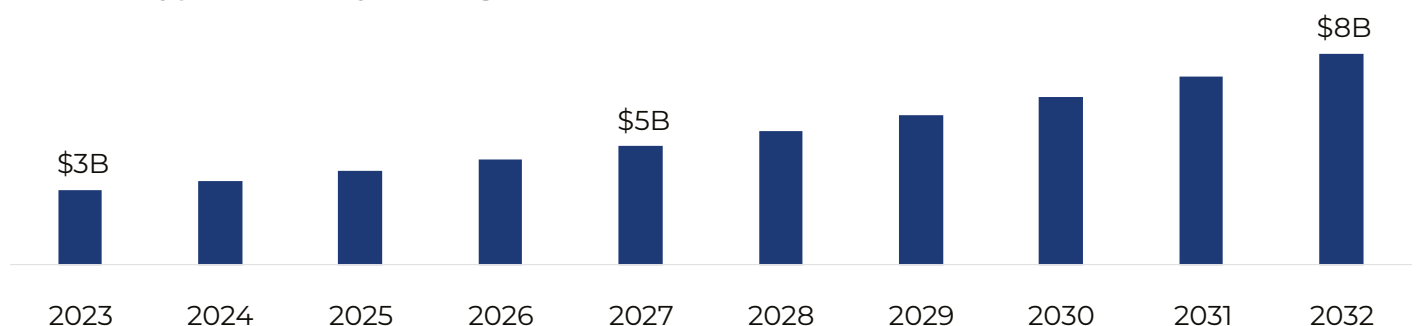
Source: Expert Market Research

04

Emerging Trends

The expansion in the global data center market is marked by several notable factors shaping the opportunities. Fundamentally, this is demand-led growth. The technology companies are seeking to make the most of this demand through their large-scale facilities.

The top cloud providers, by their predominant share in installed data center capacities, are shaping the growth pattern. This includes areas like energy efficiency, clean power sourcing, or the adoption of advanced cooling systems.

The pressure of efficiency and sustainability, however, extends to all market players. The trend in this regard shows a discernible shift towards lowering energy intensity. However, these gains are offset by the advanced graphics processing units that require greater energy. Added pressures come from the need to locate the data centers strategically – either closer to demand for technologies like 5G and IoT, or to adhere to the data localisation requirements for privacy and protection. This chapter aims to take a brief review of some of these salient points of emerging trends in the global data center market.

Hyperscalers in Investment and Practices

Hyperscalers are increasingly shaping the dynamics of sustainability and best practice adoption in the data center industry. Major cloud service providers such as Amazon, Google, Meta, and Microsoft are at the forefront of capital expenditure (capex) commitments, often setting the tone for industry-wide investments.

The trend shows a spike in capex in 2024. In 2023, the overall capex of hyperscalers grew by a modest 2.4%. The focus on AI has drastically changed investment priorities, as evidenced by the doubling of capex by the end of 2024. Infrastructure augmentation, as with data centers, is becoming a high priority for the hyperscalers.

Between 2020 and 2024, the major AI-centric companies Alphabet, Amazon, Meta, Apple, Oracle and Microsoft increased their spending classified under Property, Plant, and Equipment (PPE), at a compound annual growth rate (CAGR) ranging between 5% and 34%. These entities also hold significant stakes in generative AI and large language models, which require substantial computing resources.

AI Hyperscalers' Capital Expenditure ($, Bn)
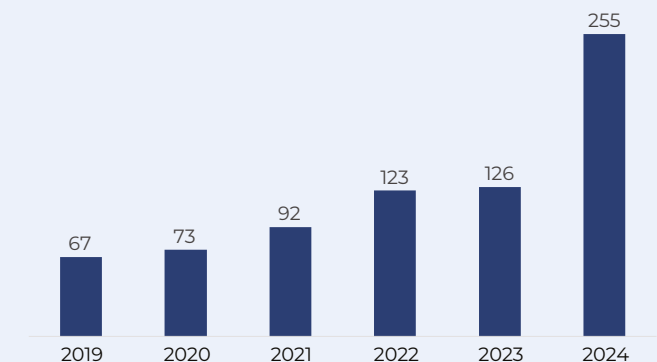
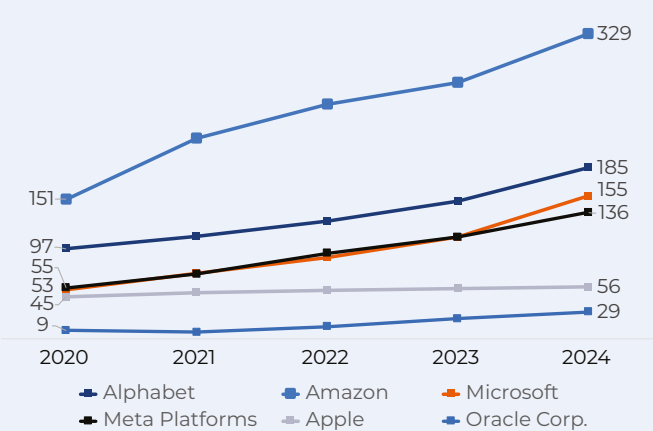Source: JP Morgan, Finbox and Wall Street Journal

Notably, they control over 60.0% of the global hyperscale data center capacity. The rise in spending commitment is directly related to the intensifying competition for market share in the digital marketplace.

In addition to leading in capex, hyperscalers play a pivotal role in the corporate Power Purchase Agreement (PPA) market, contributing significantly to the growth of corporate renewable energy purchases. Together, Amazon, Microsoft, Google, Meta and Apple are the largest corporate buyers of renewable power globally, with a contracted capacity worth 50GW (GlobalData, 2025). In 2024, Amazon stood out as the world's largest corporate clean energy buyer for five consecutive years (DCD, 2025).

The leading technology companies have signed long-term contracts across a diverse range of renewable power resources. Driven by their carbon reduction pledges, sustainability goals, and regulatory pressures, hyperscale data centers have taken the lead in renewable power purchases. However, with the rising demand for firm power, renewable energy resources are not the best choice. The focus has thus lately shifted to nuclear power, as a source of clean baseloads

power supply. Recent agreements point to planned nuclear-powered data centers in the US, including a mix of new and refurbished capacities (Goldman Sachs, 2024).

Net Spending on Property, Plant, and Equipment ($, Bn)

Source: Refinitiv Eikon

Recent Corporate Nuclear Power Capacity Agreements

Corporate	Technology provider	Date	Scale	Timing
Large-scale Nuclear Power				
Microsoft	Constellation	Sep-24	835MW	Restarted unit is expected to be online in 2028, 20-year PPA
Amazon	Talen Energy	Mar-24	960MW	Minimum commitments that ramp up in 120MW increments and two 10-year extension options, tied to license renewals
Small Modular Reactors				
Amazon	X Energy	Oct-24	5+ GW target;	Targeting full capacity in 2029
	Dominion	Oct-24	300MW minimum target	Targeting development in 2029
Alphabet	Kairos	Oct-24	500MW target	First reactor by 2030
Equinix	Oklo	Apr-24	Max target of 500MW	20-year PPA with a right to a further 20-year renewal

Note: The above data is indicative in coverage
Source: Goldman Sachs

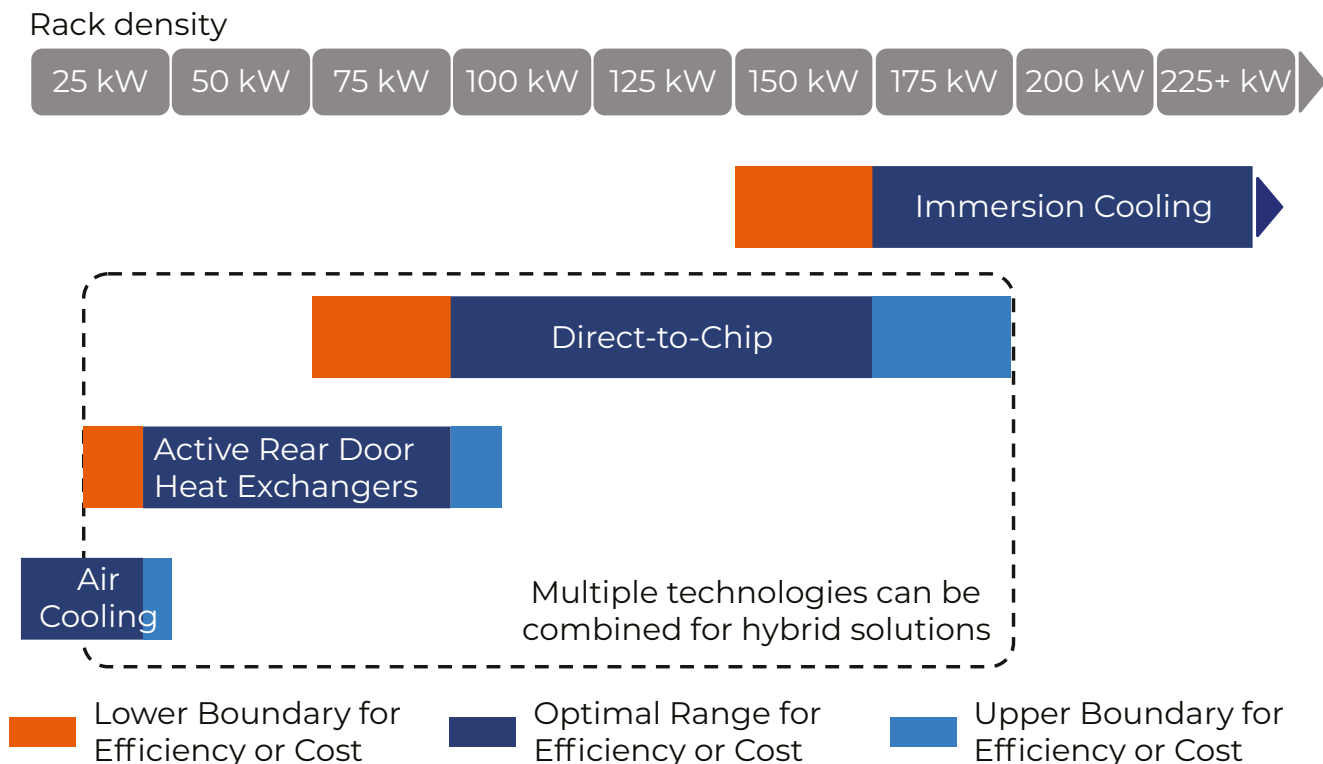# The Drive Towards Efficiency and Sustainability

To further enhance their leadership in AI and cloud computing, the data center providers/operators are making substantial investments in energy efficiency and related infrastructure. The investment by the big five—Microsoft, Amazon, Meta, Alphabet, and Apple—has jumped from $8.8 Bn in 2023 to $37.0 Bn in announced investments for 2024 (Verdict Media Limited, 2024). Additionally, Meta has announced plans to build an $800.0 Mn data center in Indiana optimized for AI services, while AWS is planning a $10.0 Bn investment in two data center complexes in Mississippi to meet the growing demand for cloud services (DataCenter Knowledge, 2024).

These developments underscore the increasing role of data centers in driving global and U.S. electricity demand, with data center power demand projected to grow by 160.0% by 2030, representing an increase of about 650.0TWh

(Goldman Sachs, 2024). The demand-led growth in the data center market, driven by the accelerated pace of digitalization, underscores the need for sustainable energy solutions and advanced cooling technologies.

The rapid adoption of AI and high-performance computing (HPC) requires high-density infrastructure. Rack power density in Europe, for example, is expected to grow from an average of 6.0–8.0kW in 2021 to about 12.0–15.0kW by 2027, while globally, the average is expected to rise from 12.0kW in 2023 to about 20.0kW by 2030 (Arizton Advisory and Intelligence, 2023) (Data Center Knowledge, 2024). The rise in power densities requires new thermal management strategies. An example in point is NVIDIA's latest AI chips, which consume up to 300% more power than the older variants. The data center facilities are, therefore, seeking a mix of solutions to address the issues (JLL, 2025).

Applicable Cooling Technologies by Rack Density

Rack density

| 25 kW | 50 kW | 75 kW | 100 kW | 125 kW | 150 kW | 175 kW | 200 kW | 225+ kW |

Immersion Cooling

Direct-to-Chip

Active Rear Door Heat Exchangers

Air Cooling

Multiple technologies can be combined for hybrid solutions

■ Lower Boundary for Efficiency or Cost   ■ Optimal Range for Efficiency or Cost   ■ Upper Boundary for Efficiency or Cost

Source: JLL

With cooling typically accounting for roughly 40.0% of a data center's electricity use, the shift to liquid cooling technologies, such as direct liquid cooling and immersion cooling, offers significant energy savings and supports higher computational capability (Jones Lang LaSalle IP, 2024). The global data center liquid cooling market is expected to grow from $2.9 Bn in 2023 to $15.3 Bn by 2032, exhibiting a compound annual growth rate (CAGR) of 20.3% (IMARC, n.d.).

Policy developments worldwide are increasingly focused on improving the energy efficiency of data centers. For example, the EU's Climate Neutral Data Center Pact, China's data center Minimum Energy Performance Standards (MEPS), and other similar regulations set strict targets for Power Usage Effectiveness (PUE) and encourage the adoption of renewable energy and heat reuse (IEA, 2024). The EU Energy Efficiency Directive 2023 mandates that data centers with a total rated energy input greater than 1MW must utilize waste heat unless it is technically or economically infeasible (IEA, 2024). In response, companies like Fortum and Microsoft in Finland and Apple in Denmark are already implementing heat reuse projects, highlighting the growing interest in energy conservation in data centers (Fortum, 2022) (Datacenter Forum, 2022).

As hyperscalers and cloud data centers continue to manage the dual challenges of reducing emissions and escalating power consumption, sustainability has become a top business priority. Leading operators such as Amazon, Microsoft, Google, and Apple have set ambitious targets for achieving carbon neutrality and transitioning to 100.0% renewable energy by the mid-2030s (Sunbird DCIM, n.d.). Several companies, including Kao Data and Equinix, have already transitioned to operating 100.0% renewable-based data centers (Sustainability Magazine, 2023).

Average Annual Power Usage Effectiveness in Data Centers Worldwide
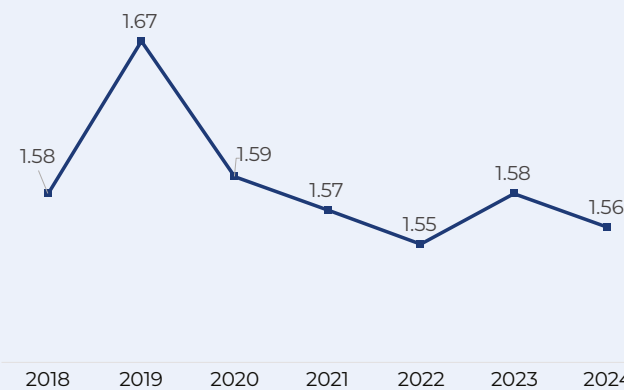
Note: (1) Power Usage Effectiveness (PUE) is the ratio of total facility energy to IT equipment energy used in a data center. (2) The data above refers to survey results (Uptime Institute's Global Data Center Survey).

Source: Uptime Institute

Edge and Co-location

Edge data centers are also emerging as critical components in the evolving data landscape, particularly as the volume of data generated at the enterprise edge continues to grow. By 2025, IDC estimates that there will be 41.6 Bn IoT devices capable of generating 79.4ZB of data (Network World, 2024).

The global edge data center market is projected to grow from $9.3 Bn in 2022 to $41.6 Bn by 2030, driven by AI, 5G, and the proliferation of IoT devices (Fortune Business Insights, 2024). Key applications for edge data centers include autonomous vehicles, smart cities, healthcare, manufacturing, and retail, which all require high-throughput, low-latency data processing closer to the point of generation (Forbes, 2024). Investments in edge data centers are on the rise, with companies like I Squared Capital and NTT Data leading the way in Europe and beyond (IPE Real Assets, 2023) (DataCenter Knowledge, 2024).

The retail co-location business model is also gaining traction, with data center operators increasingly serving organizations with smaller rack capacity demands. Local and regional retail co-location platforms are expanding, particularly in regions like Southeast Asia and Europe, where saturation in the FLAP (Frankfurt, London, Amsterdam, and Paris) regions is driving construction in new markets such as Oslo, Berlin, and Madrid (EY, 2023) (Yahoo Finance, 2024). In January 2024, Brookfield completed its $775.0 Mn purchase of Cyxtera, merging it with the Evoque colo brand to create a retail co-location provider with over 330.0MW of capacity across North America (Data Centre Dynamics, 2024).

The Focus on Data Sovereignty

Data sovereignty regulations are increasingly impacting data center demand, particularly as countries implement laws requiring data to be stored and processed locally. In response, many leading entities are opting for on-premise data centers to comply with localization requirements, with data sovereignty laws in countries like India, Indonesia, and Malaysia driving these trends (ETCIO Southeast Asia, 2024).

The potential migration of training models from the U.S. to Europe to adhere to these requirements may also drive the reinforcement or relocation of existing data centers, further influencing demand in the sector (DCD, 2024). In February 2025, Microsoft completed its EU Data Boundary for its cloud data sovereignty project. The work on this had commenced in early 2023. EU and US are signatories to a Data Privacy Framework allowing data transfers subject to privacy guarantees and protections. provider. In France, US-based cloud providers are required to partner with local businesses. While not mandated by other EU countries, many tech majors are taking the joint venture route for data center localisation (DCD, 2025).

05

Financing and Investment

The evolution of data centers has spurred material capital deployment over the past 20 years, as investors look to exploit the market opportunity presented by the increasing importance of data centers in providing the critical IT infrastructure essential to a digitalised world. This surge in demand for data processing, storage, and cloud services has attracted substantial financing from banks, corporates, private equity and other institutional investors, eager to capitalise on the sector's robust growth prospects.

As the digital economy continues to expand, the financing and investment strategies in the data center market will play a pivotal role in shaping the industry's future, with major stakeholders recognizing the long-term value proposition of these critical assets. The key pointers of the emerging landscape are tracked here through the broad categories of equity investments, debt financing, equity returns and major trends.

Data Center Equity Investments

The growth in demand for AI technologies and the ensuing rush to build digital infrastructure fuelled the PE interest. For GPs and institutional investors, data center investments stand out for the attractive contractual cash flow from typical high-quality tenants. By the end of 2024, the total PE deal value reflected the bullish investment sentiments – it was three times that of the previous year (PitchBook, 2025).

With its $16 Bn AirTrunk deal of 2024, Blackstone became the largest investor/provider of data centers worldwide, thus rapidly progressing toward a leadership position in future AI infrastructure assets. This deal is related to the Asia-Pacific (APAC) region, which is attracting rising investor attention with the resulting premium in asset valuations. In comparison, the North American region has fewer new companies because of historically intense dealmaking and the subsequent long holding period of PE firms. The quality of tenants adds to the attractiveness of the potential assets. The Hyperscalers are part of AirTrunk's tenants

Private Investment in Data Centers
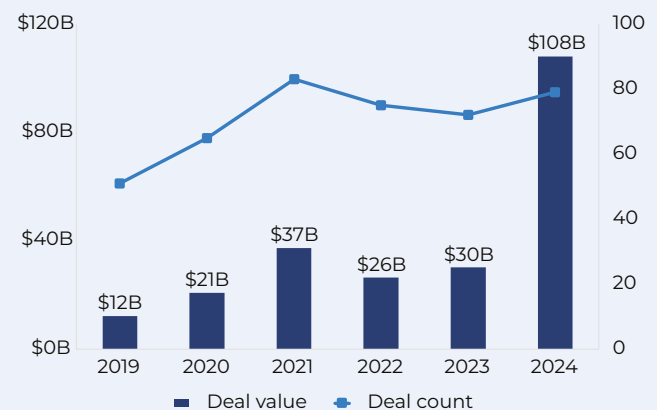
Source: PitchBook

in Hong Kong and Johor (Malaysia) locations, which reinforced its premium pricing. The second-largest PE deal of 2024 – the $9.2 Bn investment in Vantage Data Center Management Company, is aimed at supporting the hyperscalers in meeting the cloud and AI demand (S&P, 2025).

The Ten Largest PE Data Center Deals in 2024

Company	Select Investors	Deal Size	Deal Date	Deal Type
AirTrunk	Blackstone, Canada Pension Plan Investment Board	$16.0B	4-Sep-24	Buyout
Vantage Data Centers Management Company	DigitalBridge Group, GiantLeap Capital, Pantheon Infrastructure, Silver Lake	$9.2B	13-Jun-24	PE Growth
DataBank (Dallas)	Ardian, AustralianSuper, DigitalBridge Group, Swiss Life Asset Management,	$2.0B	15-Oct-24	PE Growth
EdgeCore Internet Real Estate	Partners Group	$1.9B	6-Sep-24	PE Growth
Echelon Data Centres	Starwood Capital Group	$1.9B	15-Feb-24	Buyout
eStruxture Data Centers	Fengate Asset Management, Pantheon, Partners Group	$1.3B	18-Jun-24	Buyout
ST Telemedia Global Data Centres	KKR, Singtel	$1.3B	1-Jun-24	PE Growth
Cellnex Austria	EDF Invest, MEAG, Vauban Infrastructure Partners	$0.9B	9-Aug-24	Buyout
SummitIG	SDC Capital Partners	$0.8B	30-Apr-24	Buyout
DC BLOX	Bain Capital Credit, Post Road Group	$0.7B	8-Oct-24	PE Growth

Source: PitchBook
Note: Data is as of December 16, 2024

Behind these significant transactions lies a diverse set of investors and financial instruments that are accelerating the progress of digital transformation. The surge in development pipeline and investor interest is not merely a reflection of regional growth but also an indication of evolving investment strategies. Institutional investors, private equity firms, and sovereign wealth funds are increasingly recognizing the strategic importance of data centers as critical infrastructure in the current landscape. These investors are deploying a wide range of financial instruments, from direct equity investments to complex debt financing structures, to capitalise on the growing demand for data center capacity. This influx of capital has not only enabled the expansion of existing facilities but has also fuelled the development of new data center projects across key markets.

The role of institutional investors, particularly the "Big Three" U.S. index fund managers, underscores the shift towards viewing data centers as long-term, stable investments with significant growth potential. These firms have emerged as major stakeholders in the industry, owning significant shares in leading digital companies such as Microsoft, AWS, and Alphabet Inc. Their involvement in the sector is also driving a broader focus on sustainability, as they push for greener operations and increased efficiency among the companies they invest in (S&P Global, 2024). This dynamic interplay between financial strategy and operational execution is a key factor in the continued expansion and innovation within the global data center market.

Furthermore, the surge in data center investments has also been supported by a diverse set of financial instruments, with Real Estate Investment Trusts (REITs) emerging as a particularly significant vehicle. Specialised REITs focused on data centers have gained traction,

attracting a broad spectrum of investors, including individuals and institutional entities such as pension funds, insurers, mutual funds, hedge funds, and endowments. These REITs offer investors exposure to the real estate that underpins the digital infrastructure, providing stable, long-term returns driven by the increasing demand for data processing and storage capabilities (ETF Trends, 2024).

Equity Ownership of the Big Three in Hyperscale Cloud Service Providers
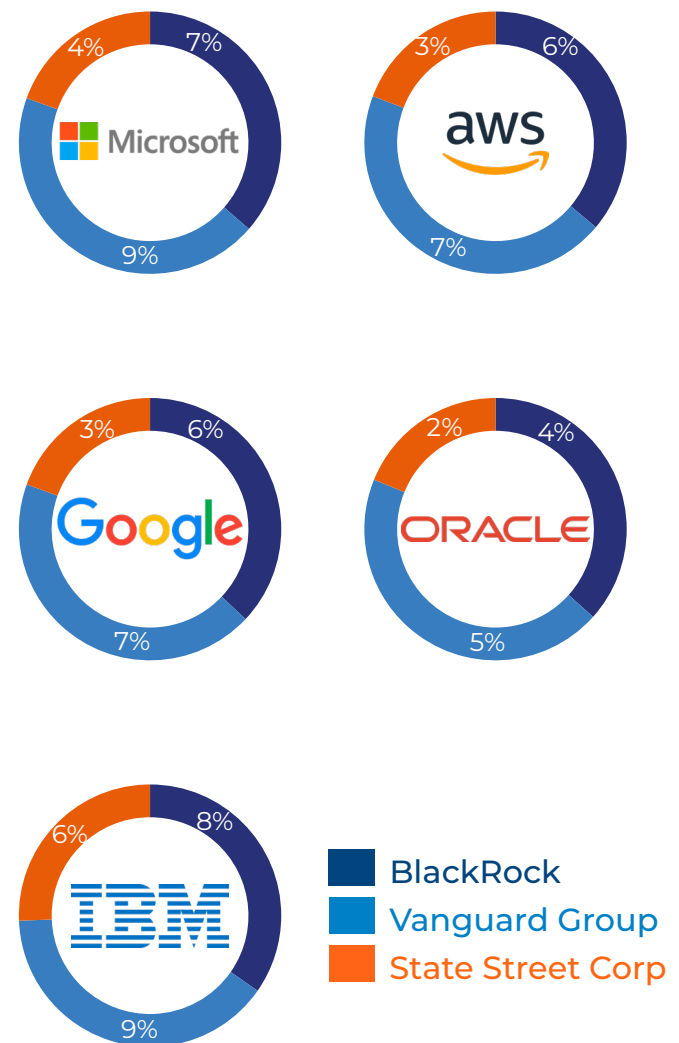
Note: The above data was sourced as of January 2024
Source: S&P Global

Top Data Center REITs

REIT	Facilities
EQUINIX	The world's largest digital infrastructure company, with over 260 data centers close to clouds and networks for optimal hybrid architectures
DIGITAL REALTY	Management of over 300 data centers across 50+ metro locations globally, with solution delivery across data centers, colocation and interconnection.
AMERICAN TOWER®	The portfolio comprises about 149,000 communication sites and a highly interconnected footprint of US data centers. In 2021, it acquired CoreSite in the US for the latter's data center capacities.
DIGITALBRIDGE	A digital infrastructure firm operating in the verticals of data centers, cell towers, fibre networks, small cells, and edge infrastructure.

Source: S&P, Respective companies

Data center REITs like Digital Realty and Equinix have become key players in the market, managing extensive portfolios of income-generating properties. These REITs not only manage extensive portfolios of properties but also play a crucial role in expanding global data center capacity. Additionally, their ability to attract and manage large-scale investments reflects the market's confidence in their continued growth and the essential services they provide to the industry.

The attractiveness of these data center-focused REITs is evident in their growing weight within the FTSE Nareit All Equity REITs Index. Since 2017, the data center segment within this index has seen substantial growth, showcasing the sector's increasing importance within the broader real estate market. This trend has also driven consolidation, with several publicly traded data center REITs being taken private or merged with other public REITs (Morgan Stanley, 2023).

Data centers have also outperformed other real estate sectors in terms of returns. As of the end of 2024, global real estate performance data shows that the data center segment ranks at the top for its returns, underscoring the strong investor interest and the robust demand for digital infrastructure (Nareit, 2025).

Beyond publicly listed REITs, unlisted REITs and evergreen funds are also playing a significant role in data center investments. Companies like Blackstone and Brookfield have made substantial commitments to the sector, with Blackstone managing assets valued at $112.0 Bn as of May 2024, and Brookfield overseeing $9.1 Bn in commitments since its inception in 2018 (PitchBook, 2024).

REIT Investment Performance by Property Sector during 2024

Specialty — **36%**

Data Centers — **25%**

Healthcare — **24%**

Office — **22%**

Retail — **14%**

Residential — **13%**

-1% — Self Storage

-1% — Gaming

-2% — Lodging/Resorts

-10% — Diversified

-14% — Telecom

-16% — Timberland

-18% — Industrial
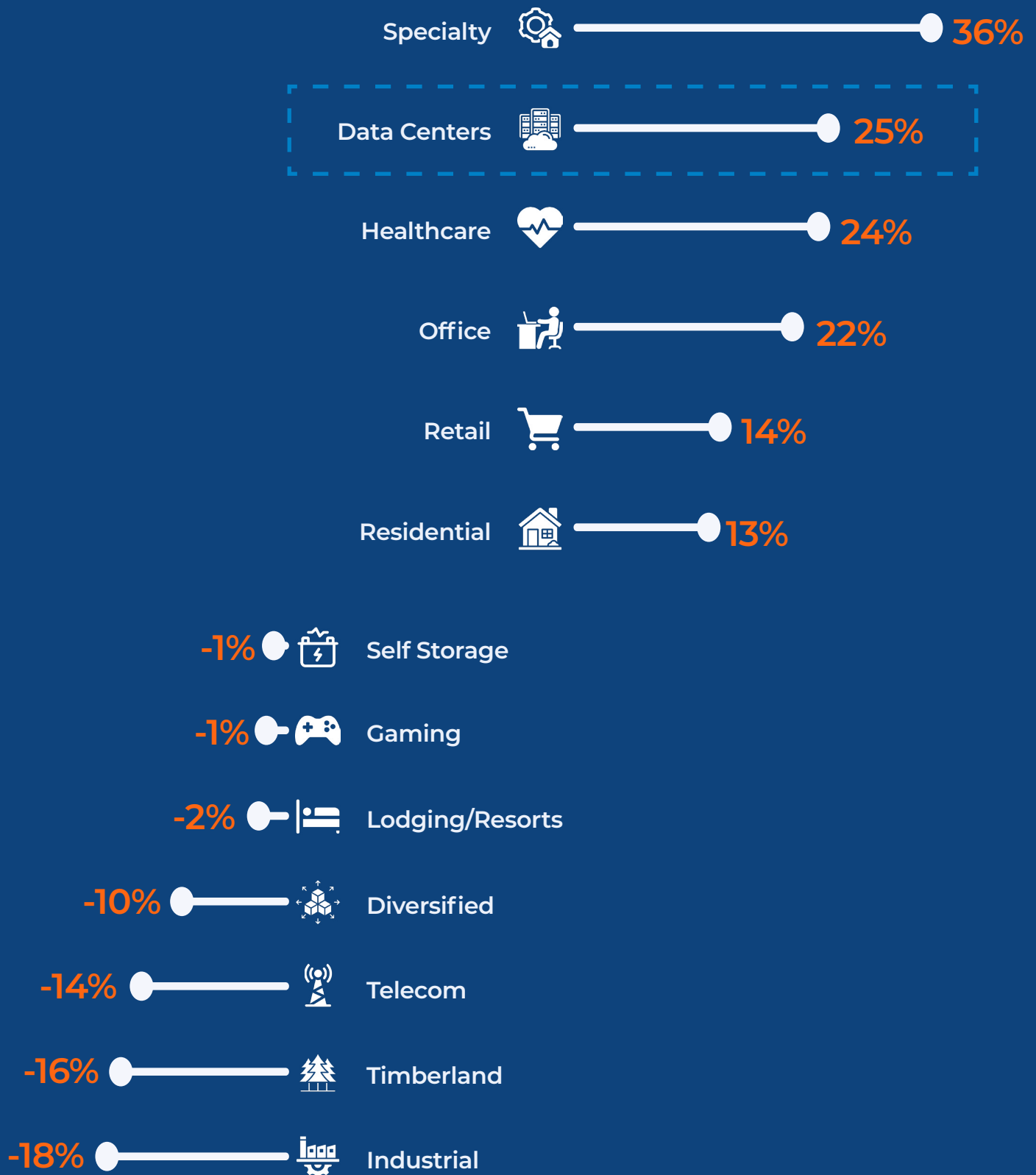
Source: Nareit

Debt Financing

The rapid expansion of the data center market has also led to significant shifts in financing strategies, particularly as traditional financing methods face limitations due to market saturation and bank balance sheet constraints. As a result, project financing options are being reconsidered, with asset-backed securitisation (ABS) emerging as a notable trend. Historically, securitisation was primarily associated with long-term contracts involving major players like Microsoft and Amazon. However, in recent years, retail and colocation market participants have increasingly entered the securitisation space as well, benefiting from better creditworthiness and ratings. The sticky nature of contracts and the high reliability of renewals have made these players more attractive to financiers, leading to a deepening and growth of the ABS market (Infrastructure Investor, 2024).

Since 2023, the cost of data center asset-backed securities has decreased. Even as the base rate remains elevated, ABS spreads have narrowed compared to levels seen during the credit crisis, making securitisation an increasingly viable financing option. Although securitisation has predominantly been a U.S.-centric market, the model is gradually gaining traction in Europe, with ABS and Commercial-Backed Mortgage Securities beginning to make an entry into the region (Infrastructure Investor, 2024).

Key Recent Financing Transactions in Data Centers

Date	Company/Enterprise	Financiers / Credit Facility	Amount
January 2025	Blue Owl	JP Morgan	$2.3 Bn
September 2024	Digital Realty	Senior unsecured multi-currency global revolving credit	$4.2 Bn
October 2024	Global Artificial Intelligence Investment Partnership	Microsoft, Blackrock, and Global Infrastructure Partners	$30 Bn
May 2024	CoreWeave	Blackstone, Carlyle Group and Blackrock	$7.5 Bn

Source: CNBC, Wall Street Journal, PR Newswire

Debt financing remains a critical tool for data center operators, particularly for funding new developments and refinancing existing projects. There has been an important number of debt transactions over the past years that provide billions of dollars to the data center market with different investors involved. Many of these financings are aligned with sustainability-linked loan principles, where the pricing of debt facilities is adjusted based on the borrower's performance in achieving greenhouse gas (GHG) reduction targets. For example, in 2024, Stack Infrastructure announced a $1.3 Bn financing package, including $506.0 Mn in green construction debt, to support its global development plans. This brings the company's total raised capital to $12.0 Bn to date, with $2.6 Bn being securitized notes as of 2023, rated "A-" by S&P (Stack Infrastructure, 2024). Similarly, CyrusOne secured $9.7 Bn in debt capital in 2024, which is split into a $7.9 Bn Warehouse Credit Facility and a $1.8 Bn Revolving Credit Facility, both aligned with sustainability-linked loan principles (CyrusOne, 2024).

The rise of specialised funding entities has also been a key factor in the robust performance of private digital infrastructure over the past decade. These entities, including private equity firms and real estate funds, have committed a cumulative $800.0 Bn to private infrastructure and real estate funds that invest in digital infrastructure. Specialist digital infrastructure funds, which invest exclusively or near-exclusively in this space, have raised $44.0 Bn over the past decade, underscoring the growing investor interest in data center assets (PitchBook, 2024).

As the demand for data center capacity continues to grow, specialised funding entities such as Digital Bridge, Iconiq, and Grain Management have played an increasingly prominent role in financing these assets. These entities have raised billions in capital, with Digital Bridge leading the way with $14.6 Bn raised across five specialist funds since 2014 (PitchBook, 2024). The performance of private infrastructure funds has been strong, with digital infrastructure and public equities in this sector outperforming benchmarks like the S&P 500 and the Morningstar US Utilities Index. Additionally, private infrastructure funds have never had negative returns since 2009, unlike other private capital strategies (PitchBook, 2024).

In summary, as data center operators continue to expand and innovate, they are increasingly turning to diverse financing strategies, including asset-backed securitisation, sustainability-linked loans, and specialised funding entities, to support their growth and meet the demands of the digital economy.

Share of Specialist Digital Infrastructure Vehicles in Total Infrastructure Capital Raised
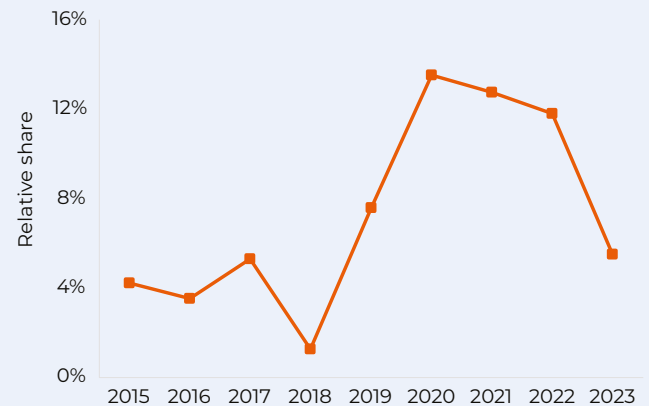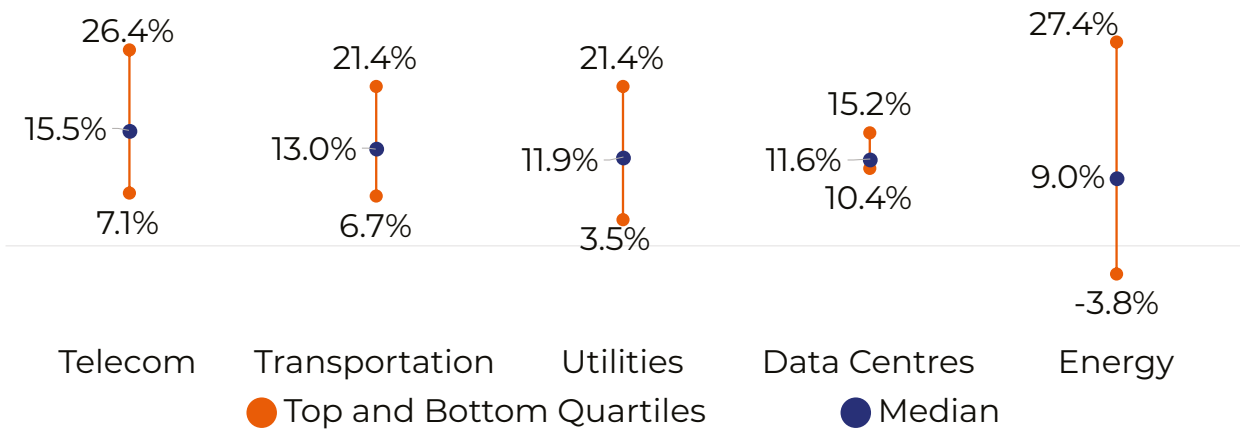

Source: PitchBook

Equity Returns

The data center market has demonstrated varying returns across regions, influenced by a mix of regulatory frameworks, market dynamics, and investor interest. In North America, the deal-level median IRR consistently surpasses those in Europe and the global average. This is largely due to the region's favourable regulatory environment, which includes state-level tax incentives for data center developments and energy efficiency stipulations under the U.S. Inflation Reduction Act. These regulatory benefits have boosted returns, making North America a particularly attractive region for data center investments (PitchBook, 2024).

In contrast, the European market, while still attractive, shows lower IRRs at the deal level. The region's stringent regulatory landscape, including policies under the General Data Protection Regulation (GDPR), has made investment slightly more challenging compared to North America. However, these regulations have also steered investments toward smaller European cities, enhancing the attractiveness of these locations for data center developments (PitchBook, 2024). Despite the lower IRRs, European data centers are still considered secure, long-term investments with strong potential returns, typically above 10.0% (Savills Research, 2024).

Global Deal-level IRRs by Sector (as of April 2024)

Source: PitchBook

IRRs of Data Center Deals Between Regions
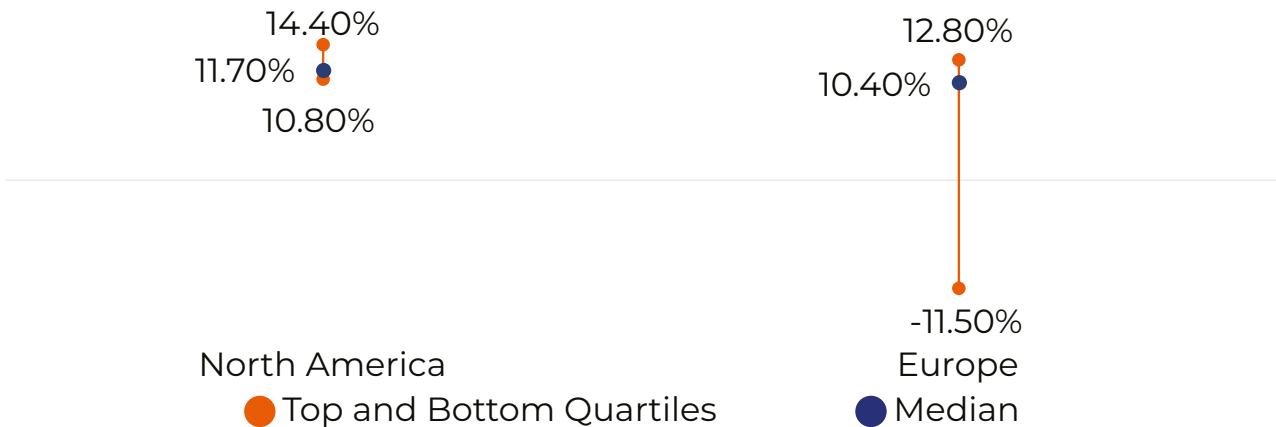
Source: PitchBook

A closer look at deal-level IRRs reveals that Europe stands as the only region in the graph which contains negative returns for the bottom quartile range. Despite this, the European market is still drawing increased attention from investors, particularly as major asset management companies like PIMCO are in the process of raising capital for dedicated data center funds. PIMCO's Europe-centric data center fund, which is currently in development, is targeting an ambitious IRR of 20.0%, reflecting the high level of confidence in the region's long-term investment potential (PitchBook, 2024).

Moreover, data centers in the U.S. have shown remarkable resilience in maintaining their value, with year-end capitalization rates ranging from 5.5% to 7.5% in 2023, despite stress in the broader commercial real estate market (Moody's, 2024) (Newmark, 2024).

In the fourth quarter of 2024, the data center sector experienced a notable compression in cap rates. The REIT implied cap rate for data centers decreased by 18 basis points, settling at 4.23%. This decline signifies a growing investor interest in data centers, likely driven by the increasing demand for digital infrastructure. Notably, the REIT implied cap rate for data centers is significantly lower than the private market cap rate of 5.48%, indicating that public market valuations have adjusted more swiftly to the sector's dynamics compared to private market valuations (Centersquare, 2025).

The strong demand and confidence in the sector highlights the unique position of data centers as a secure and profitable investment class, even when other sectors, such as offices and retail, face higher capitalization rates and associated risks (Moody's, 2024) (Newmark, 2024).

Sector-wise REIT Cap Rates (Q4 2024)

| Sector	REIT Implied Cap Rate	3 Mo. Change (bps)	12 Mo. Change (bps)	5 Yr Avg Implied Cap Rate	Private Market Cap Rate	REIT vs. Private Market Valuation Gap
Apartment	5.40%	18	(62)	5.12%	5.19%	-4.0%
Industrial	5.56%	87	143	4.13%	4.57%	-17.9%
Office	7.52%	39	(27)	6.94%	6.98%	7.2%
Retail	6.28%	6	(50)	6.87%	7.05%	12.1%
Hotel	7.10%	(10)	28	6.61%	5.85%	-17.7%
REIT ODCE Proxy	**5.67%**	**46**	**18**	**5.28%**	**5.43%**	**-4.2%**
Life Sci	7.61%	146	121	5.40%	5.50%	-27.7%
Healthcare	4.93%	21	(82)	5.59%	6.69%	35.8%
Single Family Rentals	5.51%	10	4	4.79%	4.74%	-13.9%
Manufactured Housing / RVs	5.04%	45	45	4.18%	5.05%	0.0%
Towers	5.21%	61	59	4.37%	4.59%	-11.9%
Data Centers	4.23%	48	53	4.71%	5.48%	29.6%
Self Storage	5.50%	87	20	6.13%	5.28%	4.0%
REIT Alternative Proxy	**5.12%**	**47**	**10**	**4.75%**	**5.44%**	**6.2%**
All REITs	5.67%	35	1	6.18%	5.74%	1.2%

Source: CenterSquare

Recent Trends

The data center market has seen a surge in innovative financing solutions and evolving investment trends that reflect the sector's growing importance. One significant trend is the increasing reliance on green loans to meet data center operators' debt financing needs. For instance, in April 2024, Vantage Data Centers secured a substantial $3.0 Bn green loan led by Wells Fargo Securities, with participation from TD Securities, Truist Securities, and Scotiabank. This financing supports Vantage's North America expansion plans, covering both new and existing sites (Vantage Data Centers, 2024). Similarly, DataBank established a $725.0 Mn credit facility in the same month to fund its ongoing and future data center developments, with green loan facilities provided by a consortium of 14 banks (DataBank, 2024).

In addition, there have been further sustainable capital raising events like EdgeCore's $440.0 Mn and Digital Edge's $335.0 Mn debt financing solutions (Data Center Dynamics, 2023) (Data Center Dynamics, 2024). These examples highlight the growing trend of incorporating sustainability into the financial strategies of data center operators, driven by the need to align with global environmental goals.

Following the sustainability objectives and to maintain competitiveness, older data centers are also investing heavily in upgrades and adopting more efficient cooling technologies. For example, Empyrion DC obtained its first secured green loan of S$133.0 Mn in February 2024 to refinance and upgrade its existing operations (ET CIO, 2024). Similarly, Netrality secured a $380.0 Mn sustainability-linked loan in November 2023 to invest in innovative cooling technologies, highlighting the importance of energy efficiency in maintaining competitive data center operations (Data Center Dynamics, 2023).

Another key trend is the rise in the adoption of asset-backed securitization (ABS) as a financing route. In June 2024, Vantage Data Centers raised £600.0 Mn in securitized term notes, marking its first-ever securitization of data center assets in the EMEA region (Vantage Data Centers, 2024). The ABS route is increasingly favoured due to its ability to provide liquidity and stability for large-scale data center projects, especially in the U.S., where TierPoint completed a $1.06 Bn securitization financing in July 2023— the largest ABS issuance in the U.S. data center sector since 2021 (TierPoint, 2023).
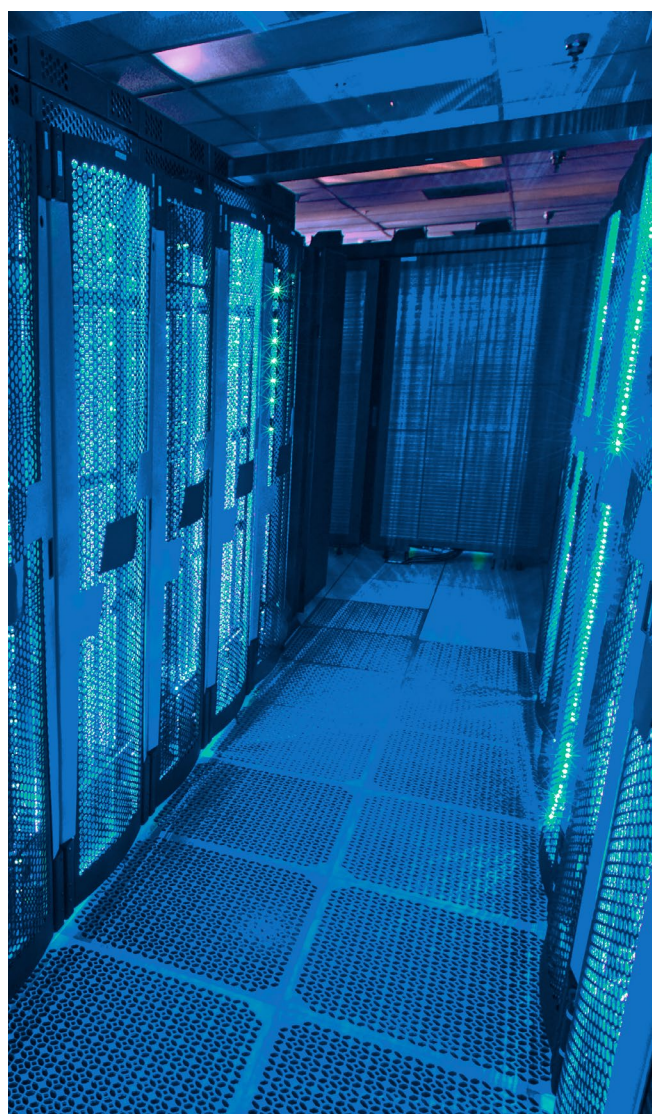
Designed by Freepik

In addition to ABS, Commercial Mortgage-Backed Securities (CMBS) are gaining traction as a financing method for data center projects. For example, in July 2024, CyrusOne secured $687.1 Mn in its first CMBS loan for its DFW1 data center in Carrollton, Texas, demonstrating the growing acceptance of CMBS in the sector (Data Center Dynamics, 2024). In relation to this, QTS Realty also secured a single asset, single borrower CMBS loan of $800.0 Mn in 2023 covering four US data centers (Data Centre Dynamics, 2023). This trend underscores the data center market's maturity and the increasing willingness of investors to engage in complex financial structures to fund data center growth.

The market is also looking beyond traditional ABS and CMBS due to the high demand for data center capacity, leading to increased activity in project financing. For instance, Siemens Financial Services has been instrumental in providing customized project financing solutions, helping companies like Vantage Data Centers and Atman raise necessary funds for their development plans (Siemens Financial Services, 2024).

Institutional financing through partnerships and joint ventures is also playing a critical role in data center development. In April 2024, AdaniConneX, a joint venture between Adani Enterprises and EdgeConneX, secured $1.4 Bn in loans to develop data centers in India (Livemint, 2024), and PGIM Real Estate formed a $600.0 Mn joint venture to develop a hyperscale data center as part of its xScale hyperscale platform in Silicon Valley (Data Centre Dynamics, 2024). This illustrates the global reach and collaborative nature of modern data center financing.

The involvement of new banks and private credit groups in funding data centers, apart from traditional infrastructure investors, is expanding the investor spectrum and providing more flexible credit terms to data center developers (Newmark, 2024).

In conclusion, the data center financing landscape is evolving rapidly, with innovative financing structures such as green loans, ABS, and CMBS becoming increasingly prevalent. These trends reflect the sector's robust growth prospects and the critical role that sustainable and flexible financing will play in supporting the continued expansion of global data center infrastructure.

06

Outlook

The data center business is headed for at least a three-fold rise in capital expenditure between 2024 and 2029, reaching the $1 Tn mark. The growth in spending commitments has been relentless and seemingly unaffected by various extraneous factors in the global economy or the IT industry. The strong demand for such infrastructure and the urgency to capture the opportunity make this a unique situation. The scale of the planned capacity addition is unprecedented, especially with AI technology leadership taking center stage – the latest example being that of Stargate in the US.

The bullish business outlook of data centers includes sustainability among key factors. Developers and operators must factor efficiency requirements in their existing and planned facilities. There are stringent regulations to report efficiency requirements. Sustainability is why US-based companies are planning dedicated nuclear power generation units to meet long-term clean energy demand. Countries with high renewable energy penetration, such as Spain, are attracting rising interest from globally leading data center developers and operators. The sustainability concerns also extend to the resource intensity of such facilities, especially in terms of power. As power utilities struggle to manage the short-term spike in power demand from data centers, developers could be exposed to potential delays or cancellations.
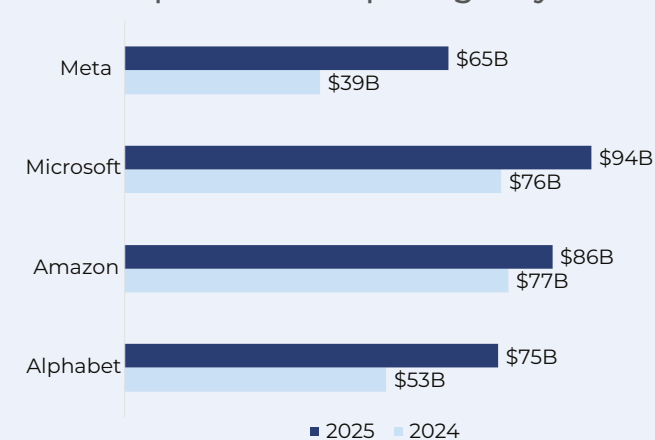
Projected Spending and Demand

Investment outlays for AI-based technologies are on the rise. Even tight enterprise IT budgets have not impacted AI-based spending plans. The survey results (conducted during October-November of 2024) of research and advisory firm ISG show enterprise leaders planning an average 5.7% rise in AI spending during 2025 despite a modest 1.8% rise in the total IT budgets. (ISG, 2024). Enterprise AI investments are part of an ecosystem gearing up for promised efficiency gains from high-end computing capabilities. The pursuit has become a rush to keep up with the competition.

All major categories and players in the emerging AI value chain – semiconductor/chips and related

AI-led Capital Spending Commitments of the Top Cloud Computing Players

Company	2025	2024
Meta	$65B	$39B
Microsoft	$94B	$76B
Amazon	$86B	$77B
Alphabet	$75B	$53B

Source: Wall Street Journal

hardware, AI hyperscalers, developers and integrators contribute to the current accelerated capex cycle. (JP Morgan, 2024). But the Big Tech incumbents in the hyperscaler segment are the drivers. The latest financial results indicate that by the end of 2024, the four top global cloud service providers, i.e. Alphabet, Amazon, Microsoft and Meta, collectively spent $244 Bn in 2024. By the end of 2025, it is set to rise by over 30% (WSJ, 2025). The investment commitments are good pointers to reconfirm the outlook for data centers – the critical infrastructure to be added for AI capabilities.

Estimates from Gartner and Dell'Oro point to global data center spending exceeding $1 Tn by 2029 (Gartner, 2025). These projections could be revised upwards by a significant margin, depending upon the progress achieved in the $500 Bn Stargate Initiative for US-based AI infrastructure. Led by OpenAI, SoftBank and Oracle, the Stargate project started with a $100 Bn investment, with the rest to be spent over the next four years. (Forbes, 2025). Notably, in February 2024, OpenAI sought funding worth $5.0-$7.0 Tn to set up specific chip-building capacities that could propel the large language models of AI systems. (WSJ, 2024). Around the same time, the head of Nvidia, a predominant company in the global AI chip market, held that about $1 Tn worth of data center infrastructure and its related hardware could be built in the next 4-5 years (DCD, 2024). Actual investments, even with a fair discount to such estimates, will still amount to a significant quantum for the industry.

The substantial investment momentum relies on the robust demand outlook. McKinsey's projected CAGR of 12%-15% in global data center demand during 2023-2030 appears more likely to be met in excess. The wide-ranging mainstream applications of AI technologies, such as through the advent of large language models, add to the demand-pull in this business. Larger capacities, as with hyperscalers, are typical to avail of economies of scale in the emerging market opportunity. Progressively, third-party infrastructure providers are working with the hyperscalers to achieve the targeted capacity addition (KKR, 2024).

### Projected IT Spending on Data Centers Globally ($ Bn)
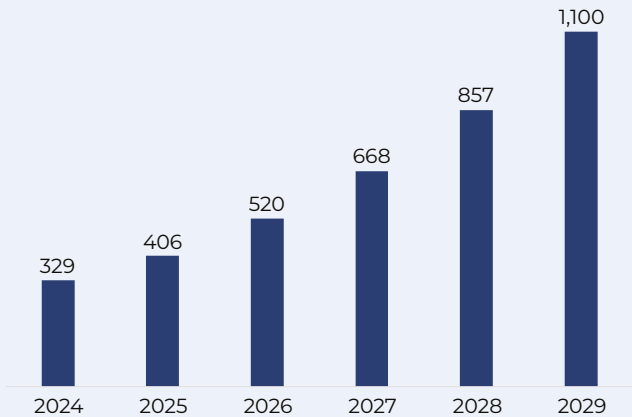
Source: Gartner and Dell'Oro

Note: The data points for 2023 and 2024 were sourced from Gartner. The data points for 2025 were derived using Dell'Oro's projected spending for 2029.

Even as hyperscale data centers occupy the maximum attention in the industry outlook, edge data centers are gradually emerging as another key market segment opportunity. Generative AI, IoT, and other technologies require edge infrastructure support. The global real estate consulting firm JLL's projections place the edge IT data center market at $317 Bn by 2026 – more than double the valuation in 2020 (JLL, 2024). The segment's demand is strong due to the low latency and high bandwidth requirement, among other things. The segment's strength is also attested by the fact that about 20% of the US data center market's developments occur in the edge geographies.

The market opportunity from the planned or announced data center spending could be much broader. It would include additional supporting infrastructure such as power transmission networks, dedicated power generation or backup units, advanced cooling systems, energy efficiency systems such as waste-heat recovery systems, etc. Technological innovations and solutions should be considered to address the typical data center requirements. Meta, for instance, achieved about 33% cost reduction in data centers by deploying AI solutions. In the case of Alphabet, its DeepMind AI system helped reduce cooling costs by 40%. By the end of 2025, about half of the cloud data centers could be equipped with AI/ML robots, which can enable energy efficiency of up to 30% (Data Center Knowledge, 2024).

Projected Global Data Center Demand
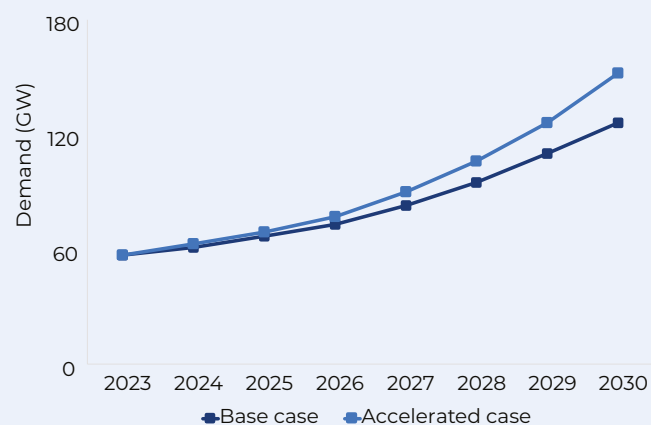
Source: KKR

Sustainability as an Investment Theme

The planned investments in data centers must factor in the sustainability implications. Globally, as critical digital infrastructures, data centers stand out for their contribution to carbon emissions (between 1.5% and 4% of the total) and the pressure on land and water (World Bank, 2023). As a result, there is a thrust on green data centers – those that can be powered by sustainable energy resources or can demonstrably minimise their carbon emissions. The market size of green data centers, estimated at $72 Bn in 2024, shows rapid growth (Precedence, 2025), reflecting the investment theme taking shape due to sustainability regulations and policy guidelines.

The steadily expanding segment of green data centers would entail investment commitments across multiple interlinked segments such as clean energy sourcing, power usage efficiency, cooling, etc. Leading data center operators are also tapping into sustainability-linked financing to help raise resources in this context. It is partly related to the pressure on the developers and operators to address sustainability in the data center project pipeline. The technology consulting entity Gartner, in a study using survey results of May 2023, projected that by 2027, about three-quarters of the organisations are likely to implement a data center infrastructure sustainability plan (Gartner, 2023). In 2022, it stood at less than 5.0%.

Initiatives Towards Integrating Sustainable Energy in Data Center Operations

Company	Country	Initiative
Alphabet	US	$20 Bn partnership with Intersect Power and TPG Climate to develop data centers powered by co-located renewable power projects.
EQUINIX	France	PA10 data center in Paris demonstrated how the systems could repurpose waste heat for the surroundings and reduce overall energy consumption and emission footprint.
Meta	US	Partnered with SRP, Ørsted to procure 100% renewable energy (300MW solar power plant) for its Arizona-based data center operations.
HIVE	Paraguay	In July 2024, the company signed an agreement to develop a 100MW hydropower-based data center for Bitcoin mining operations.
Crusoe	Iceland	A planned 80MW data center harnessing the region's geothermal and hydropower resources to support AI and other high-performance computing workloads.

Source: Data Center Dynamics, Equinix, Utility Dive, Hive Digital and Data Center Magazine

Sustainability-linked Bonds and Financing Raised in Data Center Business

Company/operator	Amount	Date
Equinix	$1.2 Bn	Nov-24
Stack Infrastructure	$3.0 Bn	Aug-24
Vantage Data Centers	$3.0 Bn	Jun-24
EdgeConneX	$1.9 Bn	Apr-24
Digital Realty	$6.0 Bn	Mar-24

Note: The above data includes green bonds, debentures and syndicated loans
Source: ESG Today, Data Centre Solutions, Data Centre Dynamics, Blackridge Research

Some of the toughest challenges could be around sourcing cleaner energy for the data centers. As 100% renewable-based operations are still not an entirely feasible route (due to the variability of the renewable energy sources, primarily wind and solar), the data center operators are considering a range of measures to supplement their efforts at sustainability and emission profile. One is the strategic location of the capacities – regions with high renewable energy penetration are in active consideration. The European region thus presents a significant growth opportunity.

Spain, for instance, has seen a jump in its data center pipeline – there are 74 facilities in total, of which 28 are in the planning or under construction stage. (Arthur D. Little, 2023). About 56% of the country's total grid-connected power is based on renewable energy sources. Notable Nordic countries such as Norway are similarly better placed because of their low-cost hydropower supply in the energy mix and the cold weather's natural cooling ability. As of February 2025, the real estate consulting firm CBRE estimated 937MW worth of new data center capacity in the European region by the end of 2025 (CBRE, 2025). Renewable energy-based power is a critical element for such capacities.

The data center operators' quest for reliable and clean energy is also driving a resurgence of nuclear power. The top global hyperscalers are leading the way here. The investment announcements in this regard have been mainly about partnerships to establish small and modularised reactors (SMR) to power the large-scale data centers through a steady baseload-grade supply with a minimum carbon emission profile. The technology sector's planned investments in nuclear power appear to be an outlier against the global declining trend in such power plants. The progress in this regard remains to be seen, mainly when all the major announcements are centered on the US market.

While the shift to sustainability-led data centers is clear, its cost implications are yet to be fully clear. Energy-efficient data centers entail upfront investments, as does clean energy sourcing. The capex of a typical data center ranges between $7 Mn and $12 Mn per MW of commissioned IT load (Dgtl Infra, 2023). The capital cost of Green data centers exceeds the upper limit. The investments, therefore, must pay off through their long-term benefits in the operational costs.

Nuclear Power Capacities Planned to Support Hyperscale Data Centers

Company	Investment details
Microsoft	The agreement with Constellation Energy to restart a mothballed nuclear reactor at Three Mile Island is expected to cost $1.6 Bn to bring online.
amazon	Agreement with Talen Energy for a 960MW data center powered by the Susquehanna nuclear power plant. Also partnering with Dominion Energy and X-energy for small modular reactors (SMR).
Google	Collaboration with Kairos Power to build up to seven SMRs, providing up to 500MW of power.
ORACLE	Plans to construct a gigawatt-scale data center powered by three SMRs.
OKLO	Master Power Agreement with Switch for 12GW of Oklo Aurora powerhouses by 2044.

Source: VOA, New York Times, Data Center Dynamics and Data Center Frontier

Challenges and Workarounds

The exponential growth in data centers could outstrip the infrastructure capacity needed to support it. The power supply is one such critical resource. There is a looming constraint on power availability as data centers require much more energy for the rising AI and related computational workload. Projections vary across agencies in this regard. Gartner, for instance, in its November 2024 release, held a likely operational constraint for 40% of existing data centers due to power supply by 2027. In this scenario, the power utilities may not be able to augment supply in time to meet the demand (Gartner, 2024). Other projection scenarios, such as IEA's, indicate that the constraints are likely to be localised instead of global (IEA, 2024). Notable examples in IEA's estimates include the US where data centers' power consumption exceeded 10% of the total power consumption in at least five states, and Ireland, where data centers account for about 20% of the total power consumption.

The concerns around energy constraints have grown in recent times. The US market, which has the most significant number of existing operational data centers globally, shows such signs. Some of the largest power utilities have limited their power supply commitments to 2-5 years for data centers. In the US region of Northern Virginia, also known as a data center hub, the electric utility Dominion Energy has been under pressure to meet data centers' demand, which doubled during 2018-2022. The utility projects a further doubling of such demand by 2028 (JLL, 2024). Consequently, the near-term electricity demand from data centers, i.e. until about 2030, is driving gas-based power generation in the US. (Argus, 2025). Gas-fired power plants are more reliable than solar or wind for a steady/baseload supply and are faster to commission (about 2-3 years for a new-build) than nuclear power plants. This is contrary to the technology industry's sustainability objectives, but the risk and cost of allowing unmet demand are too high.

Gartner's Projections on Incremental Power for Newly Added AI Servers (TWh)

Year	Value
2027	500
2026	401
2025	335
2024	261
2023	195
2022	74
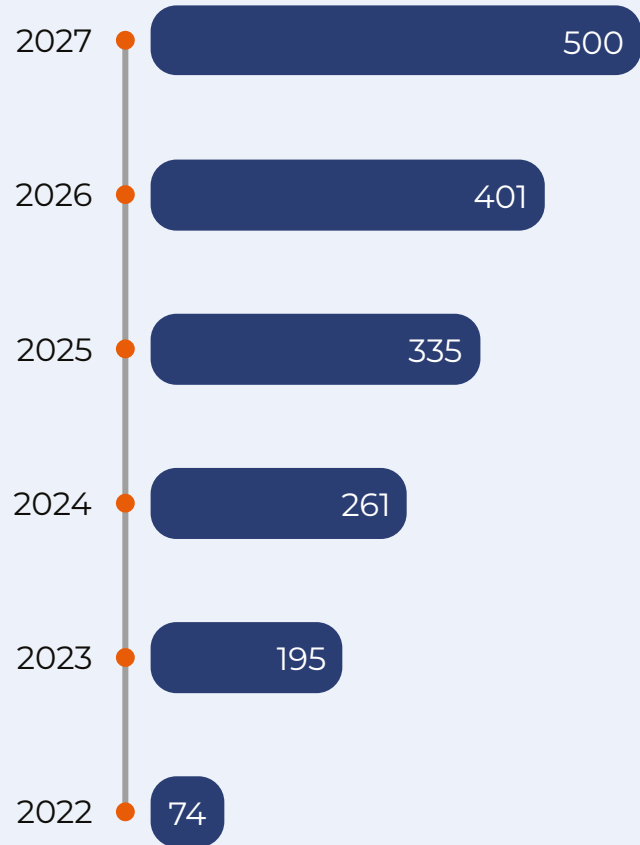
Source: Gartner

Instances of Restrictions on Data Centers to Mitigate Resource Constraints

Ireland: The grid operator halted new data centers near Dublin until 2028 due to fears of a blackout caused by pressure on the power network (AP News, 2024).

Netherlands: In July 2019, a one-year moratorium was imposed on all new data center developments in the Dutch city of Amsterdam (DCD, 2024). Subsequently, stringent efficiency requirements were introduced, and data center projects were allowed only at two designated municipalities.

Singapore: Since 2019, the country has a moratorium on new data centers. Construction was allowed for projects approved before the cut-off date (DCD, 2024).

Norway: New regulations were introduced to create a national register of data centers and discourage data centers from powering crypto mining businesses (DCD, 2025).

Source: AP News and Data Center Dynamics

Worldwide, constraints are surfacing not just in total power demand but also in the transmission network's capacity to manage such loads. In many cases, grid operators have voiced concerns about potential blackouts. The restrictions imposed on data center construction thus impacted the market. European energy efficiency standards should be looked at in this context. Developers and investors must factor in the risk of delayed or rejected applications if the grid or the power supply is not available in time.

Data center development is gradually shifting to secondary markets as developers and other key stakeholders seek options to manage costs and resource uncertainty. In Europe, secondary markets such as Madrid, Milan, Barcelona, Lisb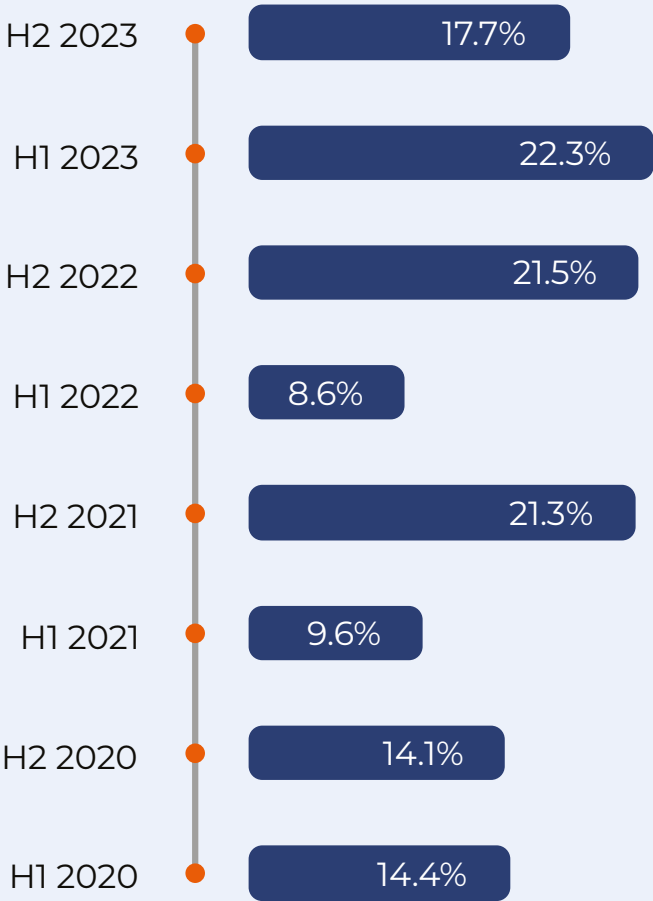on, Stockholm, Oslo, and Copenhagen are all expected to grow significantly as options beyond the primary markets of FLAP-D (Frankfurt, London, Amsterdam, Paris and Dublin) (JLL, 2024). The secondary market growth is estimated at an impressive 49% across Europe, with Southern Europe and Nordics at anywhere between 30%-55% on a year-on-year basis in 2024 (JLL, 2024).

Share of Secondary Markets in Data Center Capacity under Construction

Period	Share
H2 2023	17.7%
H1 2023	22.3%
H2 2022	21.5%
H1 2022	8.6%
H2 2021	21.3%
H1 2021	9.6%
H2 2020	14.1%
H1 2020	14.4%

Source: JLL

07

Regional Market Overviews

GERMANY

Germany is one of the largest data center markets in Europe, boasting 1,955.0MW of total IT capacity, largely owing to its thriving tech sector, economic importance and centralised location within continental Europe.

Frankfurt dominates Germany's data center market, hosting close to 75.0% of the country's IT capacity, largely driven by the data processing demands of its financial district, which is one of the largest in Europe, but also the DE-CIX, Europe's largest internet exchange (DC Byte, 2024) (Royal HaskoningDHV, 2023).

This has positioned Germany as a key destination for investors, with growing capital inflows into data centers projected to reach $12.2 Bn by 2029. Despite headwinds in the form of increasing land and capex costs and a higher cost of debt following interest rate hikes by central banks globally, German data centers remain an attractive proposition, driven by significant demand for IT capacity, as well as political and regulatory stability (Business Wire, 2024).

GDP
(Current Prices, $ 2023)
4,527 Bn

Projected Average GDP Growth 2024-28
0.8%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
2.3%

Country Credit Rating
AAA

Renewable Energy Share
49%

Data Center Capacity (2024)
1,955MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

As of 2024, Germany's operational data center capacity totalled 1,955.0MW, of which 69.0% pertained to colocation and hyperscale facilities, partly owing to the continued shift away from an enterprise business model as companies continue to favour the cost-efficiency, scalability and optionality of a cloud-based service provision (German Datacenter Association e.V., 2024).

Broader digitalisation trends are also playing a role, and the growth of AI is particularly prominent in Germany. Virtus, a European-focused colocation operator, and Microsoft have both committed over €3.0 Bn to data center investment in Germany, specifically aimed at meeting the increasing data processing, interpretation and storage demands of AI and cloud computing (Data Centre Dynamics, 2024) (FDI Intelligence, 2023)

Germany's data center market has historically been dominated by Frankfurt, one of the coveted "FLAP-D" markets, given its economic and financial importance to continental Europe, as well as its global connectivity. In particular, Frankfurt is home to Europe's largest carrier and data center-neutral Internet exchange point, DE-CIX, which in 2023 received 59 exabytes of traffic, equivalent to around 9.8 Bn two-hour video streams, marking an 84.4% increase on the 32 exabytes of traffic received in 2020. With the proliferation of the IoT and the importance of low latency for real-time results and decision-making, it is no surprise that data center providers have strategically located themselves in, or close to, the city (DC Byte, 2024).

Additionally, Frankfurt is a global financial hub, home to 280 financial institutions, including behemoths such as Deutsche Bank and the European Central Bank (Frankfurt Business, 2024). The increasing computing needs of financial institutions are driven by demand for low latency and growing regulatory requirements governing the processing, storage, and transfer of personal data (Digital Core, 2024). Additional factors, such as Germany's stringent data protection regulations, make it an ideal choice to locate the data storage and processing capacities.

Share of Frankfurt in Total Germany Data Center IT Power Capacity

43%

1,955MW
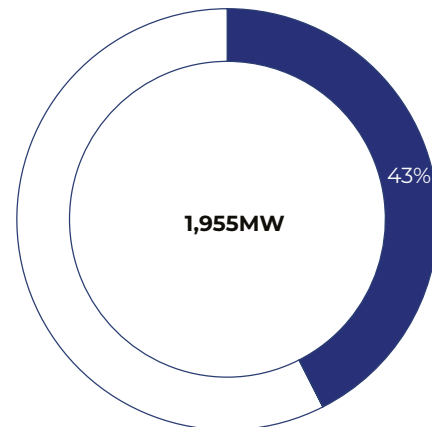
Source: Data Center Association

Note: Frankfurt data center IT power capacity consists of Hyperscale and colocation capacity

Whilst Frankfurt has historically dominated Germany's data center landscape, Berlin is rapidly emerging as the country's second digital hub. Google launched a cloud region in the summer of 2023, and Microsoft now serves its Azure Germany North Europe region from Berlin.

Frankfurt and Berlin Key Data Center Facts

Technology	Frankfurt	Berlin
IT Load	745.0MW	92.0MW
Under construction	542.0MW	76.0MW
IT-Load in planning	383.0MW	219.0MW

Source: JLL (JLL, 2024)

In 2019, the city had only a few MW of IT power capacity but is expected to reach the 700.0MW mark by 2027, bolstered by a combination of a digitally proficient economy, the Berlin Commercial Internet Exchange (BCIX) internet node, a substantial wind energy supply from Brandenburg, and competitive land costs (REFIRE, 2024). BCIX's capacity grew from 3,500Gbps in January 2019 to 4,700Gbps by November 2024, strengthening Berlin's digital infrastructure. This expansion has enhanced interconnection, faster data transfers, and network efficiency for local data centers (Internet Society, 2024). As of Q2 2024, Berlin boasts the most affordable commercial real estate and land prices among major German cities, making it an appealing investment hub, particularly for data centers (Statista, 2024). Additionally, Brandenburg's wind energy capacity reached 8.6GW in early 2024, making it the most significant contributor to Berlin's power needs, thereby positioning the city as a sustainable data center destination (Berlin Business Location Center, 2024).

Hyperscale and colocation providers drive the industry's capacity growth. The German Data Center Association's survey report of 2024 estimated that hyperscale data centers corner about three-quarters of the planned capacity. The same survey also points out that the number of colocation data centers, especially those with a capacity of 20.0MW and above, could rise sharply—from 18 presently to about 40-50 by 2030.

Germany's hyperscale market makes up more than 45.0% of total IT capacity and is dominated by the major global CSPs; AWS, Google, Microsoft, Oracle and IBM, in addition to other global data center operators, such as Alibaba, Apple, Meta and Tencent, each of who have the demand, capabilities and access to capital to construct and/or operate these huge facilities (Ken Research, 2022).

The colocation market is largely dominated by global colocation providers, such as NTT, Digital Realty, Equinix, Cloud HQ, Vantage, Goodman, Stack Infrastructure and Vantage Data Centers, as well as European players, such as Virtus (German Datacenter Association e.V., 2024) (DC Byte, 2024). The colocation providers are tapping into the demand from infrastructure digitalisation in major sectors for efficient data processing.

Policy and Regulation

The policy and regulatory directives targeting the data center market in Europe, largely relate to the issue of sustainability, as countries globally continue to work towards Net Zero targets.

The European Commission's Delegated Act adopted in March 2024, sets out the first phase of establishing an EU-wide scheme to rate data centers based on a series of sustainability factors, which will require data center operators to submit a series of Key Performance Indicators ("KPIs") bi-annually. The ranking of data centers, as planned under the regulations, will place added pressure on data center operators to improve energy efficiency levels. The norms of performance reporting and ratings have their origin in the EU's revised Energy Efficiency Directive (European Commission, 2024).

In September 2023, the EU adopted the revised Energy Efficiency Directive (EED), which set a binding target of reducing energy consumption by 11.7% by 2030. The EED mandates reporting performance parameters related to energy and water consumption in data centers with an installed power of over 500.0kW. The data centers will be accordingly rated for their progress towards net zero goals (EUR-Lex, 2023). Among major implications, the regulations will help drive innovations and investments in green data center technologies. Data center cooling technologies, including those based on waste heat recovery, are likely to find traction from operators in both existing and planned units.

Germany's data center regulations align with EU energy efficiency goals, emphasizing sustainability. The Energy Efficiency Act (EnFG), enacted in 2023, aims for a 26.0% reduction in final energy consumption by 2030 (compared to 2008 levels). It introduces stringent Power Usage Effectiveness (PUE) standards for data centers with a connected load of 300.0kW or more, effective for centers operational from July 2026. Compliance with these norms will require

significant investments and may influence operators to prefer cooler, less humid locations to achieve lower PUE values. The long-term impact on capital costs and new data center buildouts remains uncertain (DCD, 2024) (Mayer Brown, 2024) (White & Case LLP, 2023) (White & Case LLP, 2023).

Power Usage Effectiveness Norms for Data Centers

|	Mandated PUE to achieve, as of		
	1 July 2026	1 July 2027	1 July 2030
Data centers operational on or before July 1, 2026		≤ 1.5	≤ 1.3
Data centers operationalised after July 1, 2026	≤ 1.2		

Source: Mayer Brown

Outlook

The German data center market size, by revenue, is projected to grow at a CAGR of 9.0% during 2024-2030 (Grand View Research, 2024). Colocation and hyperscale units, which already account for about 70.0% of existing capacity (by MW), will drive the growth. The German Data Center Association's estimates from the project pipeline suggest doubling colocation capacity by 2027 to reach 2.7GW. The top global hyperscale operators have committed investments for a rapid scale-up. As of February 2024, Microsoft announced a €3.2 Bn investment to boost its data center capacity in Germany by 2025 (CIO, 2024). In June 2024, AWS announced its €8.8 Bn investment plan focused on the Frankfurt region during 2024-2026 (AWS, 2024).
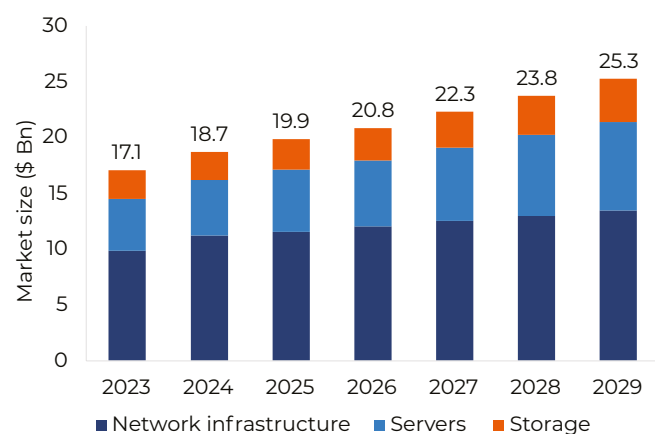
The strong market growth outlook, as visible in the investment commitments and an expanding project pipeline, is sustained by a general preference for Germany among the European countries. The country's central geographical location enables connectivity to all other European markets for data exchange. Its internet exchange, DE-SIX, is the world's largest and provides premium services through several carrier and data center-neutral internet exchanges. The country's data protection laws are regarded as the most stringent in Europe and help reinforce the credentials to host capacities involving sensitive AI applications and systems. A robust infrastructure base, especially in terms of reliable power networks and high-speed internet connections, adds to the list of relative advantages. Furthermore, Germany's rising renewable energy penetration is important for operators seeking sustainability in capacity addition plans (DataCenter Knowledge, 2023).

While Frankfurt is established as the most important location for data centers, Berlin is the next choice for developers for reasons cited in the Market Dynamics section above. Based on projects under planning/construction, Berlin was set to register a 39.0% year-on-year growth in data center capacity by the end of 2024 (JLL, 2024). In 2023, Google launched its cloud region in Berlin, while Microsoft uses Berlin-based capacities to cater to other European markets. Major foreign investments (e.g. Tesla's Gigafactory), strategic location for the Eastern European market, and skilled resource base (SAP's research centre and technology institutes) – together make a compelling case for Berlin (DCD, 2023).

Data Center Market by Revenue

Source: Statista

The growth momentum also entails navigating a few looming challenges. The rising demand for data centers is imposing significant pressure on resources such as land, water, and power. Developers are increasingly challenged by limited land availability and prolonged approval and grid connection timelines. The rise of secondary markets such as Berlin and Munich can be seen as a result of the rising constraints. The stringent regulations in sustainability (notably the legislation on energy efficiency) place additional pressure in terms of capacity design, costs and the like. These are likely to be mitigated through strategic partnerships and collaborations with technology providers and equipment manufacturers. Waste Heat Recovery is among the key efficiency-based technologies that could potentially become widespread with the rise in adoption due to regulatory stipulations. Several innovative projects in Germany are repurposing waste heat from data centers for sustainable applications. For example, Penta Infra has upgraded a high-performance data center in Berlin to utilise waste heat for microalgae cultivation, demonstrating innovative applications of excess thermal energy (ScaleUp Technologies, 2022). Similarly, Virtus is planning to develop a 300.0MW data center campus outside Berlin and make the waste heat generated by the data centers available to the local municipality integrated into its district heating network (DCD, 2023). Another example is the University of Oldenburg, which is using waste heat from its data center to heat faculty buildings and a swimming pool as part of a project, supported by the German Federal Ministry of Education and Research (DCD, 2024).

Overall, Germany is well-positioned to retain its leadership position in the global data center market. The emerging challenges of resource constraints and efficiency regulations are unlikely to dent the market opportunity significantly. However, they may drive developers to consider competing locations in Europe in the long term.

SPAIN

Spain is one of the emerging secondary data center markets in Europe with a total installed capacity of 354.9MW in 2024, benefitting from the current challenges and gradual saturation of the key European markets, FLAP-D (Frankfurt, London, Amsterdam, Paris and Dublin), that drives operators and investors to consider other countries, including Spain, as an alternative for strategic investments. Madrid is the dominant market in the country, accounting for 54.8% of the total installed capacity, largely owing to its strategic location as a pivotal point of data center connectivity infrastructure acting as a link between Europe, Africa and America and being the main telecommunications hub in the Iberian Peninsula (Spain DC, 2025) (Cushman & Wakefield, 2024).

The Spanish Data Center Association projects that Spain could attract direct investments of more than €21.0 Bn ($22.9 Bn) in digital infrastructure investments for the period from 2025 beyond 2027 under the trend market scenario and reach a total installed capacity of 2,180.0MW. While challenges like limited land availability and power delays due to a modified electricity plan have emerged, these issues are expected to ease as data centers receive prioritised access to power under the current regulatory framework (Spain DC, 2025) (Spain DC, 2024).

GDP
(Current Prices, $ 2023)
1,621 Bn

Projected Average GDP Growth 2024-28
2.0%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
3.2%

Country Credit Rating
A

Renewable Energy Share
41%

Data Center Capacity (2024)
355MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

As of 2024, Spain's total data center IT power capacity stood at 354.9MW, largely attributable to the increase in data traffic and transactions, digitalization of the economy, prevailing challenges in FLAP-D markets, and the growth of AI adoption, underscored by Microsoft's planned investment of €2.1 Bn ($2.3 Bn) in AI and cloud infrastructure (Cushman & Wakefield, 2024). However, the market capacity is still relatively smaller than the other FLAP-D markets, e.g., it is just 18.2% of the total capacity of the German market. Nonetheless, the capacity is expected to expand due to the numerous favourable opportunities available in the market (Spain DC, 2025) (German Datacenter Association e.V., 2024).

Spain and other secondary European markets are benefitting from the underlying challenges faced by the core European markets, FLAP-D, due to power constraints and land availability, as well as increasing regulatory scrutiny owing to the growing demand for sustainability in data center operations. Also, as the FLAP-D markets become increasingly more crowded, operators and investors are looking beyond these markets due to cost implications and are expanding in markets such as Spain, which can offer high-speed connectivity, data sovereignty and an alternative for strategic investments as well as business stability and diversification (Cushman & Wakefield, 2024).

Spain, being a critical part of the technological infrastructure network and telecommunication hub within Europe owing to its strategic location, is also playing a prominent role in the growth of the overall data center market in Europe (Cushman & Wakefield, 2024). The DE-CIX Southern European region consists of internet exchanges in Madrid and Barcelona, apart from Lisbon, Palermo, and Marseille, with 13 data centers having almost 500 network connections distributed among them (DE-CIX, 2024). The total customer capacity of these internet exchanges increased 31.0% y-o-y from 2022 and reached 12 terabits in 2023. The peak data throughput of DE-CIX Madrid internet exchange reached 1.5 Tbit/s in 2023, growing at an impressive 44.0% y-o-y as compared to 2022. This increase was driven by rising data traffic and the growing demand for low-latency connections required for real-time decision-making, prompting data center developers to position themselves near the city (DE-CIX, 2024).

Digitalization of the Spanish economy has infused substantial growth in the data center market due to increasing demand from enterprises and government organizations (Cushman & Wakefield, 2024). Spain's huge investments in the fibre and 5G network, amounting to €4.3 Bn ($4.6 Bn) in public funding and an additional €24.0 Bn ($25.8 Bn) in private funding under its "Plan for Connectivity and Digital Infrastructures and the Strategy to Promote 5G Technology" running from 2020 through 2025, have resulted in the country having ultrafast broadband (European Commission, 2024). As of September 2023, Spain had the highest penetration rate (78.9%) and the second highest coverage rate (91.9%) of Fibre to the Home (FTTH) in Europe (FIERCE Network, 2024) (FTTH Council Europe, 2024).

Spain's renewable energy capacity and stable economy are key drivers of data center growth, presenting significant opportunities for operators and investors. In 2023, renewable energy accounted for 61.3% of the country's total electricity generation, making Spain second only to Germany among EU nations (Spain DC, 2025) (Spain DC, 2024). This combination of robust renewable energy resources and economic strength makes Spain an appealing location for sustainable data center development. Major data center operators like Equinix, Interxion, and Amazon Web Services (AWS) have committed to powering their data centers using renewable energy from solar and wind sources. A prime example is Equinix's energy-efficient BA1 data center located in the city of Barcelona, which is 100.0% powered by renewable energy (Rider Levett Bucknall, 2021) (Equinix, 2024).

Spain's data center market is dominated by Madrid (194.5MW with 54.8% share as of 2024). As with the other European key data center hubs (FLAP-D) with reference to their respective countries, the city is similarly incredibly significant to Spain in terms of communication, educational institutions and the concentration of businesses, which makes its market very conducive for digital operators and data center industry players contributing to the sector's growth (Spain DC, 2025) (Spain DC, 2024).

As seen in other sub-markets globally, which have experienced a concentration in data construction activity, Madrid is experiencing a scarcity of land and power availability. The scarcity of suitable land plots with power infrastructure in Madrid has pushed up land prices in 2024, adversely impacting project economics. Consequently, investors are considering other regions such as Barcelona (65.7MW with 18.5% share as of 2024) and Aragon (38.0MW with 10.7% share as of 2024) which have higher land availability and at more economical price points (Colliers, 2024) (Spain DC, 2025).

Barcelona is set to experience sustained investment in the data center market, as highlighted by the various land banking deals. Major real estate developer Panattoni and build-to-suit data center developer Global Technical Realty (GTR) have been acquiring large swathes of land for data center development. GTR's site spans 15,000 sqm and can host a new 16.0MW IT load facility. Panattoni has acquired a 60,000 sqm plot of land and aims to develop a 42.0MW two-building campus. Panattoni is reportedly aiming to invest around €300 Mn ($328 Mn) in the project (Global Technical Realty, 2023) (Colliers, 2024) (Data Center Dynamics, 2023).

Aragon is expected to receive a significant share of the big-ticket investments planned by large cloud players such as AWS and Microsoft, which have announced investments of €15.7 Bn ($16.9 Bn) and €6.7 Bn ($7.2 Bn), respectively, over the next 10 years, to expand their cloud regions and build new data centers in the region. The biggest advantages offered by the region are land availability, access to renewable sources, exceptional connectivity and seamless collaboration with the local authorities, which make it an extremely attractive option for building and operating data centers (Colliers, 2024) (DC Byte, 2023).

Other locations that are witnessing investments and capacity building are Valencia, Malaga, Castilla-La Mancha, Galicia and the Bilbao-Navarre corridor. Availability of large land plots, secure power supply, access to renewable energy and excellent connectivity due to the arrival of submarine cables, are some of the key factors driving data center investments in these regions (Colliers, 2024) (Spain DC, 2024).

Spain's hyperscale market is dominated by global technology majors such as Google, Oracle, AWS, and IBM, which have launched multiple cloud regions in the country over the past couple of years. Microsoft is also investing heavily in the Spanish market as a business diversification strategy to expand beyond the FLAP-D markets (Arizton Advisory and Intelligence, 2024) (DC Byte, 2023) (Cushman & Wakefield, 2024) (Data Center Dynamics, 2022) (Oracle, 2022) (AWS, 2022) (Data Center Dynamics, 2023).

The Spanish colocation market is highly competitive, driven by strong demand for digital infrastructure and cloud services. Spain's strategic position as a digital gateway between Europe, Latin America, and North Africa, combined with its growing digital economy, makes it an attractive location for colocation services. Major players like Equinix, Interxion, Digital Realty, NTT, and Global Switch are actively expanding their facilities in Spain, particularly in Madrid and Barcelona, to meet the rising demand for data storage and cloud services (Colliers, 2024) (Cushman & Wakefield, 2024).

Share of Madrid in Total Spain Data Center IT Power Capacity

54.8%

354.9MW
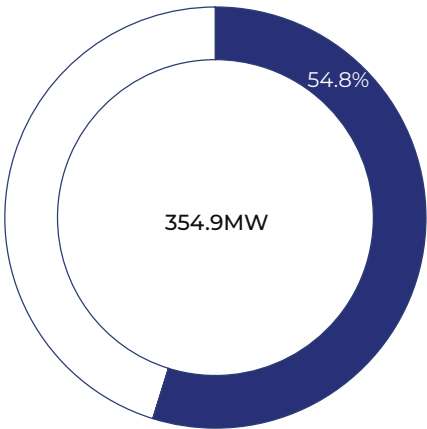
Source: Spanish Data Center Association

Policy and Regulation

After the adoption of the EU-wide revised Energy Efficiency Directive (EED), effective from September 2024, which set a binding target of reducing energy consumption by 11.7% by 2030, it is expected that innovations and investments in green data center technologies are going to see a boost across the region (EUR-Lex, 2023) (Spain DC, 2025). Spain proactively adopted policies in this regard to be aligned with the European guidelines. The Royal Decree-Law, 8/2023 of 27 December 2023 ("Royal Decree-Law 8/2023"), among other provisions, outlines measures to promote energy savings and efficiency in data centers.

Data centers are now mandated to offer financial guarantees for electricity grid access, fostering improved energy efficiency. It also promotes competitive bidding for access to grid nodes, prioritizing projects with high energy efficiency and low carbon emissions (Freshfields Bruckhaus Deringer, 2024) (Garrigues, 2023). However, data center investors view the financial guarantee provision as restrictive, particularly in the Madrid market, where most power grid access requests pertaining to planned data centers potentially constrain growth. Any adverse effects on the Madrid data center market could also impact other regions and the overall market in Spain (Bird & Bird, 2024) (Freshfields Bruckhaus Deringer, 2024) (Bloomberg, 2024) (Spain DC, 2024).

This regulation comes in the backdrop of The Ministry for Digital Transformation and Public Administration working on a modified electricity plan for 2025-2030 because the energy demand, as estimated in the current five-year plan covering 2021-2026, has fallen way short of the actual demand. This is due to the higher-than-expected demand generated by the data centers, which was grossly underestimated in the previous plan. Most data center players feel these actions are insufficient and expect swifter reactions from the authorities and the sole transmission system operator (TSO), Red Electrica, so that it does not cause massive disruptions to the growth of the data center market, signs of which are already visible. The saturation in certain pockets of Madrid in terms of power availability has resulted in the cancellation of some projects due to high costs (Freshfields Bruckhaus Deringer, 2024).

From the Spanish Data Center Association's viewpoint, the country's regulatory framework is ambiguous, and there may be a tendency for hyperregulation that can result in the market losing its competitive advantage to the other European markets, resulting in data center development failing to achieve its true growth potential. Moreover, a convoluted permitting process requiring regulatory compliance at municipal, regional and federal levels can extend project timelines and stymie the growth momentum in data center development (Spain DC, 2025) (Spain DC, 2024).

Outlook

Revenue from the Spanish data center market is projected to grow at a CAGR of 6.1% during 2024-2029 and reach a value of $6.0 Bn by 2029 from $4.5 Bn in 2024, largely driven by the growing demand for higher processing capacity requirements triggered by the emergence, development, and use of AI tools (Spain DC, 2025) (Spain DC, 2024) (Statista, 2024). The Spanish Data Center Association estimates, by assessing various market scenarios, that the capacity in Madrid will reach anywhere between 365.0MW to 920.0MW by 2027 as compared to 194.5MW in 2024, growing at a CAGR between 23.4% to 67.9%. While Spain's installed capacity is expected to grow from 354.9MW in 2024 to between 860.0MW and 1,552.0MW over the same period, with a CAGR ranging from 34.3% to 63.5%. This is based on the substantial pipeline of investments announced by large public cloud service providers, concentrating on the demand for colocation services in the market (Colliers, 2024) (Spain DC, 2025).

The strong market growth outlook, as visible in the investment commitments and an expanding project pipeline, is sustained by a general preference for Spain among the secondary European markets beyond the increasingly saturated FLAP-D markets. Spain's strong digital infrastructure and high-speed connectivity give it an edge over competing countries. Initiatives like the 2025 Digital Spain Plan significantly support the data center sector, with substantial investments aimed at enhancing digital infrastructure. The country plans to invest €28.3 Bn ($30.4 Bn) from 2020 to 2025, demonstrating its commitment to digital transformation and expansion. The Spanish Data Protection Act (LOPD), which is aligned to the EU-wide General Data Protection Regulation (GDPR), establishes the country's credibility to handle bulk data processing with the utmost security and is imperative for the growth of the data centers (Centraleyes, 2024) (European Commission, 2024).

Forward and Backward integration in the data center market is also going to drive investments in the sector. Leveraging the expansion of data centers in Spain, energy companies like Iberdola and Solaria have started developing their own data center portfolios to leverage their existing energy resources and expertise. At the same time, data center developers are also investing in renewable energy projects to secure power supply and add to their credibility as a sustainability-focused market player (The Corner, 2024) (Solaria, 2024) (Invest in Spain, 2024).

Overall, Spain has several factors going in its favour of being a preferred destination among the secondary emerging markets in Europe, notwithstanding the temporary headwinds posed by regulations and resource constraints. While this may cause developers to explore alternative locations in the short term, the strong market fundamentals will enable the region to sustain its growth trajectory over time.
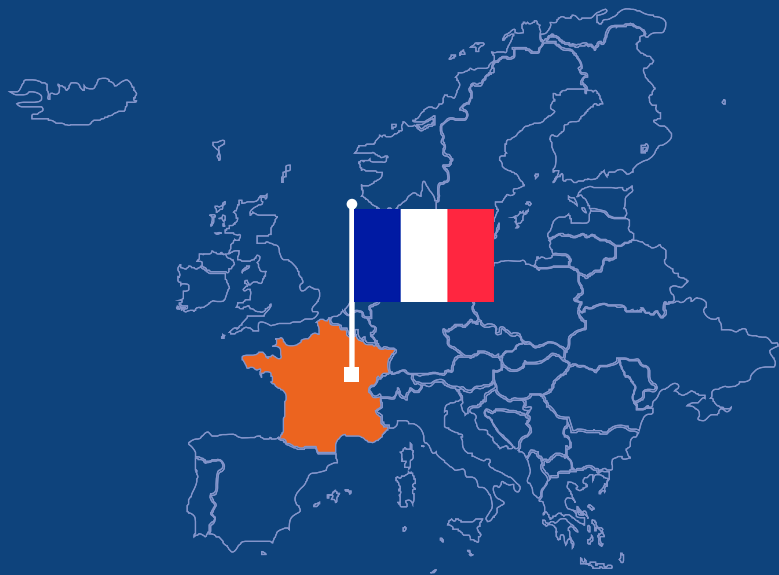
Data Center Market by Revenue
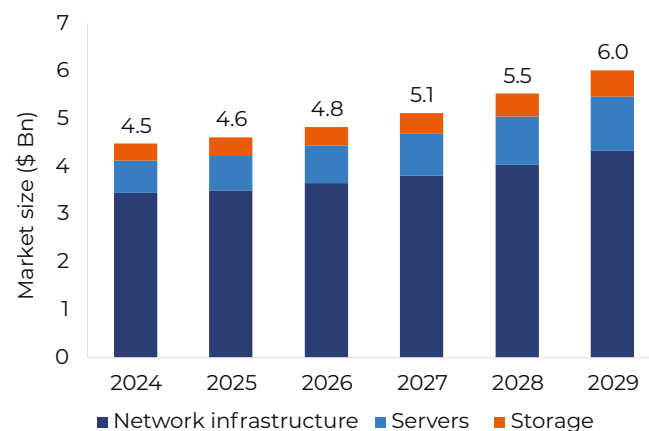
Source: Statista

FRANCE

As of March 2024, France hosted the third highest number of data centers in Europe, behind the UK and Germany (Statista, 2024). Its data center capacity grew at a CAGR of 13.4%, from 235.0MW in 2016 to 566.0MW by 2023, and is expected to reach 1.8GW by 2033 (France Datacenter, 2024) (France Datacenter, 2023).

In 2023, investments in France's data center market reached €879.0 Mn ($944.3 Mn), driven by a global shift towards data-centric services like Big Data, IoT, AI, and cloud computing. The growing need for data localization - storing and processing data within the country of collection - has been a key factor driving new data center developments, particularly following the implementation of the General Data Protection Regulation (GDPR) (JLL, 2024)(France Datacenter, 2023).

Additionally, submarine cable infrastructure is anticipated to positively impact the investment in the data center market as it plays an important role in connecting data centers across different regions. As of January 2025, France has 28 active cables, with three more planned by 2025 and one each planned for 2026 and 2027, thereby fueling investment in the sector (Research and Markets, 2024) (TeleGeography, 2025).

GDP
(Current Prices, $ 2023)
3,053 Bn

Projected Average GDP Growth 2024-28
1.3%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
3.0%

Country Credit Rating
AA-

Renewable Energy Share
16%

Data Center Capacity (2023)
566MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

France's data center market is flourishing, driven by substantial investments from local and global players, government-backed digitalization efforts, and the growing adoption of AI, machine learning, and Big Data solutions. France's strong connectivity to major markets and the presence of leading cloud service providers, such as OVHcloud, AWS, Microsoft, Google, and Oracle, makes it an attractive hub for data center development. The country's Free Trade and Industrial Free Zones offer financial incentives, such as tax breaks and reduced duties on imported equipment, which helps in lowering the overall cost of setting up and operating data centers. These zones also offer streamlined regulatory processes, making it faster and easier to establish and expand data center operations within these areas. Additionally, unlike other European markets facing energy constraints, France benefits from its robust nuclear power infrastructure, providing significant energy autonomy (Express Computer, 2023).

Strategically located in the heart of Europe, Paris is an ideal location for organisations and data centers to connect with other major markets in the region. It serves as a key center for French internet traffic and facilitates data exchange between the US and Europe (Equinix, n.d.). This is the reason it is home to major public cloud platforms like AWS, Microsoft Azure, Google, IBM, and Oracle. The city had a strong pipeline of planned capacity addition of 259.0MW apart from the 329.0MW, which was already under construction as of Q2 2024. This surge reflects the city's vital role in meeting the growing demand for data storage and rapid connectivity. Despite a subdued first half of 2024, Paris was set for a significant increase in capacity, with 78.0MW anticipated to go online for the whole year, further pushing vacancy rates to levels below those in Amsterdam and London (JLL, 2024).

Paris also hosts large-scale projects like Digital Realty's Paris Digital Park, a campus with four interconnected data centers. Two buildings are already operational, and two more are planned, offering a total of 76.0MW of IT power (Baxtel, 2024) (Mercury, 2024). The park, potentially powered by 100.0% renewable energy, emphasises advanced technologies and sustainable practices, including free cooling systems and high-density power racks (Mercury, 2024).

Beyond Paris, which houses 42.7% of France's data centers, cities like Lille, Marseille, Lyon, and Nantes are witnessing growth, reflecting a trend towards regional expansion (Cloudscene, 2025). Nation Data Center, for instance, is expanding with new facilities in Brittany and Normandy and plans for more in Lille, Toulouse, and other cities (Data Centre Dynamics, 2024).

France's dedication to sustainability necessitates the establishment of data centers that align with environmental goals. The government's Renewable Energy Acceleration Act compels the industry to integrate renewable energy sources and implement efficiency measures, thereby facilitating the creation of more sustainable data centers. A key example of sustainability gaining momentum is the increasing number of industry leaders committing to long-term agreements to secure renewable energy.

- Digital Realty: In 2024, the company signed two 15-year Power Purchase Agreements (PPAs) for wind energy.
- Equinix: Secured a 20-year PPA for over 100MW of green energy.

These commitments underscore the growing transition toward eco-friendly data centers in France (Data Centre Dynamics, 2024) (Techerati, 2023).

Policy and Regulation

The rapid growth of the French data center market is largely driven by stringent regulatory frameworks, including the General Data Protection Regulation (GDPR) and national legislation such as France's Data Protection Act (Loi Informatique et Libertés) (Kiteworks, 2024) (Techerati, 2023).

As part of the European Union, France has been required to adhere to GDPR since its enforcement in May 2018. This comprehensive privacy and data protection law prompts significant investments in data localization infrastructure to comply with strict data protection and transfer regulations within the EU (Techerati, 2023) (CyrusOne, 2023).

Alongside GDPR, France's own data protection law, the French Data Protection Act (FDPA), serves as a precursor to the EU regulation. First enacted in 1978, the FDPA provides a legal framework to protect personal data and ensure the privacy of French citizens (Kiteworks, 2024) (Securiti, 2022). Over the past decade, this regulation has gained increased significance as the volume of data traffic has surged exponentially due to technological advancements. Consequently, the need for local data storage has become critical, driving the expansion of data center projects nationwide.

To encourage the growth of sustainable data centers, France provides financial incentives, including partial or full exemptions from the Electricity Excise Tax for facilities that meet specific energy efficiency standards (SDIA, 2024). Furthermore, the Research Tax Credit (Crédit d'Impôt Recherche) supports innovation in the data center sector by reimbursing 30.0% of eligible R&D expenses, up to €100.0 Mn ($107.4 Mn), with a 5.0% rate for any amount exceeding this threshold (Sunbird, 2023) (PwC, 2024) (Techerati, 2023).

The R&D tax credit includes technical and scientific research operations in three areas: fundamental research, applied research, and experimental development. The qualifying expenses are the following:

- Depreciation of assets entirely or partially dedicated to R&D, including patents acquired.

- Researchers' salaries, including a twofold increase in expenses for 'young graduate doctors' within the 24 months following their hiring under an open-ended contract by the company.

- Purchases of qualified subcontracted research towards public or private subcontractors in the European Economic Area, approved by the French Ministry of Research.

- Operating costs equaling 75.0% of R&D tax credit eligible depreciation and 43.0% of R&D tax credit and eligible researchers' salaries (50.0% before FY20).

- Miscellaneous amounts, such as patents-related costs (filing, maintenance, and defense), standardisation, and technological monitoring.

- The subsidy amounts for R&D projects eligible for the R&D tax credit.

Moreover, the data center landscape began to shift significantly with the introduction of the Tertiary Decree, which mandates a gradual reduction in energy consumption. Originating from the Élan law, the Tertiary Decree, also known as the "tertiary eco-energy scheme," was published in July 2019 and requires players in the tertiary sector[1], including data centers, to progressively lower the energy usage of their buildings as part of the effort to combat climate change. This decree applies to all owners or tenants of buildings, parts of buildings, or complexes used for tertiary activities with a surface area of 1,000.0m² or more (APL Data Center, 2023) (APL Data Center, 2022) (Dametis, 2023). The decree outlines a set of requirements and implications that data center operators must comply with:

- Data center operators must report the energy consumption of their facilities to the Observatoire de la Performance Energétique de la Rénovation et des Actions du Tertiaire (OPERAT), the energy performance data platform overseen by the French Agency for Ecological Transition (Ademe).

- Failure to provide information to OPERAT or submit an action plan results in an administrative fine of €7,500.0 ($8,056.9) imposed on the responsible legal entities (APL Data Center, 2022).

- Operators must decrease energy consumption by at least 40.0% by 2030, 50.0% by 2040, and 60.0% by 2050.

With the expected rise in data center usage, operators will have the option to meet a target Power Usage Effectiveness (PUE) value instead of achieving absolute reductions in energy consumption.

Additionally, the Building Automation and Control Systems (BACS) Decree, which came into effect in July 2020, complements the Tertiary Decree by requiring advanced Building Management Systems (BMS) in commercial buildings with high power consumption. Buildings with consumption over 290.0kW must install BMS by January 1, 2025, and those over 70.0kW by January 1, 2027. The BACS Decree focuses on improving energy efficiency through cutting-edge technology, reducing energy waste and enhancing operational performance. Unlike the Tertiary Decree's results-based targets, the BACS Decree mandates the implementation of these systems to achieve energy savings (Adeunis, 2024) (Akila, 2024).

1 The French Tertiary Decree covers service industry buildings such as those in IT & Telecommunications, Hospitality & Tourism, Retail & Wholesale Trade, Financial Services, Healthcare, Education, Transport & Logistics and Professional Services (APL Data Center, 2023) (Adeunis, 2019)

Outlook

The French data center market serves as a key hub for European and transatlantic data traffic, supported by robust infrastructure, rising cloud service demand, and a strong emphasis on sustainability and energy efficiency. This solid foundation is driving significant growth, with revenue projected to increase from $11.8 Bn in 2024 to $15.4 Bn by 2029, reflecting a 5.6% CAGR. Key growth drivers include the expanding adoption of digital technologies, increasing data storage requirements, and continued infrastructure investments (Statista, 2024).

Central to this expansion lies the Paris data center market, which serves as the primary hub for data center activity in France. The demand in Paris is particularly strong, fueled not only by the widespread adoption of AI and cloud computing but also by local needs from diverse sectors such as pharmaceuticals and digital media. As the demand for data centers continues to rise, so do the challenges. The surge in demand has led to increasing occupancy rates, with the vacancy rate in Paris dropping to just 4.0% in the second half of 2023, down from 5.3% in the first half of 2023. Demand, pricing and construction costs are rising due to record levels of data center capacity being delivered to meet the growing requirements of hyperscalers. Securing land and power for new developments is increasingly difficult (DataX Connect, 2024) (CBRE, 2024) (Cushman & Wakefield, 2024). These challenges have prompted many data center operators to pivot their focus toward secondary markets, such as Lille, Marseille, Lyon, and Nantes, where opportunities for growth remain viable.

The French data center market is set for a surge in investments, particularly from hyperscale providers, as France's emphasis on cloud sovereignty and data protection aligns with their strategic interests. This enables companies to strengthen their presence in the European market while ensuring compliance with local regulations. Further, these investments directly support France's National AI Strategy and align with the French Commission for Artificial Intelligence's recommendations to position France as a leader in AI development and application. Noteworthy examples include Microsoft and Amazon, which plan to invest €4.0 Bn ($4.3 Bn) and €1.2 Bn ($1.3 Bn), respectively, in building data center infrastructure in France (Data Centre Dynamics, 2024). These substantial investments underscore the country's growing importance as a hub for data center operations (Data Centre Dynamics, 2024).

Additionally, the French government's strong focus on sustainability is driving the development of green data centers. Major corporations are increasingly prioritising the construction of energy-efficient facilities that derive a significant portion of their power from renewable energy sources. This commitment to environmental responsibility is accelerating the evolution of the French data center market toward more sustainable and innovative solutions.

Overall, as the global data center market becomes more competitive, France stands at the crossroads of opportunity and innovation, uniquely positioned to lead the way in sustainable infrastructure and technological advancement.

NETHERLANDS

The Netherlands has emerged as a prominent player in the global data center market, offering a robust and thriving ecosystem for businesses seeking reliable and scalable infrastructure solutions. With its strategic location, a strong commitment to sustainability, advanced digital infrastructure, and favourable business climate, the Netherlands has become an essential market for global tech companies and enterprises looking to optimise and expand their IT operations (Datacenters.com, n.d.). Between 2021 and 2023, the market expanded from 1,489.0MW to 1,638.0MW, reflecting a CAGR of 4.9% (Dutch Data Center Association, 2024) (Dutch Data Center Association, 2023). As the leading hub, Amsterdam has the largest concentration of data centers in the country, with Rotterdam, Eindhoven, Limburg, and the northern regions following closely behind (Dutch Data Center Association, 2024).

The sector's rapid growth has significantly contributed to the Netherlands' GDP, providing job opportunities, enhancing technological innovation, and fostering economic resilience. According to the Ministry of Economic Affairs, the digital infrastructure industry contributes approximately €25.0 Bn ($26.9 Bn) to the national economy (Dutch Data Center Association, 2024). Additionally, the data center sector not only bolsters the broader digital economy but also aligns with the nation's goals for energy efficiency and sustainable growth.

GDP
(Current Prices, $ 2023)
1,155 Bn

Projected Average GDP Growth 2024-28
1.5%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
2.6%

Country Credit Rating
AAA

Renewable Energy Share
47%

Data Center Capacity (2023)
1,638MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

The Netherlands continues to solidify its position as a leading data center hub in Europe, driven by increasing demand for cloud services, AI and robust digital infrastructure. As of February 2024, the country ranked 4th in Europe for the number of data centers, reflecting its growing significance in the data center industry (Statista, 2024). Major cloud service providers like Microsoft, Google, AWS, and Oracle are delivering cloud on-ramp services through various facilities operated by Digital Realty and Equinix in the country (Research and Markets, 2024). Cloud on-ramps offer high-speed, low-latency connections to major cloud providers, essential for compliance-driven sectors like finance and healthcare. This connectivity advantage attracts global businesses, spurring data center investment (Datacenters.com, 2023) (Equinix, 2024). With over 90% of Dutch companies now using cloud technology, demand for data centers continues to rise to support this widespread integration (Research and Markets, 2024).

The overall IT capacity of the Dutch data center market has expanded significantly, fueled by major investments in AI infrastructure and the rise of edge computing, which enables data storage and processing closer to end-users. The strategic location of the Netherlands has been a key factor in this growth, with the total power capacity of Dutch data centers increasing by 5.7% year-on-year, rising from 1,550.0MW in 2022 to 1,638.0MW in 2023 (Dutch Data Center Association, 2024) (Dutch Data Center Association, 2023).

Colocation IT capacity grew by 9.5% year-on-year, surpassing hyperscale growth at 4.1%, while enterprise IT capacity declined by 1.5%. Colocation accounted for 52.7% of total power in 2023, up from 50.9% in 2022, largely driven by rising demand for AI-ready data centers and renewed interest in the wholesale sector as enterprise data center share continues to

Total and Segment Wise Data Center Capacity (MW)
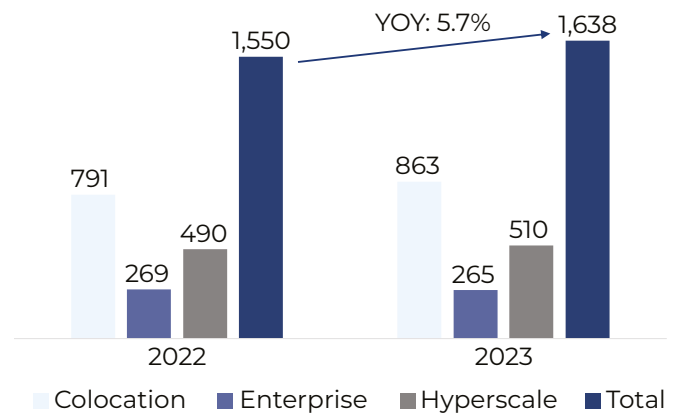
Source: (Dutch Data Center Association, 2023) (Dutch Data Center Association, 2024)

fall. Unlike colocation and hyperscale data centers, enterprise data centers have historically placed less emphasis on their environmental impact. However, the gas crisis has heightened awareness around this issue. Additionally, the growth of enterprise data centers is slowing as they prioritise consolidation over expansion, with organisations increasingly migrating workloads to the cloud (Dutch Data Center Association, 2024).

Amsterdam leads the Netherlands' data center market and ranks among Europe's largest IT hubs, expanding its capacity from 298.0MW in 2016 to 565.0MW by 2023, reflecting a CAGR of 9.6%. Following a temporary halt on new developments, the market regained momentum in 2023 with a 117.0MW addition, and another 11.0MW has been added until Q3 2024. Currently, 126.0MW is under development, with an additional 210.0MW in the planning phase (JLL, 2024). Most of these new facilities are concentrated in the Amsterdam metropolitan area (MRA), which accounts for 71.0% of the Netherlands' data center market. This robust growth is driven by escalating wholesale demand and the rising need for AI-ready data centers, spurred by the region's diverse business

models that often integrate a wide array of IT services, hosting, and private cloud solutions (Dutch Data Center Association, 2024) (Dutch Data Center Association, 2023) (Dutch Data Center Association, 2022).
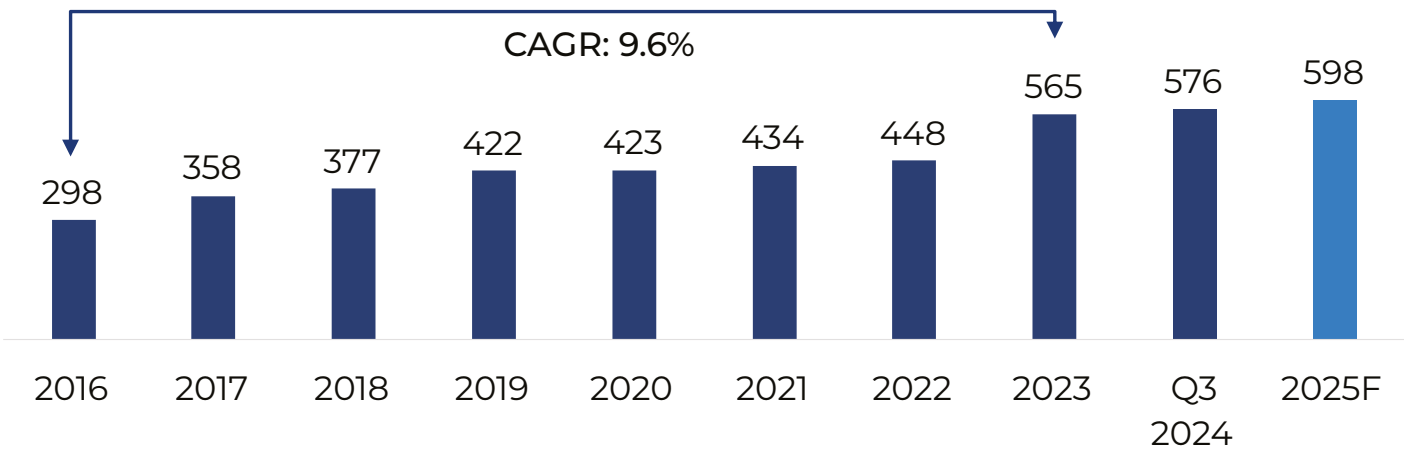
Hyperscale data center growth has slowed due to regulatory restrictions, with the Netherlands halting new developments until a formal policy is in place. As a result, hyperscalers have been compelled to adopt a more distributed network of data centers to maintain and improve service quality, particularly by reducing latency and meeting data sovereignty requirements. This shift has led them to favour colocation facilities over building their own, especially in regions where power and space are limited. Consequently, colocation services in the Netherlands are seeing significant growth. (CMS Legal, 2022) (Dutch Data Center Association, 2024).

Besides Amsterdam, the Haarlemmermeer district, part of the larger Amsterdam metropolitan area, is another vital sub-market in the Netherlands' data center industry.

Haarlemmermeer, which includes towns like Hoofddorp and Schiphol, has become a hotspot for data center developments due to its proximity to key infrastructure, excellent connectivity, and access to one of the world's largest internet exchanges, the Amsterdam Internet Exchange (AMS-IX).

The data center market in Amsterdam and Haarlemmermeer experienced slow growth in 2019 and 2020 due to a moratorium imposed by local municipalities in July 2019. This pause, prompted by concerns over the strain on local resources, especially the electricity grid, and environmental issues, halted new data center projects. The moratorium had a significant impact on the local market, causing a decline in international demand, particularly for wholesale data center space, which shifted to other European locations. However, after the moratorium was lifted in 2020, the market began to recover, with new projects allowed in designated areas under strict energy efficiency standards. This move was essential to sustain growth and maintain the Netherlands' position as a leading data center market in Europe (Data Centre Dynamics, 2024).

Amsterdam Total Market Size (MW)

CAGR: 9.6%

2016	2017	2018	2019	2020	2021	2022	2023	Q3 2024	2025F
298	358	377	422	423	434	448	565	576	598

Source: (JLL, 2024) (JLL, 2023)

Policy and Regulation

The Netherlands has implemented several policies and regulations related to data centers, focusing on sustainability, energy efficiency, and balanced spatial development. These policies are designed to promote environmental responsibility and sustainability in data centers, covering existing facilities and new constructions.

Regarding sustainability, the Dutch 'Energy Saving Obligation,' introduced in 2019, includes data centers under its scope. This regulation mandates that business locations consuming at least 50,000kWh of electricity or 25,000 cubic meters of natural gas annually implement energy-saving measures with a payback period of five years or less (Netherlands Enterprise Agency, 2023). Additionally, businesses must report the energy-saving measures they have implemented to a relevant authority every four years. The regulation outlines detailed measures, including three specific to data centers and six focused on server rooms (IEA, 2024). The three measures related to the data centers include – setting a higher cooling temperature for cooling servers, using a frequency controller to limit the capacity of the room coolers and applying free cooling to the cooling installation in the data center, thereby significantly reducing energy consumption (Government of Netherlands, 2023).

Additionally, in September 2023, the European Energy Efficiency Directive (EED) came into effect, promoting more sustainable practices for data center operations. The directive mandates that EU data centers with 500.0kW IT power or more, including colocation, hyperscale, and enterprise facilities, report metrics such as energy efficiency, renewable energy use, residual heat reuse, and water usage. As hyperscale facilities have a limited growth opportunity due to spatial restrictions, this directive may boost the Dutch colocation market, as companies could prefer colocation facilities over enterprise data centers, given that both are subject to the same regulations. Consequently, businesses may find it more practical to opt for modern colocation facilities rather than investing in setting up their own enterprise data centers (Dutch Data Center Association, 2024).

On the spatial front, in March 2019, a partnership of three national ministries, provincial and municipal governments, regional economic boards, and key stakeholders like the Dutch Data Center Association and energy grid operators developed the "Roadmap 2030 for the growth of data centers in the Netherlands". The roadmap outlined key initiatives, including permitting further colocation clustering in the Amsterdam region, expanding colocation data center construction in Greater Amsterdam, allowing additional hyperscale facilities in Middenmeer and Eemshaven (home to Google and Microsoft), and exploring opportunities in South Holland (Saltzman, 2023).

In January 2024, further regulatory clarity was introduced, providing more detailed guidelines for data center development and ensuring alignment with national sustainability and spatial planning goals. The Environment and Planning Act (Omgevingswet) was introduced to consolidate all regulations for spatial projects. This law includes a decree that prohibits the construction of hyperscale data centers (exceeding 10 hectares or 70.0MW) throughout the country, except in specific locations like Eemshaven in Het Hogeland and Agriport A7 in Hollands Kroon (Greenberg Traurig, 2024) (JLL, 2024). The goal is to align data center industry growth with environmental sustainability, ensuring the Netherlands remains competitive and appealing for data center investments while safeguarding its natural resources and communities.

Outlook

The Netherlands remains a key hub for data centers in Europe, housing one of the largest colocation hubs, two major hyperscale campuses, and several regional facilities serving SMEs. While historically benefiting from strong international connectivity and competitive electricity prices, the market now faces challenges such as ageing undersea cables, rising investments in other European regions, regulatory hurdles, and power grid congestion, particularly around Amsterdam. Additionally, less competitive wholesale electricity prices are impacting project economics and creating barriers to further expansion.

Despite these challenges, the country's data center market remains promising, requiring strategic adjustments to sustain its leadership in Europe. Driven by rising demand for colocation and connectivity services, the market is set to maintain its growth trajectory, with a projected 12.3% CAGR, doubling in value from $1.2 Bn in 2023 to $2.4 Bn by 2029 (Dutch Data Center Association, 2024) (Research and Markets, 2024) .

Consequently, colocation capacity in the Netherlands is projected to grow at a CAGR of 9.7% from 863.0MW in 2023 to 1,373.0MW in 2028, driven by the entry of several new players looking to set up wholesale data centers. The growth will be concentrated primarily in and around the Amsterdam metropolitan region, where 483.0MW of new data centers are planned. This development is expected to meet increasing customer demand over the next few years, underscoring the Netherlands' pre-eminent position as a major market in the global data center industry (Dutch Data Center Association, 2024).

Colocation Data Centers Forecasted Capacity (MW)
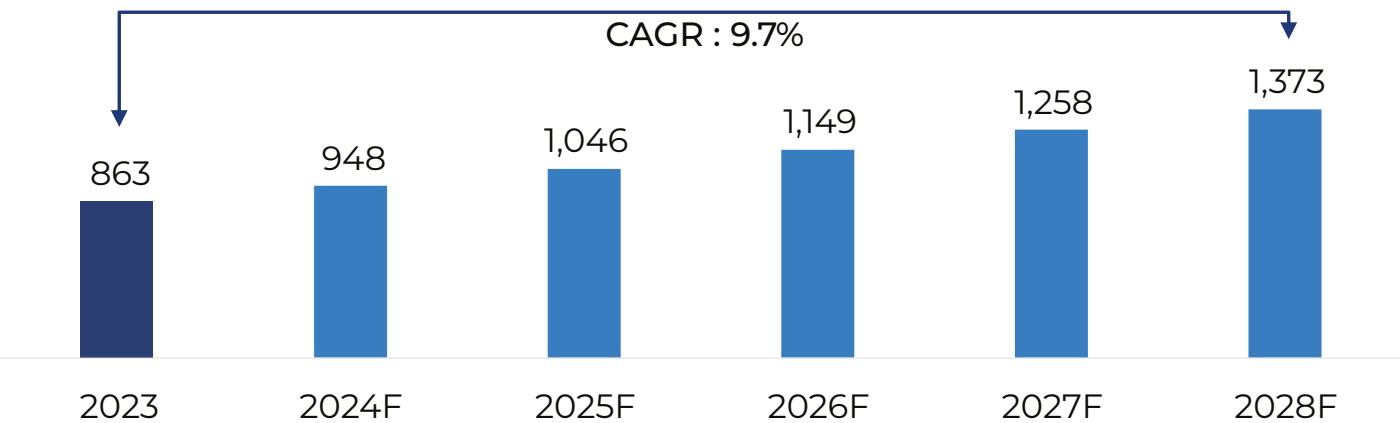
Source: (Dutch Data Center Association, 2024)

ITALY

Italy's data center market has been growing rapidly as operators look to make inroads into Southern Europe to streamline end-user experience by reducing latency. Alongside Madrid, Milan is emerging as a key hub for data center development in Southern Europe, offering an alternative to the traditional FLAP-D (Frankfurt, London, Amsterdam, Paris and Dublin) hotspots (Datacenters.com, n.d.). Its strategic location, strong network connectivity, and submarine cable links make it an attractive destination for data centers in Italy (Hines, 2022). Demonstrating this growth, European data center operator Data4 is investing €500.0 Mn in a new campus in Vittuone, Milan, which will house four data centers with a total capacity of up to 100.0MW (Data Centre Dynamics, 2024).

In 2024, Italy's data center market continued its upward trajectory, building on the positive trend of the previous year. New facility openings added 75.0MW of IT power, bringing the total capacity to 513.0MW—an increase of 17.0% compared to 2023. This growth is driven by both existing and new companies expanding capacity through new data centers planned for 2023-2025 (Data Center Observatory, School of Management at Milan Polytechnic, 2024). For example, Microsoft is launching its first cloud region in Italy with three data centers in Lombardy and investing €4.3 Bn to expand AI and cloud capacity in Northern Italy (Microsoft, 2023) (Microsoft, 2024).

GDP
(Current Prices, $ 2023)
2,302 Bn

Projected Average GDP Growth 2024-28
0.7%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
3.7%

Country Credit Rating
BBB

Renewable Energy Share
28%

Data Center Capacity (2024)
513MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

Reflecting a broader European shift away from saturated locations, Italy's data center market is seeing rising demand from investors and operators seeking expansion in less congested areas. Challenges in the traditional FLAP-D markets, such as limited power, constrained land supply, escalating costs, and a need for diversification, have driven growth in Italy. In 2023, 23 organisations, including 8 new entrants, announced plans to build 83 new facilities by 2025, potentially attracting up to €15.0 Bn ($16.1 Bn) in investment (Data Center Observatory, School of Management at Milan Polytechnic, 2024).

Milan, in particular, holds a strategic position for content distribution and reception in Europe, supported by its strong data transfer connectivity and submarine cable infrastructure (Colliers, 2024). The multiple cables and network routes in Milan ensure redundancy, enabling data to be rerouted in case of a path failure. This makes Milan a key gateway for data traffic to and from the continent, making it an ideal hub for data centers and cloud providers. It boasts around 500.0MW of data center capacity (built + under construction), with an additional pipeline of approximately 700.0MW, indicating considerable growth potential. Most of Milan's data center supply, both operational and planned, has traditionally been concentrated in the city's southern and western areas, near key internet backbones and the MIX (a major Italian IXP or Internet eXchange Point) (Colliers, 2024). However, data center expansions are shifting north, east, and southwest, signaling a wider distribution across the Milan area. This growth is driven by the demand for more space, improved power availability, and strategic positioning (Data Centre Dynamics, 2024) (STACK INFRASTRUCTURE, 2022).

Nonetheless, the data center market in Milan is not without its challenges. A stable power supply, in the face of escalating energy demand from data centers is a major obstacle. Focus on sustainability has led to increasing pressure on data center operators to adopt greener practices, by integrating renewable energy sources and managing excess heat. This has increased operational complexity and inflated operating costs, prompting investors to explore alternative locations.

Consequently, Rome is emerging as a secondary data center hub, with growth also occurring in Turin (Cloudscene, 2024). Rome hosts key government institutions, international organisations, and large enterprises, driving strong demand for data services. Additionally, Rome's inclusion in the 5G network rollout across major Italian cities is boosting the need for data computation and storage (GlobeNewswire, 2021). Turin, known for its industrial and tech innovation, has a strong tech ecosystem driven by automotive and aerospace industries, increasing the demand for advanced data solutions (WICCO, 2023). Beyond these major markets, smaller data centers are being built in other regions to cater to specific functional needs (Data Center Observatory, School of Management at Milan Polytechnic, 2024). Smaller data centers bring computing closer to end-users, reducing latency and enabling rapid data processing. They are essential for industries that demand low latency and offer a solution to the challenges of securing land and power for larger facilities (JLL, 2023).

Number of Data Centers by Key Cities

|	Milan	Rome	Turin	Padova	Arezzo	Autonomous Regions
Value	65	24	14	4	3	58
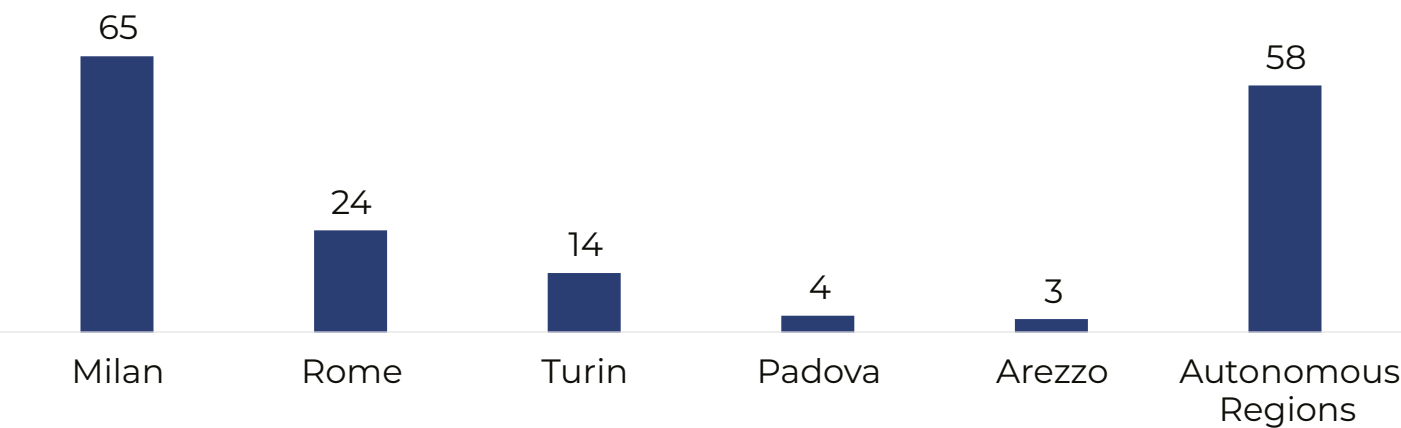
Source: (Cloudscene, 2024)

Italy's colocation market is expanding rapidly, playing a crucial role in the country's overall data center growth. The segment grew sharply in 2024, reaching an estimated €765.0 Mn ($818.6 Mn), up from €654.0 Mn ($702.6 Mn) in 2023 and €594.0 Mn ($638.1 Mn) in 2022, reflecting steady year-over-year growth. Within the colocation market, the wholesale segment holds the largest share at 58.0%, followed by the retail segment at 23.0%. While hyperscale accounts for just 19.0%, it is poised for significant expansion, driven by Cloud Providers' development plans, with projections suggesting the market could more than double by 2026 (Data Center Observatory, School of Management at Milan Polytechnic, 2024) (CBRE, 2024). Hyperscalers require large-scale infrastructure for cloud services, and colocation facilities offer the necessary space, power, and connectivity. Leveraging colocation helps reduce capital and operational costs, enables rapid expansion into new regions, and allows hyperscalers to focus on their core business. Colocation also offers scalability and flexibility, enabling capacity adjustments based on demand, making it ideal for efficient global expansion. The colocation market value could more than double by 2025, potentially reaching up to €1.4 Bn ($1.5 Bn). Conservative estimates place it between €1.0 Bn ($1.1 Bn) and €1.4 Bn ($1.5 Bn) by 2025, implying a CAGR of 24.0% to 46.0% (Data Center Observatory, School of Management at Milan Polytechnic, 2024).

Data Center Colocation Market Value (€ Mn)

€ 654 — YoY Growth: 17.0% → € 765

2023   2024
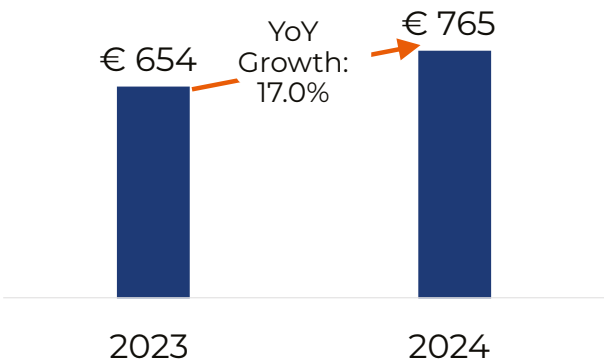
2024 Wholesale & Retail Colocation Market Value (€ Mn)

€ 444

€ 176

Wholesale Colocation   Retail Colocation
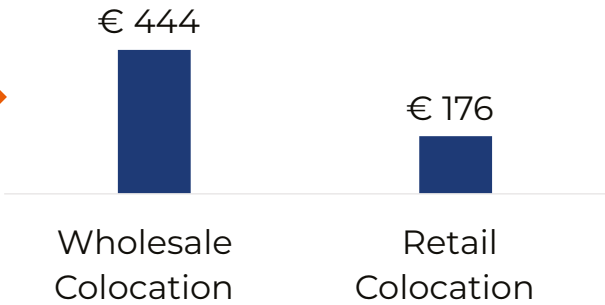
Source: (Data Center Observatory, School of Management at Milan Polytechnic, 2024)

The growth of Italy's data market is fueled by increasing demand for advanced technologies such as cloud computing, IoT, and edge computing, with the expansion of the public cloud market emerging as a key driver(Data Centre Magazine, 2024). The public cloud market grew notably at a CAGR of 25.0% from 2021 to 2023, reaching $9.5 Bn in 2023. According to Statista, it is expected to continue growing at a CAGR of 17.0% and reach roughly $25.2 Bn by 2029 (Statista, 2024). Major global data center companies like AWS, Oracle, Google, and Microsoft have set up cloud regions in Italy. In May 2024, Oracle partnered with Telecom Italia (TIM) to launch its second cloud region in Turin, housed in TIM's data center (Data Center Dynamics, 2024). Similarly, Google opened its second cloud region in Turin in 2023, adding to its existing facility in Milan, which was launched in 2022 (Data Center Dynamics, 2023).

Companies with Cloud Regions in Italy

Company	Location of Cloud Region	Year of Opening
Amazon Web Service	Milan	2020
Oracle	Milan	2021
Google	Milan	2022
Microsoft	Milan	2023
Google	Turin	2023
Oracle	Turin	Not Disclosed (Upcoming)

Source: (Data Center Dynamics, 2024)

Policy and Regulation

Currently, there are no specific policies or regulations governing data center construction in the country. However, the rapid growth of the sector and the concentration of data centers in specific areas are increasingly subjecting data center operations to social and environmental scrutiny (Italian Datacenter Association, 2024). Data centers are classified as general industrial buildings, resulting in lengthy assessments and delays in acquiring necessary permits. These bureaucratic delays create uncertainty around the timeline for investors to operationalise data centers and recover their investments, potentially hindering the sector's growth. Therefore, industry experts are advocating for data centers to be classified as "special" assets, allowing for a streamlined application process and faster project approvals (Data Center Observatory, School of Management at Milan Polytechnic, 2024).

Nonetheless, certain overarching policies and regulations, such as the EU's General Data Protection Regulation (GDPR), continue to shape the data center industry due to their stringent requirements of data protection and privacy. As in other countries, GDPR norms have set off a trend to store data locally in Italy (Data Center Dynamics, 2024) (Intelligent Data Centres, 2024) (Data Center Observatory, School of Management at Milan Polytechnic, 2024). Additionally, Italy has been a key player in Europe for cloud migration and digital transformation, driven by national initiatives like the "Triennial Plan for IT in Public Administration," which promotes digitalisation in public sectors, and the "National Recovery and Resilience Plan" (PNRR), which focuses on post-pandemic digital growth. The "Cloud Italia Strategy" further supports this by providing guidelines for public administration cloud migration, enhancing the relevance of cloud services and fueling the expansion of the data center market (Data Center Dynamics, 2024) (Intelligent Data Centres, 2024) (Data Center Observatory, School of Management at Milan Polytechnic, 2024).

At the same time, Italy is promoting green certifications like LEED (Leadership in Energy and Environmental Design) and ISO 50001 (Energy Management) to encourage sustainable practices and efficient energy management in data centers. However, these certifications remain voluntary without mandatory policy targets, limiting their overall enforceability and impact on the industry's environmental standards (Italian Datacenter Association, n.d.).

Outlook

Italy's data center market is set for rapid growth, drawing both established companies and new entrants looking to build multiple facilities. Due to land and power shortages, as well as regulatory issues in traditional FLAP-D markets, Italy is emerging as an attractive alternative, particularly in Southern Europe. This appeal is further enhanced by the development of new cloud regions and the arrival of subsea cables. The market is expected to see significant capacity growth, increasing from 550.0MW in 2025 to 1,390MW in 2030, representing an annual growth rate of 20.2%. In terms of revenue, the Italian data center market is projected to generate $7.4 Bn in 2025, rising to $9.1 Bn by 2029, with a CAGR of 5.3%. Network infrastructure is anticipated to remain the largest segment, with an estimated market value of $5.3 Bn in 2025 (Statista, 2024) (Mordor Intelligence, n.d.).

Milan is set to capture the bulk of this growth, with international property consultancy JLL projecting a 51.0% rise in data center capacity from 2023 to 2024 (JLL, 2024). As of December 2024, Italy hosted nearly 150 data centers, with Milan as the primary hub, housing 65 facilities. As of March 2024, the city had 14 operational data centers, 8 under construction, and 10 secured for potential development (Statista, 2024)(Colliers, 2024).

The Italian data center market currently favours the development of small (<2.0MW) and medium-sized (2.0-10.0MW) facilities. These data centers are popular due to their cost efficiency, flexibility, and improved latency and data processing, which appeal particularly to local businesses and startups for their lower capital and operational costs. However, in the coming years, as the market matures, larger facilities (>10.0MW) are expected to gain momentum as operators seek greater operational efficiency and economies of scale (Data Center Observatory, School of Management at Milan Polytechnic, 2024).

Despite a promising outlook, the Italian data center market faces challenges, including the need for clearer regulations on sustainability and environmental impact and a more streamlined permitting process for data center projects. The absence of consistent national policies creates uncertainties, potentially delaying approvals and construction. Additionally, competition from other emerging European markets could hinder the growth prospects of the Italian data center industry. However, certain inherent advantages, such as favourable geographical positioning, well-developed digital infrastructure, and a concerted push towards digitalisation, are likely to offset the challenges and sustain growth in the coming years.
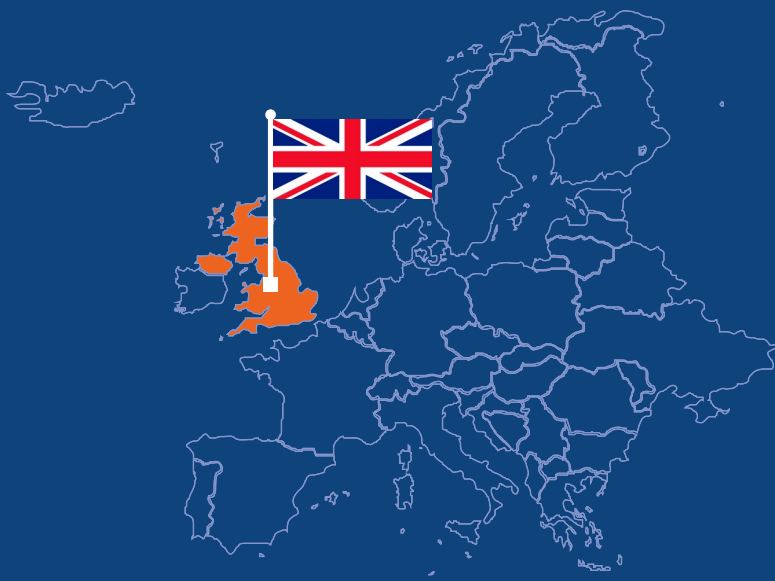
Data Center Revenue by Segment ($ Bn)
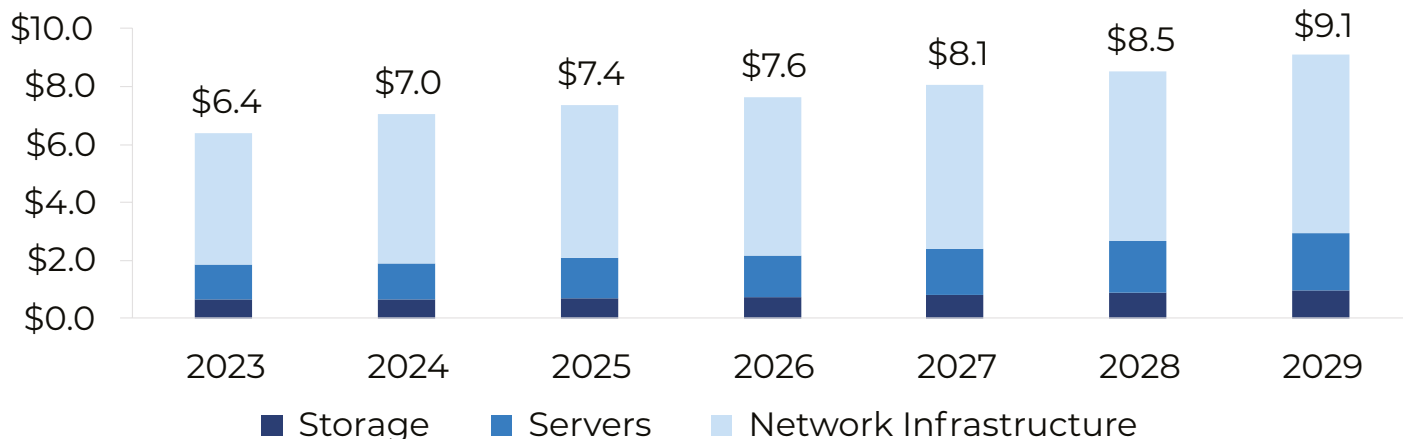
Source: (Statista, 2024)

UK

The UK is a key hub for data center infrastructure, ranking second in Europe with 514 data centers as of March 2024, just behind Germany. Globally, it is the third-largest data center market, driven by rapid technological advancements and a surge in cloud computing, heightened data storage requirements, and enhanced processing capabilities (Statista, 2024). As of 2024, the UK's total data center capacity is estimated at 2.2GW, with London contributing approximately 1.1GW to the market supply (AWS, 2024) (Spain DC, 2025) (Cushman & Wakefield, 2025). Besides the existing installed capacity, London has an additional 265.0MW of capacity under construction and a further planned capacity of 1,260.0MW (Cushman & Wakefield, 2025).

Key geographical hubs within the UK, including London, Manchester, and Slough, serve as vital nodes in the data center ecosystem. Among these, London holds a particularly significant position on account of being a global financial center, benefitting from exceptional connectivity, skilled manpower and a vibrant business ecosystem, making it an attractive location for data center investments (DC Byte, 2023).

GDP
(Current Prices, $ 2023)
3,382 Bn

Projected Average GDP Growth 2024-28
1.4%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
4.2%

Country Credit Rating
AA

Renewable Energy Share
45%

Data Center Capacity (2024)
2,190MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

The UK has long been favoured for data center investments, attributable to its robust economy, advanced connectivity infrastructure, and strategic geographic location. Investment in the UK data center market has reached unprecedented levels, with numerous operators expanding their footprints to cater to a diverse clientele across the financial services sector, healthcare providers, technology and cloud services providers, media and content providers, retail and e-commerce, and the public sector. The UK accounts for approximately 20.0% of total data center investments within the Western European region. As of October 2024, the UK secured a new investment of £6.3 Bn ($8.2 Bn) from US companies, bringing the total investment in UK data centers to over £25 Bn ($32 Bn) since the current government took office in July 2024 (PR Newswire , 2024) (Department for Science, 2024).

The UK's data center sector is seeing notable growth, largely fueled by significant investments from colocation data center operators, including prominent entities such as Equinix, VIRTUS Data Centers, Digital Realty, and Ark Data Centers (PR Newswire , 2024) (Data Centre Magazine, 2024) (STT GDC, 2024) (Capacity Media, 2024) (Data Centre Dynamics, 2024). As of March 2023, the colocation market is predominantly characterised by wholesale-focused facilities and operators, which represent 63.0% of the total market. Conversely, retail colocation constitutes the remaining 37.0%. Within the wholesale segment, single-occupier tenants (hyperscalers), comprise 18.0%, while multi-tenant arrangements account for 45.0%. Notably, the retail segment is also witnessing expansion, predominantly driven by new developments occurring in areas beyond London and the M25 corridor[1] (Colocation Exchange, 2023).

The UK is more reliant on its capital city than many other countries. London, as one of Europe's most established data center hubs, holds historical importance in the industry's growth and development (DC Byte, 2024) (Kao Data, 2024). However, the available capacity in London has diminished significantly in the second half of 2024, with colocation vacancy rates plummeting to 5.7% from 9.0% in the first half of 2024 as providers struggle to meet soaring demand (Cushman & Wakefield, 2024) (Cushman & Wakefield, 2025). Despite rising rents, major technology firms are rapidly securing data center space in London, with take-up capacity reaching 42.0MW in the first quarter of 2024, a marked increase from 17.0MW during the same period in the previous year (CBRE, 2024).

Challenges persist for providers aiming to build new data centers in London, particularly due to lack of suitable land and adequate power supply. This issue is most acute in the western corridor of the city, where land acquisition costs have escalated, complicating project viability. As a result, many data center operators are now shifting their focus to relatively untapped locations beyond London to avoid these constraints (CBRE, 2024) (Kao Data, 2024).

Greater Manchester has emerged as a prominent alternative, with a rapidly growing digital economy. The region offers a strong industrial base, research and development presence, and excellent connectivity. A noteworthy development underscoring the region's attractiveness for investment is the recent approval obtained by Kao Data in March 2024 for a new 40.0MW data center at Kenwood Point in Stockport. This project represents a £350.0 Mn ($438.2 Mn) investment and is set to be the largest and most advanced facility in North England (Kao Data, 2024) (Kao Data, 2024).

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1 The M25 or London Orbital Motorway is a major road encircling most of Greater London. It's a key transportation route that connects various regions and cities in the southeast of England.

Beyond Greater Manchester, other regions are also being considered by data center operators. Noteworthy developments include:

- In January 2024, Google announced a $1.0 Bn investment to build a data center in Waltham Cross, Hertfordshire (East England), approximately 15.0 miles north of central London (Reuters, 2024).

- Similarly, in May 2024, Ark Data Centers received approval for a new facility near Corsham in Wiltshire (South West England) (Wiltshire Times, 2024) (Data Centre Dynamics, 2024).

- Additionally, a technology hub with three data centers is set to be developed at Thorney Business Park, near Iver (South East England) (Bucks Free Press, 2024).

- Furthermore, DC01UK has proposed a significant project in Hertsmere, Hertfordshire (East England), which is anticipated to be one of the UK's largest data center campuses. With a reserved power capacity of 400.0MV-amperes from the National Grid, the facility is expected to be operational by 2029. The construction of the data center is estimated to be worth approximately £3.8 Bn ($4.9 Bn) (Yahoo Finance, 2024).

In alignment with Hertsmere Borough Council's net-zero strategy, the construction of DC01UK will focus on delivering low-carbon buildings and on-site renewable power generation (Yahoo Finance, 2024). This reflects a broader trend within the industry, as operators increasingly prioritise adopting more sustainable practices, including integrating renewable energy sources and implementing energy-efficient technologies. A key development in this regard is repurposing waste heat generated during operational processes. Traditionally focused on cooling technologies for energy efficiency, data centers are now exploring ways to reuse heat, offering the potential for further decarbonisation and supporting residential heating solutions. For instance, in August 2024, North Lincolnshire's planning committee approved a £3.0 Bn ($3.8 Bn) data center project in South Killingholme, led by Humber Tech Park Ltd. The facility,

Share of London in UK Data Center IT Power Capacity

50.2%

2.2GW
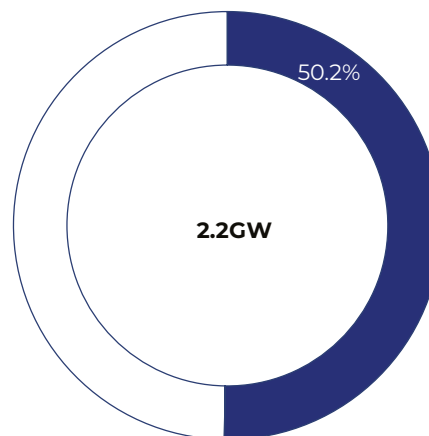
Source: AWS, Cushman & Wakefield, Spain DC

spanning around three million square feet (278,000 square meters) with 386.0MW of power across three buildings, incorporates green initiatives like a district heating unit to capture waste heat. This heat will be used in a local heating network and a 300,000-square-foot (27,000 square meters) greenhouse for tomato cultivation, contributing to carbon reduction and regional sustainability efforts (MDE, 2024).

The rollout of 5G services in the UK has been a key growth enabler for the data center industry. As of December 2024, around 90.0% to 95.0% of the UK premises can access 5G coverage outdoors from at least one mobile network operator (Ofcom UK, 2024). Although the deployment of standalone 5G networks is still at a nascent stage, the UK government aims for all populated areas to have full standalone 5G coverage by 2030 (House of Commons, the UK, 2024). This surge in connectivity creates a pressing need for faster data processing and reduced latency. The low-latency capabilities of 5G necessitate data centers to adopt edge computing, where data is processed closer to end-users, enhancing real-time applications such as IoT and augmented reality. Consequently, this shift has resulted in the deployment of smaller, strategically located edge data centers, complementing larger facilities.

Policy and Regulation

The rapid expansion of the UK's data center industry has drawn increased scrutiny over its carbon footprint, leading policymakers to enforce stricter regulations on energy consumption and efficiency.

The UK government introduced Climate Change Agreements (CCAs) to promote energy efficiency in energy-intensive industries. Running since 2001, the current phase began on April 1, 2013, and will continue until March 31, 2025. This voluntary scheme offers discounts on the Climate Change Levy, a tax on electricity and fuel, in exchange for energy savings through targeted PUE (Power Usage Effectiveness) reductions. However, penalties apply if targets aren't met, requiring companies to purchase carbon offsets (techUK, 2023) (Techerati, 2023) (DESNZ, 2023) (techUK, 2023) (techUK, 2023).

In London, the Greater London Authority's (GLA) London Plan supports these initiatives by mandating that all major new developments, including data centers, achieve a minimum 35% on-site carbon reduction. Even after meeting this target, any residual emission must be offset through a financial contribution to the GLA's Carbon Offsetting Fund, essentially acting as a tax to finance carbon reduction efforts elsewhere (Data Center Dynamics, 2023) (GLA, 2023). This regulation effectively turns sustainability into a fiscal responsibility.

In the context of these regulatory frameworks and a wider endeavor to promote sustainability and energy efficiency, the UK government has endorsed the initiative to repurpose waste heat generated by data centers by unveiling a funding allocation of £65.0 Mn ($81.4 Mn) for five green heating projects, which are intended to channel waste heat from data centers to residential dwellings (GOV.UK, 2023).

In the UK, commercial property owners must comply with Minimum Energy Efficiency Standards (MEES) to enhance energy efficiency and reduce carbon emissions. A key aspect of MEES is the Energy Performance Certificate (EPC), which rates buildings from A (most efficient) to G (least efficient). Since April 1, 2018, landlords can only grant or renew leases for non-domestic properties with a minimum EPC rating of E, unless exempt. Data centers, like other commercial properties, are subject to these standards, with fines of up to £150,000 ($187,802) per building for non-compliance. Operators may need to adjust operations and infrastructure to meet these requirements. Future EPC reforms propose raising the minimum rating to C by April 2027 and B by 2030 for rental properties (Pinsent Masons, 2023) (Techerati, 2023) (Lexology, 2024).

Alongside regulations focused on energy efficiency and sustainability, post-Brexit, the UK government assimilated the fundamental tenets of the General Data Protection Regulation (GDPR) into its domestic legislative framework, thereby establishing the UK GDPR, which came into force on January 1, 2021. This regulation delineates the essential principles, rights, and obligations pertaining to the processing of personal data within the UK. It is paramount for ensuring data center security, as organizations must adhere to their stipulations to avert significant financial penalties for regulatory infractions. A growing number of enterprises are choosing to retain data within the UK jurisdiction to mitigate compliance risks, driving demand for local data center services, which benefit domestic providers. This amplified necessity for data localization has intensified investor interest in the establishment of new data centers within the nation (Knowsley Council, 2024) (OneTrust, 2024) (Grow, 2024) (Secure Privacy, 2024).

Outlook

The UK data center market was valued at $17.2 Bn in 2024 and is projected to continue expanding at an annual rate of 6.7%, potentially reaching $23.8 Bn by 2029 (Statista, 2024). This growth is largely fueled by the rapid integration of AI technologies across various industries (PR Newswire , 2024). The country has already established itself as a global leader, ranking fourth in the Global Innovation Index 2023 out of 211 countries. Projections suggest that by 2040, an estimated one million businesses throughout the UK will have AI-driven solutions integrated into their operations (PR Newswire , 2024).

Leading technology companies are making substantial investments to leverage this growing momentum. For instance, In November 2023, Microsoft announced a £2.5 Bn ($3.1 Bn) investment over the next three years to expand its next-generation AI data center infrastructure in the UK (GOV.UK, 2023). Meanwhile, AI cloud provider CoreWeave made significant investments of £1.0 Bn ($1.3 Bn) to establish two data centers in the UK in 2024, with plans to invest £750.0 Mn ($939.0 Mn) for further expansion in 2025, aiming to provide high-performance computing solutions tailored for AI enterprises (Data Center Dynamics, 2025).

Recognising the crucial role of data centers in the digital economy, the UK government officially designated them as Critical National Infrastructure (CNI) on 12 September 2024. This designation enables government support in the event of critical incidents, helping to minimize economic disruptions. It also signals strong government backing for data centers, boosting investor confidence and encouraging increased investment in the sector (GOV.UK, 2024) (TechTarget, 2024).

Data center builders, however, are calling on the government to streamline and enhance the planning process, seeking clearer guidance from local authorities, many of whom are not well-versed in the technical aspects of data center construction. Improved guidance would facilitate the development of new sites and support the growing demand for commercial data centers (Sifted, 2023) (Data Centre Dynamics, 2024).

Overall, the UK data center market is poised for continued growth, supported by significant investments and increasing demand for data processing capabilities, especially with the rise of 5G and edge computing. Sustainability will play a critical role, with operators focusing on renewable energy, waste heat repurposing, and compliance with energy efficiency standards such as the UK's Climate Change Agreements. The focus on carbon reduction regulations, coupled with the growing demand for data localisation post-Brexit, will continue to drive investment and expansion in the UK's data center sector.

DENMARK
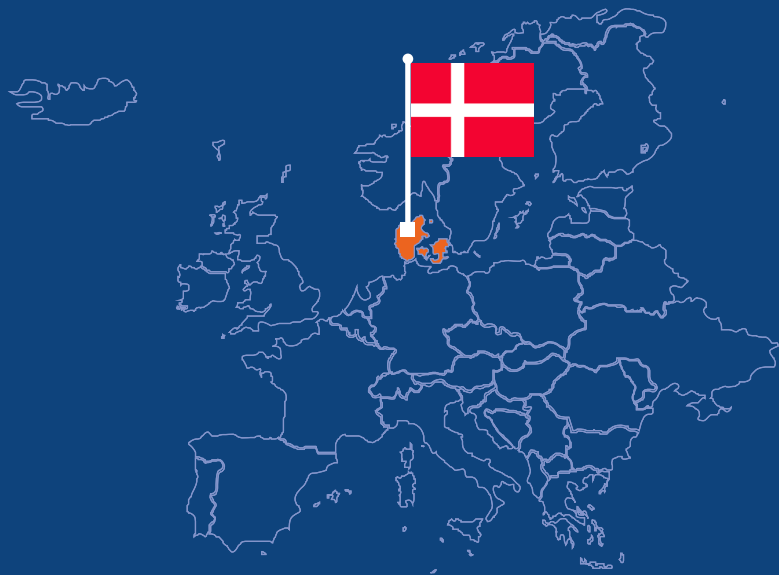
Denmark is an emerging data center market in Europe with a total installed capacity of 280.0MW, and an additional 108.0MW under construction as of Q1 2024 (Danish Data Center Industry, 2024). The country is benefiting from power and land constraints as well as escalating costs in the FLAP-D markets (Frankfurt, London, Amsterdam, Paris, and Dublin), which is pushing investors to consider alternative locations offering headroom for growth.

Hyperscale facilities accounted for 78.6% of the total installed capacity, mainly due to the self-built campuses constructed by hyperscalers such as atNorth, Microsoft and Prime Data Centers. Advancements in AI and digital infrastructure have driven demand for high-performance computing, which has, in turn, propelled the development of hyperscale data centers.

Denmark provides an attractive setting for data center development due to its abundant renewable energy resources, strong data protection laws, and commitment to sustainability. Although it faces competition from other Nordic countries, Denmark's strategic benefits, such as government incentives, supportive regulations, and a favourable climate, make it a promising location for hyperscale operators and colocation providers looking to expand their presence in Europe.

GDP
(Current Prices, $ 2023)
407 Bn

Projected Average GDP Growth 2024-28
1.6%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
2.3%

Country Credit Rating
AAA

Renewable Energy Share
88%

Data Center Capacity
(Q1 2024)
280MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

Denmark's low population density of 141.0 people per km², ranked 92nd globally in 2024, enables it to provide large-scale, low-risk sites for data centers. Furthermore, the country's stable climate—politically, economically, and meteorologically—positions it as one of the safest places globally, offering ideal conditions for low-energy cooling (Database Earth, 2024) (Danish Data Center Industry, 2024) (Ministry of Foreign Affairs of Denmark, 2024). The current capacity, while still relatively smaller than other FLAP-D markets—representing just 14.3% of Germany's total capacity—is expected to increase due to the market's potential for growth (Danish Data Center Industry, 2024) (German Datacenter Association e.V., 2024).

Hyperscale data centers represent a substantially larger portion of total capacity compared to colocation data centers. While colocation facilities are expanding, the hyperscale sector is viewed as more established and stable, attracting substantial investments and larger projects. As a result, major tech companies like Google, Apple, and Facebook are investing heavily in Denmark to build hyperscale data centers. Additionally, Denmark offers optimal conditions for energy efficiency, with 85% free cooling available year-round, significantly reducing operational costs (Businesswire, 2021). This sustainability focus aligns with hyperscalers' goals, as they increasingly prioritize green energy solutions and carbon neutrality in their operations.

Due to ongoing land and power availability challenges in the primary FLAP-D markets, companies are exploring other countries, such as Denmark, to expand and diversify their operations cost-effectively. However, hyperscale data center deployment in Denmark differs from the FLAP-D markets, with facilities often located outside the main city of Copenhagen. This approach is driven by the availability

Share of Hyperscale and Colocation in Total Denmark Data Center IT Power Capacity (As of Q1 2024)

- Hyperscale
- Colocation

21.4%

78.6%
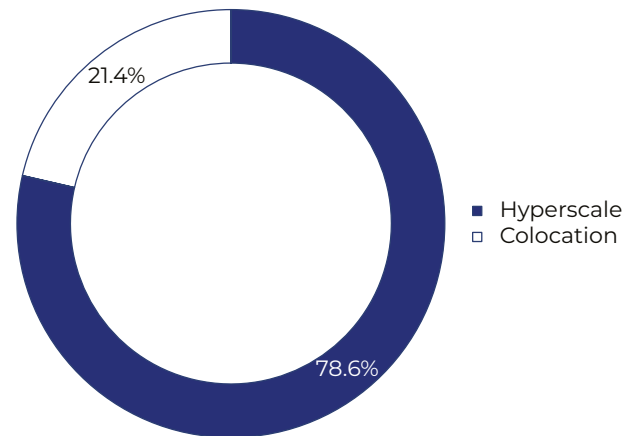
Source: Data Center Association

of sizeable land parcels and a stable power supply, conditions that are expected to remain favourable. As a result, regions with ample land and reliable power are likely to continue attracting investment and experiencing capacity growth (DC Byte and Datacenter Forum, 2023) (Prime Data Centers, 2024).

Denmark's appeal as a prime location for data center development is driven by its low-latency networks, a highly reliable power grid, and a strong commitment to clean energy—more than 84% of its electricity generation came from low-carbon sources in 2024 (Low Carbon Power, 2025) (Ministry of Foreign Affairs of Denmark, 2024) (Danish Data Center Industry, 2024). Additionally, Denmark boasts excellent connectivity to key regions, including the USA, the UK, Ireland, and central Europe, through its high-speed, low-latency network. With less than 50% of the country's total fibre grid capacity currently in use, significant opportunities remain for data center expansion (Danish Data Center Industry, 2024) (Ministry of Foreign Affairs of Denmark, 2024).

Denmark's rich green energy resources make it an appealing market for data centers and developers with substantial power requirements. In 2024, solar and wind energy contributed 70.0% of the country's electricity supply(Low Carbon Power, 2025) (Eurostat, 2024). This strong emphasis on renewable energy is particularly attractive to companies committed to sustainability goals (Verne Global, 2024).

Denmark's cold climate offers natural advantages to data center operators, as it minimises cooling requirements, thereby reducing operating costs. Denmark has been at the forefront of innovation in cooling technologies. Danfoss is collaborating with Hewlett Packard Enterprise to build energy-efficient data centers that leverage the local climate to reduce cooling energy consumption by more than 50.0% (Danfoss, 2019). In 2023, a data center in Denmark became the first in Europe to implement submerged cooling or liquid immersion cooling, significantly reducing power consumption for cooling by up to 90.0%. This method is up to 1,000 times more efficient than traditional air-cooling systems and is considered a leading solution for the future of data center cooling (Araner, 2024).

The country's stable power grid is another key growth driver for the data center market, ensuring a secure and uninterrupted power supply essential for data center operations. It has one of the most developed grids globally with 99.99% of uptime and 80.0% of power lines being underground. The country can provide low-risk sites with N-1 contingency and 132/150kV power supply which reinforces the stability of the grid for smooth operations of the data centers (Ministry of Foreign Affairs of Denmark, 2024). High-capacity DC interconnections link Denmark with major European countries like the Netherlands, Norway, Sweden, the UK, and Germany, allowing it to import energy from these countries to compensate for any shortfall in its renewable energy production (DC Byte and Datacenter Forum, 2023).

Denmark hosts several major global companies, such as A.P. Møller-Maersk, Danske Bank, Novo Nordisk, Carlsberg Group, and Vestas, along with significant operations from many Fortune 500 companies. This concentration of corporate activity fuels the growth of data centers to accommodate substantial data processing needs. The hyperscale market in Denmark is led by global cloud service providers like Apple, Microsoft, and Google, while the colocation market features investments from international firms like Digital Realty and Prime Data Centers, Nordic companies such as Bulk Data Centers and atNorth, and European providers like Penta Infra, all aiming to meet the data requirements of these large enterprises (DC Byte and Datacenter Forum, 2023) (Prime Data Centers, 2024).

Policy and Regulation

Danish data centers are governed by GDPR and the Danish Data Protection Act, requiring companies to safeguard EU residents' data and keep it within national borders. These regulations drive demand for data localisation, enhancing the appeal of Danish data centers and encouraging investment in advanced security measures like encryption and access controls. The regulatory environment is also boosting the adoption of cloud services, leading to new data center projects and expanded capacity (DLA Piper, 2024).

After the adoption of the EU-wide revised Energy Efficiency Directive (EED), which set a binding target of reducing overall energy consumption within the region and a scheme to rate the data centers based on certain sustainability criteria, it is expected that innovations and investments in green data center technologies are going to see more traction across the region (EUR-Lex, 2023). Data centers with capacities of 1.0MW or more must incorporate plans to connect to district heating systems before initiating any project. These systems, which provide heat to approximately 64.0% of Danish homes, reinforce the focus on sustainability by enabling data centers to contribute to energy-efficient heating solutions, further aligning with environmental regulations. This may pose challenges for smaller wholesale operators in Denmark, while domestic retail operators are mostly unaffected due to their lower power demands (DC Byte and Datacenter Forum, 2023) (Danish Data Center Industry, 2024).

The Danish Data Center Industry (DDI) and other Nordic data center associations have agreed to comply with the EU's Energy Efficiency Directive (EED) while proposing modifications to the reporting criteria. They believe colocation providers and enterprise operators without access to data traffic information should be exempt from reporting it, as this could lead to suboptimal ratings and undermine the purpose of the rating system (Danish Data Center Industry, 2024).

Furthermore, the association also suggests lowering the eligibility threshold for energy efficiency reporting from 500.0kW to 100.0kW for data centers in Denmark. Lowering this threshold would mean that a greater number of smaller data centers, including colocation facilities and enterprise operators, would be subject to the same reporting requirements, thereby enhancing transparency in energy usage across the sector (Danish Data Center Industry, 2024). This aligns with Denmark's aim to tighten sustainability regulations to achieve 55.0% renewable energy consumption by 2030 and carbon neutrality by 2050 (IEA, 2023) (Directorate-General for Climate Action, European Commission, 2023).

Outlook

The Danish data center market is on the cusp of a significant transformation, with revenue expected to soar from $2.2 Bn in 2024 to $3.1 Bn by 2029, marking an impressive compound annual growth rate (CAGR) of 6.6%. This growth narrative is primarily fueled by the increasing demand for hyperscale facilities, which have emerged as the market leaders. Denmark's favourable business climate, reliable power infrastructure, and exceptional connectivity create an ideal backdrop for these expansive data centers to thrive. As highlighted by Arizton Advisory & Intelligence, the country is poised to add approximately 418.0MW of power capacity between 2024 and 2029, a change driven by the rise of the digital economy, escalating cloud service adoption, and advancements in artificial intelligence and machine learning. With extensive land availability and a commitment to green energy, Denmark is set to attract ongoing investments from hyperscale operators, paving the way for a dynamic and sustainable future in the data center landscape (Statista, 2024) (Danish Data Center Industry, 2024) (Danish Data Center Industry, 2024) (Arizton Advisory & intelligence, 2024).

The Danish data center market is likely to witness sustained investments via both the greenfield and the inorganic routes. Nordic colocation provider atNorth, which entered the Danish market in 2023, is investing in two data centers. The first, a 30.0MW facility in Copenhagen, is set to launch in Q2 2025. The second, a 250.0MW data center in Ølgod, is expected to be completed by 2026 (Data Center Dynamics, 2024) (atNorth, 2023). European data center firm Penta Infra has announced its plans to build a 20.0MW data center in Copenhagen,

Denmark, its second facility in the country (Data Center Dynamics, 2024). Additionally, US-based hyperscalers are likely to invest in expanding existing campuses in Denmark, as it may be more cost-effective and convenient than building new facilities, although the greenfield option cannot be entirely ruled out (DC Byte and Datacenter Forum, 2023). US firm Prime Data Centers entered the European market in 2023 by announcing plans for a 124.0MW data center campus in Denmark, featuring three hyperscale facilities designed for Fortune 500 companies and international cloud providers (Prime Data Centers, 2023) (Data Center Dynamics, 2023). Prevailing market dynamics might also favour M&A activity in the sector, as evident from CapMan Infra's acquisition of Fuzion, a Danish colocation company serving SMEs with four data centers (Arizton Advisory & intelligence, 2024) (Data Center Dynamics, 2023) (CapMan Infra, 2023).

Data Center Market by Revenue
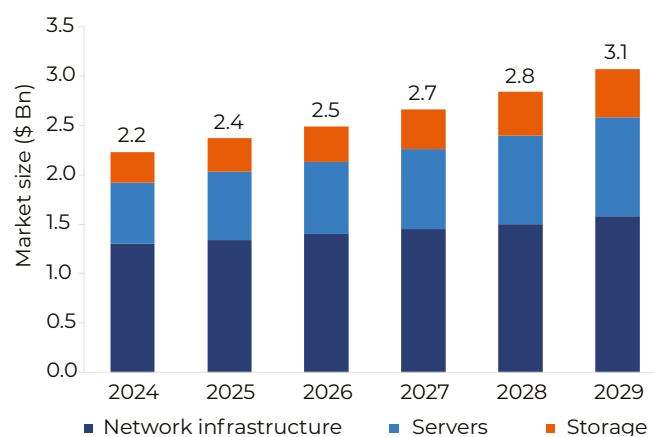
Source: Statista

The growth of Denmark's data center market will hinge on how well it addresses current challenges. To distinguish itself from other Nordic markets with similar advantages—like ample land, cool climates, and renewable energy—Denmark has enhanced its competitiveness through incentives, tax benefits, streamlined regulations, and expedited project approvals (Verne Global, 2024). For example, the Danish Government's Green Tax Reform and investment in green R&D as part of the Recovery and Resilience Plan represent a significant commitment to sustainability. The $250.0 Mn investment aims to support environmentally friendly initiatives, particularly in the construction of data centers (Data Center Forum, 2023). The electricity tax systems at the company level across the Nordic countries vary significantly, reflecting each country's economic strategies, resource availability, and policy priorities. Norwegian hydropower is subject to the highest tax levels in the Nordic region, while Denmark has the highest consumption-based taxes. In general, the electricity tax is very high in Denmark, which is part of its broader strategy to promote renewable energy and reduce carbon emissions (Nordic Tax Group, 2023). Meeting the requirements of the EU Energy Efficiency Directive (EED) also compels developers to improve their planning, design, and operational practices. Encouraging the use of district heating systems and fostering partnerships between local authorities and data center operators, such as Microsoft's initiative to use excess heat from its data center to heat 6,000 homes, could support long-term sustainability goals and create differentiation from the competition (IEA, 2023) (Directorate-General for Climate Action, European Commission, 2023) (Danish Data Center Industry, 2024) (Data Center Dynamics, 2024).

Overall, Denmark has several advantages positioning it as a preferred alternative investment destination to the FLAP-D markets in Europe. However, it will face competition in the short term from neighbouring Nordic markets for similar investments. Nonetheless, favourable market fundamentals coupled with a supportive policy environment will likely sustain continued growth.

USA

The US leads the global data center market, driven by its strong economy, the presence of top technology companies, and increasing demand for digital transformation across multiple industries (Mordor Intelligence, 2025) (Statista, 2024).

As of 2024, the US data center market is estimated to reach a total IT capacity of 21.0GW, representing approximately 35.0% of the global market (Utility Drive, 2024) (FERC, 2024) (Mordor Intelligence, 2024). Emerging technologies like edge computing, coupled with significant investments in digital infrastructure, are the main forces behind rising demand. Moreover, the growing adoption of cloud services for data storage and management is increasing the need for larger data center capacity (Mordor Intelligence, 2025) (Statista, 2024) (Mordor Intelligence, 2025).

Northern Virginia has emerged as the leading data center market in the US, accounting for 23.4% of the country's total installed capacity. The region's prominence is driven by the increasing demand for large-scale self-build facilities from hyperscalers and colocation providers (JLL, 2024) (Cushman & Wakefield, 2024).

GDP
(Current Prices, $ 2023)
27,721 Bn

Projected Average GDP Growth 2024-28
2.2%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
4.3%

Country Credit Rating
AA+

Renewable Energy Share
16%

Data Center Capacity (2024)
21,000MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

The shift from traditional enterprise models to cloud-based services is driving capacity growth in the US data center market. As cloud and hyperscale providers dominate, enterprises are exploring distributed cloud environments or outsourcing their data center needs. The growing adoption of cloud services is prompting businesses to reassess their options due to increased competition for power, limited colocation space, latency issues, rising costs, and security concerns. This is driving companies to seek more flexible solutions (JLL, 2024).

The growing demand for generative AI, which requires significant power, is also fuelling the US data center market. With ground-up construction unable to keep pace with this demand, existing data centers are being expanded. Enterprises struggling with on-premises AI applications are turning to colocation providers, who are upgrading infrastructure, while hyperscalers are building AI-optimized facilities. This trend underscores the link between AI advancements and data center capacity (JLL, 2024).

The US data center market's diversity results in varied growth drivers across regions. In Northern Virginia, the largest market with 4.9GW capacity (as of mid-2024), cloud services drove 82% of demand in 2023. Major players like AWS and Microsoft, operating multiple facilities, are the largest colocation tenants and key developers of self-built centers in the area (Cushman & Wakefield, 2024) (JLL, 2024) (Cushman & Wakefield, 2024) (DC Byte, 2024). Economic incentives, such as sales and use tax exemptions, along with proximity to the federal government and defence firms, make the region attractive for data center expansion. While Ashburn remains the primary hub, power and land shortages are pushing data centers to expand into areas like Manassas, Herndon, Sterling, and Prince William County, offering better access to resources. This diversification is positioning

Northern Virginia as a broader statewide market, meeting growing data center demand while reducing pressure on Ashburn (Cushman & Wakefield, 2024) (Inside Climate News, 2024).

Share of Northern Virginia in Total US Data Center IT Power Capacity
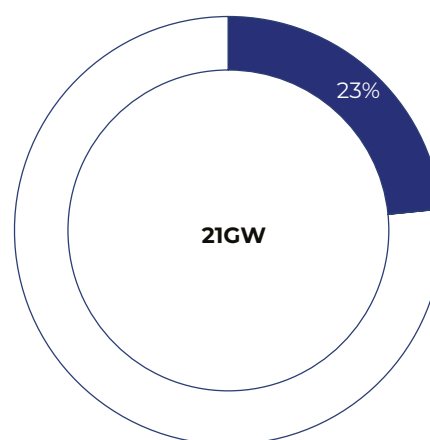
Source: Utility Drive and FERC

Note: Latest figures (mid-2024) as available for Northern Virginia has been taken to calculate its market share

In the Northwest US, Portland, Oregon, with an operational capacity of 1.6GW, has established itself as a key data center market, particularly in the Hillsboro data center cluster. Growth in this area is driven by investments from hyperscalers and colocation providers, fuelled by the availability of abundant renewable energy, affordable land prices, and proximity to West Coast markets (Cushman & Wakefield, 2024) (Cushman & Wakefield, 2024). As per the 'Cleanest Electricity States in the US – 2024 Study', Oregon ranked second among US states for clean energy generation, with 76.3% of its total capacity coming from renewable sources, according to the US Energy Information Administration. This focus on clean energy makes Oregon an attractive location for data center development (Smart Asset, 2024).

Note: Latest figures (mid-2024) as available for all the markets have been provided

Atlanta's data center market, with a capacity of 1.4GW, is expanding as major colocation providers establish large-scale campuses in the Douglasville and Lithia Springs submarkets. The region is set to accommodate multiple projects at various stages of development, ensuring a continuous influx of new data centers. Both colocation providers and hyperscalers are actively securing new sites, with significant acquisitions by Microsoft, Switch, and Vantage Data Centers in 2024. Growth prospects remain strong, driven by affordable and accessible land, power constraints in other regions, a business-friendly climate, and rising investor interest (Cushman & Wakefield, 2024).

In the Chicago market, with a 1.3GW capacity, hyperscalers' demand for large data center spaces in established submarkets like Hoffman Estates and Elk Grove Village has been a key driver. Growth has also come from repurposing defunct office campuses into data centers, a strategy employed by major players like CloudHQ, Aligned Data Centers, and NTT to bypass competition for new space and leverage existing infrastructure (Cushman & Wakefield, 2024) (Cushman & Wakefield, 2024).

Phoenix, Arizona, with a 957.0MW capacity, is experiencing rapid growth driven by increasing demand from hyperscale cloud providers and colocation services. Growth is further fuelled by established players' expansion and the entry of new companies such as Prime Data Centers and Edged Energy (Cushman & Wakefield, 2024) (Cushman & Wakefield, 2024). Hyperscalers such as Meta and Google are making substantial investments in the Phoenix data center market, with Meta committing $1.0 Bn and Google investing $600.0 Mn for the development of new facilities (Arizona Technology Council, 2024) (Construction Drive, 2023). Arizona's highly reliable power grid (ranked second-best in the US), along with ongoing solar developments around Phoenix, has bolstered its data center market. Ranked the top city for solar energy based on factors like roof viability, climate, and affordability, Phoenix is an appealing choice for eco-conscious data center developers (Axios Phoenix, 2024) (Roof Gnome, 2024).

The Silicon Valley market, with a 904.0MW capacity, is driven by demand from IT services, growing cloud service needs from hyperscalers, and the rising adoption of AI technologies (Cushman & Wakefield, 2024) (Cushman & Wakefield, 2024). In 2023, cloud services accounted for 70% of the end-user industry demand, with the remaining 30% coming from the broader technology sector (JLL, 2024) (Data Center Frontier, 2023).

The Dallas data center market, with a capacity of 848.0MW, is growing rapidly, particularly in South Dallas, driven by colocation demand and hyperscale builds due to better land availability and reliable power. Key players like Compass Data Centers, QTS, and DataBank have expanded their facilities. Columbus, Ohio, with 574.0MW capacity, is seeing significant colocation development, benefiting from affordable land and a deregulated power market. Meanwhile, the New York and New Jersey markets, with a combined 441.0MW capacity, are growing due to AI deployments and proximity to financial markets, particularly in New York City (Cushman & Wakefield, 2024) (JLL, 2024) (Brightlio, 2024) (Cushman & Wakefield, 2024) (DC Byte, 2024).

Policy and Regulation

The US lacks comprehensive federal data privacy or sovereignty law, relying instead on industry-specific regulations. However, at least 15 states, including California, Colorado, Connecticut, Delaware, Florida, Indiana, Iowa, Montana, New Hampshire, New Jersey, Oregon, Tennessee, Texas, Utah and Virginia have enacted their own data privacy laws. Additionally, a recent executive order allowing the Attorney General to block bulk data transfers to certain countries may encourage more businesses to establish domestic data centers to ensure compliance with these regulations. State data breach laws require businesses to comply with each state's regulations when personal data is compromised, emphasizing the protection of sensitive information and driving investment in secure data storage within the US (The International Comparative Legal Guides, 2024) (TechTarget, 2024).

Further, the US policy and regulatory directives for the data center market are increasingly focused on environmental accountability, aiming to standardize climate-related disclosures. A key development is the SEC Climate Disclosure Rules, adopted in March 2024, which currently apply to public companies. These rules mandate data center operators to report on climate governance, risks, and associated financial impacts. Consequently, data centers are expected to invest in energy-efficient infrastructure and renewable energy, ensuring transparent reporting of their sustainability initiatives (Techereti, 2023) (Nlyte Software, 2024). From an operational perspective, data centers must adopt several measures to reduce energy consumption. This includes upgrading to more efficient hardware and optimizing cooling systems. Additionally, implementing sustainable practices across operations, supply chain management and waste reduction is crucial (Nlyte Software, 2024).

Meanwhile, various states have introduced or are considering laws aimed at addressing the sustainability aspects of data centers. These regulations aim to limit the rapid expansion of data centers due to their high energy demands. In California, for example, businesses with revenues over $1.0 Bn, including data center operators, are required to report direct and indirect greenhouse gas (GHG) emissions starting in 2026 (based on 2025 data). This initiative highlights the growing regulatory emphasis on sustainability and accountability, encouraging hyperscalers and colocation providers to adopt more sustainable practices and improve transparency regarding their environmental impact (Data Center Knowledge, 2023). Washington has enacted a law requiring non-residential users, including data centers and crypto mining operators, to meet the state's clean electricity purchasing standards. As a result, data centers can no longer buy non-compliant power, likely leading to increased operational costs as they turn to cleaner energy sources to ensure compliance (Baxtel, 2023) (OPB News, 2023).

In Virginia, several bills introduced in the state senate aim to regulate data centers with stricter carbon reduction and sustainability requirements. These proposals reflect the state's intent to assess data centers' broader climate impacts, including the investment needed for power grid upgrades and the effects on land, air, and water during site evaluations. Additionally, the regulations may tie tax credit eligibility to the use of renewable energy, further incentivizing data centers to adopt sustainable practices (Virginia Mercury, 2024).

Outlook

The US data center market's total IT load capacity is expected to reach 35.0GW by 2030, up from 21.0GW in 2024, growing at 8.9% on average annually over the projection period (Utility Drive, 2024) (FERC, 2024). Revenue is projected to grow from $123.2 Bn in 2024 to $212.1 Bn by 2029, with a CAGR of 11.5%. Colocation revenues are projected to increase from $24.0 Bn in 2025 to $38.7 Bn in 2030 driven by a 10.0% CAGR (Statista, 2024) (Mordor Intelligence, 2025).

The market is expanding into peripheral regions due to space and power constraints in traditional hubs, driven by hyperscalers and colocation providers. For instance, Ashburn's limitations are pushing investments to Southern Virginia, while rising costs in South Dallas are shifting growth toward East Dallas, with similar trends seen in Oregon as hyperscalers such as Apple, Google, Meta and Amazon move beyond Hillsboro into eastern Oregon (Cushman & Wakefield, 2024) (Cushman & Wakefield, 2024).

Interstate data center development is accelerating as land and power constraints in core markets like Virginia and Chicago shift investment to nearby states like North Carolina, Maryland, Indiana, and Wisconsin, which offer better resources and incentives. Major technology firms such as AWS, Google, and Meta are already planning large campuses in these regions, a trend expected to intensify as resource limitations continue in key markets (Cushman & Wakefield, 2024) (Cushman & Wakefield, 2024).

To meet growing data demands, large-scale data center parks, campuses, and multi-story facilities are emerging, maximizing land use and enabling flexible expansion. Notable examples include Tract's 1.8GW park in Arizona, Quantum Loophole's 2.0-2.5GW park in Maryland, and PowerHouse's 800.0MW campus in Virginia, with vertical developments like DataBank's three-story 40.0MW center in Dallas further optimizing

space (Data Center Dynamics, 2024) (JLL, 2024).

The growth of the US data center market depends on addressing regulatory and sustainability challenges, as state-level policies vary in the absence of unified federal regulation. While states like Georgia and Oregon resist sustainability laws to attract investments, others, such as Arkansas and Connecticut, balance incentives with clean energy standards. Additionally, the lack of federal data privacy laws adds uncertainty for investors, making states that align sustainability with competitiveness more attractive for long-term data center investments (Government Technology, 2021) (Illinois Department of Commerce, 2023) (Arkansas Senate, 2024) (Government Technology, 2024) (Department of Commerce, Maryland, 2024) (Kintsugi, 2024).

Overall, the US is well-positioned to maintain its leadership in the global data center market. Emerging challenges like land, power, and regulatory uncertainties are manageable due to the market's dynamic and diversified nature. In the long run, this adaptability will ensure developers can access the necessary space and power on accelerated timelines to meet their capacity needs.

Data Center Market by Revenue
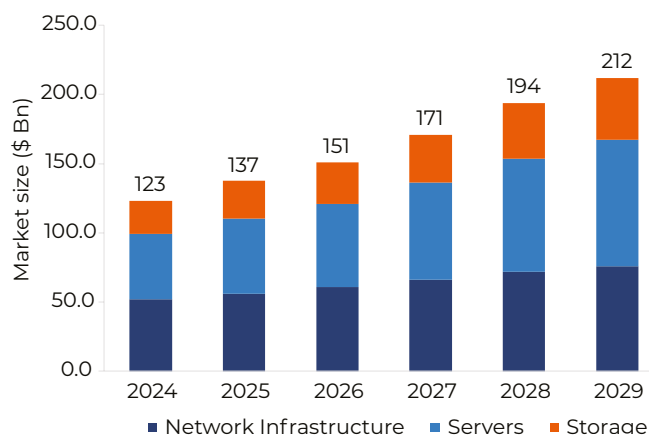
Source: Statista

MEXICO

The Mexican data center market is considered the second most important in the LATAM region's dynamic emerging markets landscape, following Brazil. As of April 2024, Mexico boasted an aggregate data center capacity of 587.2MW. 111.5MW of this capacity was live, while the remaining 475.7MW of the total capacity was under construction (Mexican Association of Data Centers (MEXDC), 2024).

Mexico offers a strategic location near the US and a skilled workforce, particularly in regions like Querétaro, Jalisco, and Guanajuato. Additionally, Mexico provides competitive salaries and enhanced security in regions such as Querétaro, making it an attractive option for data center development. Querétaro provides extensive land for development and industrial parks with competitive reserves, offering leasing and sale prices up to 20% below the national average. This affordability positions it as the leading choice for data center construction in Mexico (Area Development, 2023).

Consequently, Querétaro has emerged as the focal point of data center activity in Mexico and hosts the first data center cluster in the country. Despite representing a mere 5.0% of the country's populace, Querétaro accommodates 67.3% of Mexico's aggregate data center capacity (DC Byte, 2024) (Mexican Association of Data Centers (MEXDC), 2024).

GDP
(Current Prices, $ 2023)
1,789 Bn

Projected Average GDP Growth 2024-28
1.8%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
9.8%

Country Credit Rating
BBB

Renewable Energy Share
16%

Data Center Capacity
(April 2024)
112MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

The emergence of data center clusters has hinged on prevailing market dynamics such as availability of land, power and connectivity. It is for these reasons that the colocation market has pivoted towards Querétaro, after initially taking roots in the capital, Mexico City. Situated in the center of Mexico, Querétaro has an operational capacity of 75.0MW as of mid-2024 and benefits from robust terrestrial connectivity flowing north to the US and to subsea routes on the coasts that extend internationally. With multiple Availability Zone clusters already starting to emerge, quite evidently, hyperscale providers have selected Querétaro as a key location (Cushman & Wakefield, 2024) (Structure Research, 2023) (Mexican Association of Data Centers (MEXDC), 2024).

For instance, in July 2022, Oracle launched its Mexican cloud infrastructure region in Querétaro, becoming the first hyperscaler to launch a cloud region in the country (Data Centre Magazine, 2022). In May 2024, Microsoft launched its first Mexican data center region in Querétaro (Data Centre Dynamics, 2024). Both Oracle and Microsoft have committed to powering their new cloud regions with 100.0% renewable energy by 2025 (Capacity Media, 2022) (Microsoft, 2024). In December 2024, Google Cloud opened its first Mexican data center region in Querétaro (Google, 2024). Meanwhile, Amazon Web Services (AWS) has also launched its AWS infrastructure Region in Mexico in January 2025 expanding on its existing presence of two Edge locations in the state. AWS plans to invest over $5 Bn in Mexico over the next 15 years to expand infrastructure and drive innovation in machine learning, artificial intelligence, and other advanced technologies (AWS, 2025) (Mexico Business News, 2024).

Querétaro is poised to become the hub for hyperscale cloud expansion, driving growth in Mexico's data center market. Valued at $83.0 Mn in 2023, the market is expected to grow at a five-year CAGR of 41.7% through 2028. By early

Total Data Center Capacity by Stages as of April 2024

587.2MW

- 19%
- 81%

■ Live IT Capacity
■ Under Construction IT Capacity
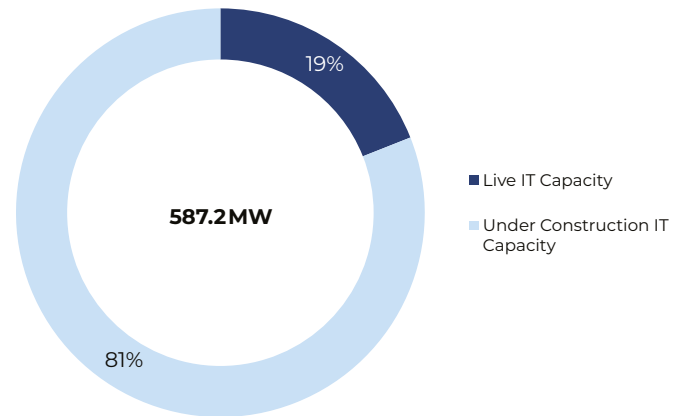
2025, colocation services within large-scale data center facilities, primarily serving hyperscalers, are expected to comprise more than half of the market. However, the concentration of data center development in Querétaro presents short-term challenges, including energy supply constraints, infrastructure limitations, talent availability, and high initial costs (Structure Research, 2023). This has led to the consideration of alternate locations such as Bajío.

Bajío is a region within the central Mexican plateau that includes cities such as Aguascalientes and Guadalajara. The Mexico Data Center Association anticipates an investment of $8.5 Bn in the Bajío region for developing data centers (Linesight, 2023) (Structure Research, 2023) (DC Byte, 2024).

Nearshoring is expected to boost Mexico's GDP by 3.0% over five years, attracting foreign investment and driving data center demand. The expansion includes large, small, and strategically located edge facilities, driving increased investment in the ICT sector. For example, AWS' investments enhance cloud services for government, education, and nonprofits (Reuters, 2024) (Amazon, 2024).

Policy and Regulation

Mexico's data protection laws, primarily the Federal Law for the Protection of Personal Data Held by Private Parties (LFPDPPP) and the General Law for the Protection of Personal Data Held by Obligated Parties, have set robust standards for data privacy and security. Data localization requirements have triggered a spate of investments in data centers in Mexico as foreign investors have sought to host data locally. The appointment of Data Protection Officers and enforcement of data privacy requirements have ensured compliance and data centers' alignment with international standards (Chambers and Partners, 2024) (European Commission, 2024).

In addition to this, Mexico's National Digital Strategy, launched in 2013 and periodically updated, aims to accelerate the country's digital transformation and enhance digital infrastructure by improving connectivity, fostering innovation, and enhancing the overall digital ecosystem. This has led to the increasing demand for data storage and processing capabilities, as offered by data centers. The adoption of emerging technologies such as AI, cloud computing and 5G will likely sustain the demand for advanced data center facilities (BNamericas, 2023).

The Mexican government offers fiscal and regulatory support to data center developers. Tax incentives in the form of import duty exemptions on data center equipment such as servers, cooling systems and power infrastructure and accelerated depreciation of renewable energy equipment have spurred investments into the data center market. In addition, tax breaks for renewable energy investments and support for energy-efficient technologies central to data center operations have been key enablers. Public-private partnerships (PPP) are also being encouraged to deploy capital on a scale to develop the digital infrastructure. For instance, the state

government of Querétaro announced, in the second half of 2023, an investment of $293.2 Mn to strengthen the power grid, involving the construction of 75km of high voltage lines, two electrical substations, six switching stations, and the interconnection of 19 load centers (DC Byte, 2024). Additionally, in November 2024, to ensure reliability in the national electric system, the central government unveiled its $23.4 Bn investment plan for 2024-2030, including $12.3 Bn for 13.0GW of new generation capacity, $7.5 Bn for transmission grid reinforcement, and $3.6 Bn for distribution improvements (Cacheaux, Cavazos & Newton, 2024).

The Mexican government has been attracting foreign investments through tax incentives, including fiscal benefits for nearshoring. The Decree issued on October 11, 2023, provides accelerated tax depreciation on new fixed assets till the end of 2024 and additional tax deductions on training until 2025 (White & Case, 2023) (UNCTAD, 2023). As companies relocate their operations to Mexico to mitigate supply chain risks and reduce costs, there will be an increased need for local data centers to support their IT infrastructure. Special Economic Zones (SEZs) have been a key strategic route through which the Mexican government has offered fiscal and regulatory benefits. They offer a streamlined regulatory procedure which reduces the time and complexity in setting up data center operations. They also benefit from the availability of state-of-the-art infrastructure such as transportation networks, power supply, enhanced connectivity and essential services. Lastly, investors can avail of benefits such as exemptions from taxes on infrastructure investments and land and energy costs, thereby paring their operating expenses (ITR, 2018) (Foley & Lardner, 2017) (NovaLink, 2024) (Research and Markets, 2024).

In terms of promoting renewable energy usage to make data centers more sustainable, the Mexican government has offered tax incentives under Article 40 of the Law of Corporate Income Tax, which provides for accelerated depreciation of 100.0% for investments in equipment and machinery for electricity generation through renewable sources. Further incentives include an exemption from import and export tax and a tax credit for selected renewable technologies, including wind and solar (Mexico Business News, 2024) (Norton Rose Fulbright, 2016).

Outlook

The Mexican data center market is capitalizing on the nearshoring trend, supported by government regulations that mandate data localization and promote the adoption of renewable energy to improve sustainability in data center operations.

The Mexican data center market by revenue is projected to grow at a CAGR of 5.6% during 2024-2029 and reach $5.1 Bn by 2029 from $3.9 Bn in 2024, driven by increasing efforts towards digital transformation and rising demand for efficient data management the increasing demand for high-performance computing, Big Data analytics, and AI applications (Statista, 2024). As per the data center association, over the next five years, the data center, colocation, and cloud market in Mexico is set to receive direct investments totalling c.$9.2 Bn, which is expected to generate an additional c.$27.6 Bn in indirect investments (Mexican Association of Data Centers (MEXDC), 2024).

The market is projected to sustain its robust growth trajectory, underpinned by rapid digitalization and the proliferation of cloud services. The advent of larger and more powerful data centers to cater to the ever-increasing data demands is likely to create challenges related to power distribution and data processing. This is evident in the case of Querétaro, where a rapid buildup in data centers has put pressure on the local power grid and led to a rise in energy prices as power demand has risen unabated (Credence Research, 2024) (Mexico Business News, 2023).

The expansion of data centers in Mexico is likely to encounter some headwinds from stricter regulations due to increasing concerns about their environmental impact, particularly regarding their carbon footprint and high energy consumption. The data center industry is expected to require an additional 1,492.7MW of power over the next five years, positioning the country as the second-largest consumer of electricity for this sector in Latin America (Mexican Association of Data Centers (MEXDC), 2024) (Mexico Business News, 2024). This growing energy demand necessitates an estimated $8.7 Bn in infrastructure investment (Mexico Business News, 2024).

Mexico's renewable energy potential could help meet the growing energy needs of its data center sector sustainably, but the current infrastructure for large-scale distribution is inadequate. High initial investment costs for renewable facilities and the intermittent nature of solar and wind energy are key challenges. Innovative financing, microgrids, and energy storage systems are essential to manage these issues. Government initiatives to enhance power grids and infrastructure, combined with economic growth and increasing digital service demand, are supporting the growth of Mexico's data center market (Mexico Business News, 2024).

CANADA

Canada's data center market is rapidly growing, driven by increasing demand for cloud services, digital transformation, and data storage needs across industries. With its stable political environment, strong infrastructure, and cooler climate for energy-efficient operations, Canada is becoming a favoured destination for data center investments. Additionally, Canada is emerging as a viable alternative to the increasingly saturated and expensive US market (Research and Markets, 2024) (Green Street News, 2024) (ENCOR Advisors, 2024).

As of 2024, Canada's data center market had reached a total IT power capacity of 750.0MW, driven by the increasing adoption of cloud computing, the widespread use of Internet of Things (IoT) devices, and the growing importance of big data analytics (ENCOR Advisors, 2024).

Toronto is the leading data center hub in Canada, accounting for c.45% or 335.0MW of the nation's total installed capacity. Toronto's prominence stems from its status as a major financial hub and a vibrant tech ecosystem, making it a prime location for data center operations (Cushman & Wakefield, 2024) (StartupBlink, 2024) (Equinix, 2023).

GDP
(Current Prices, $ 2023)
2,142 Bn

Projected Average GDP Growth 2024-28
1.9%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
3.3%

Country Credit Rating
AAA

Renewable Energy Share
9%

Data Center Capacity (2024)
750MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

Canada's low population density of 4.4 people per km² and expansive territory, being the second largest country globally, provide key advantages for the data center market. The abundance of land is ideal for constructing large-scale data centers, making it particularly attractive to hyperscalers that require significant space for their operations (Green Street News, 2024) (ENCOR Advisors, 2024) (Forbes India, 2024) (Statistics Times, 2024).

In addition, Canada's relatively low electricity prices further enhance its appeal to data center developers. As of June 2024, residential electricity costs were $0.117/kWh, and business rates were $0.099/kWh, both below the global average. Again, these lower energy costs are especially beneficial for hyperscalers, where power consumption is a significant operational expense (Global Petrol Prices, 2024).

Canada's growing renewable energy capacity is another key factor attracting data center operators, especially those focused on sustainability. By the end of 2023, the country had 22.9GW of installed wind and solar capacity, reflecting an 11.4% growth from 2022 (IRENA Electricty Statistics, 2024). This commitment to expanding green energy helps data centers minimise their carbon emissions. Provinces such as Ontario, Alberta, and Quebec, which hold the largest share of renewable capacity, are also experiencing substantial data center growth (Canadian Renewable Energy Association (CanREA), 2024).

The rapid growth of Canada's cloud computing market is driving increased demand for data center services due to the need for greater data generation and storage. Statista forecasts the Canadian public cloud market to reach $19.6 Bn by 2025 and sustain strong growth, reaching $38.2 Bn by 2029 at a CAGR of 18.1% (Statista, 2024).

At the same time, the deployment of 5G networks is reshaping Canada's digital infrastructure. Public and private investments, including C$470.0 Mn ($352.0 Mn) from the Canadian government and Ericsson, are advancing 5G and future 6G technologies (Ericsson, 2023). Reflecting this trend, Japanese telecommunications operator KDDI's acquisition of Allied Properties REIT's three carrier-neutral urban data centers for C$1.4 Bn positions the company to provide the critical infrastructure needed to support 5G's enhanced network capabilities. These developments are closely tied to the growing data center market, driven by the expansion of cloud services and the rise of 5G technology (Global News, 2024) (Borden Ladner Gervais LLP, 2023) (Data Center Dynamics, 2023).

The combination of AI advancements, a thriving startup ecosystem, and strong government initiatives is creating a favourable environment for data center investments in Canada (StartupBlink, 2024). According to Stanford University, Canada's AI sector saw significant growth from 2013 to 2023, with 397 new AI companies receiving $10.6 Bn in private investment (Stanford University, 2024). Between 2022 and 2023 alone, a total of C$2.6 Bn ($1.9 Bn) was invested in AI research, while venture capital funding hit C$8.6 Bn ($6.4 Bn) (Deloitte, 2023). Additionally, in June 2023, the Canadian government invested C$124 Mn ($92.8 Mn) in the Université de Montréal through the Canada First Research Excellence Fund (CFREF) to support responsible AI development (Government of Canada, 2023). Additionally, in November 2024, the Canadian government introduced the Canadian Artificial Intelligence Safety Institute (CAISI) to enhance the country's ability to address AI safety risks. This initiative reinforces Canada's position as a leader in the safe and responsible development and adoption of AI technologies. CAISI is part of a broader $2.4 Bn investment outlined in Budget 2024,

aimed at supporting researchers and businesses in advancing AI innovation while ensuring responsible implementation (Government of Canada, 2024).

To further accelerate AI-driven data center growth, Canada's federal government is also exploring a $15.0 Bn incentive program to encourage domestic pension funds to invest in AI data centers powered by green energy. This proposal, currently under consultation with major pension funds, aims to meet AI's surging energy demands while advancing the country's clean energy transition (ESG News, 2024).

Share of Toronto in Total Canada Data Center IT Power Capacity

750MW

45%
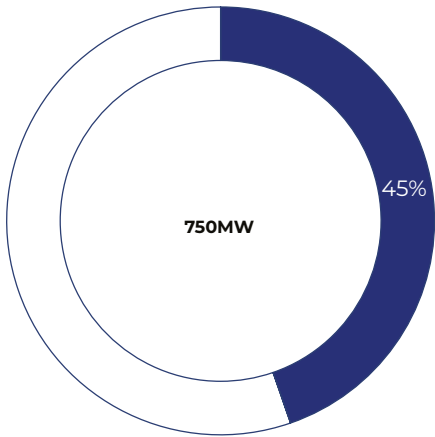
Source: Cushman & Wakefield; ENCOR Advisors

Toronto's status as a leading financial hub plays a crucial role in Canada's data center market, driving strong demand for data center services. Financial institutions require advanced infrastructure to handle high-frequency trading, real-time data analytics, and secure data transfers, all of which contribute to the growth of the data center industry. Equinix's 'Global Interconnection Index (GXI) 2024' forecasts Toronto to be one of the fastest-growing edge metros in the Americas, with interconnection bandwidth expected to grow at 40.0% CAGR from 2022 to 2026, reaching 320 Tbps. This growth strengthens the city's capacity for low-latency applications, critical for financial

operations like trading and real-time analytics (Equinix, 2023) (Equinix, 2024).

While Toronto has been Canada's primary data center hub, Montreal is quickly emerging as a major player. As of H1 2024, it had 169.0MW of data center capacity (22.5% market share) with 30.0MW under construction, driven by key operators and the benefit of low-cost hydroelectric power (Cushman & Wakefield, 2024). Montreal's strong telecommunications and aerospace sectors, along with the fastest-growing interconnection bandwidth (43.0% CAGR from 2022-2026, reaching 124 Tbps by 2026), position it as a significant digital hub (Equinix, 2023) (Equinix, 2024). Its strategic location also provides low-latency access to both North American and European markets, which is ideal for data center operations (ENCOR Advisors, 2024) (Equinix, 2023).

The Canadian data center market is fragmented, with the top five companies accounting for 33.5% of the total capacity. Key players in this space include Beanfield Technologies Inc. (Beanfield Metroconnect), Cyxtera Technologies, Digital Realty Trust Inc., Equinix Inc., and Sungard Availability Services LP (Mordor Intelligence, 2023). The hyperscale market is led by major global cloud service providers like Microsoft, Oracle, Google, Amazon Web Services, and Tencent, driven by the growing adoption of cloud computing and AI infrastructure. The colocation market is primarily dominated by global providers such as Equinix, Cologix, Digital Realty, STACK Infrastructure, and Vantage Data Centers, along with local players like eStruxture Data Centers and Urbacon Data Center Solutions, which are capitalizing on the rising demand for 5G and digital infrastructure (Arizton, 2024).

Policy and Regulation

Data centers in Canada must comply with standards such as NIST (National Institute of Standards and Technology), PIPEDA (Personal Information Protection and Electronic Documents Act), and ISO 27001. PIPEDA's data sovereignty requirements complicate cross-border data transfers, prompting a rise in demand for data center operations outside traditional hubs like Toronto, Montreal, and Vancouver. Companies are increasingly establishing data centers in diverse locations across Canada to adhere to local regulations and reduce latency (Equinix, 2023) (Enzuzo, 2023). The government's cloud-first strategy, aimed at keeping citizens' data within national borders, prioritises local data center development. This strategy ensures the availability of major public cloud services in the country. In addition to federal regulations, provinces like Alberta, British Columbia, and Quebec have their own privacy laws similar to PIPEDA (Zoho Corporation, 2024).

NIST, a non-federal US government agency, develops security standards and guidelines covering data center infrastructure as well as IT and supporting applications. Organisations that align their data center operations with NIST security standards can have greater confidence in the efficiency and security of their critical business data that fosters trust among clients and stakeholders (Security Engineered Machinery, 2023). ISO 27001 is the internationally recognised best practice framework for an Information Security Management System (ISMS). An ISO 27001-certified data center demonstrates robust technical measures for data protection, risk management, and effective response to evolving security challenges (Zoho Corporation, 2024).

The Canadian Net-Zero Emissions Accountability Act and the 2030 Emissions Reduction Plan, along with provincial carbon pricing policies, are driving significant changes in the data center industry. Data centers must innovate in climate data tracking, adopt more renewable energy sources, and enhance energy efficiency to comply with regulations and meet their sustainability goals (Techerati, 2023).

The Canadian government's emphasis on net-zero energy-ready buildings and retrofitting codes, along with broader energy efficiency measures, has direct implications for the development of data centers. By controlling energy costs, adopting low-carbon technologies, and upgrading to meet performance-based codes, data centers not only comply with regulatory requirements but also enhance their operational efficiency and sustainability (Minister of Environment and Climate Change, 2022) (Ministry of Environment and Climate Change, 2024). By leveraging funding programs like the C$200.0 Mn ($149.6 Mn) Deep Retrofit Accelerator and the Canada Infrastructure Bank's (CIB) C$2.0 Bn ($1.5 Bn) Growth Plan for retrofits, developers can navigate these challenges and support Canada's climate objectives (Minister of Environment and Climate Change, 2022) (Ministry of Environment and Climate Change, 2024) (Natural Resources Canada, 2024).

Outlook

The Canadian data center market is expected to grow substantially, with revenue projected to grow annually by 5.7% from $8.5 Bn in 2025 to $10.6 Bn by 2029. Investments are projected to expand at a CAGR of 10.3% between 2023-2029 and reach $9.0 Bn by 2029, fueled by increasing demand for digital infrastructure, major cloud provider contributions, and technological advancements (Statista, 2024) (ENCOR Advisors, 2024). Among notable developments, Microsoft announced a $500.0 Mn investment to expand AI and cloud computing infrastructure, while Amazon plans to invest C$24.8 Bn ($18.6 Bn) by 2037 to develop cloud regions in Canada (Microsoft, 2023) (AWS, 2023).

The growth of the Canadian data center market is drawing considerable interest from investment firms and asset management companies, leading to major acquisitions and investments. In January 2024, Brookfield Corporation's $775.0 Mn acquisition of global data center provider Cyxtera, marked a strategic move to expand capacity and leverage existing infrastructure for future growth (Data Center Dynamics, 2024). Similarly, Fengate's record-setting C$1.8 Bn ($1.3 Bn) investment in eStruxture Data Centers, a Canadian provider of colocation, cloud, and network infrastructure solutions, in June 2024 aims to boost facility expansions and support hyperscale development (Real Estate News EXchange, 2024). LIUNA's Pension Fund of Central and Eastern Canada participated in Fengate's investment in eStruxture backed by a group of institutional secondary investors. This consortium is co-led by Partners Group, a global private markets firm, and Pantheon, a specialist in global private markets and secondaries (Daily Commercial News, 2024).

The Canada Data Center Market is projected to grow steadily, with an estimated size of 1,370.0MW in 2025, reaching 2,010.0MW by 2030 at a CAGR of c.8.0%. The country's data center rack market is also set for significant expansion, with upcoming IT load capacity expected to reach 1,150.0MW by 2029, driven by IoT adoption, strong connectivity, and supportive government policies (Mordor Intelligence, 2023) (Research and Markets, 2024). Additionally, growing concerns over data privacy and sovereignty regulations are prompting businesses to invest in local infrastructure, ensuring compliance and mitigating regulatory risks (Equinix, 2023) (ENCOR Advisors, 2024).

## Data Center Market by Revenue
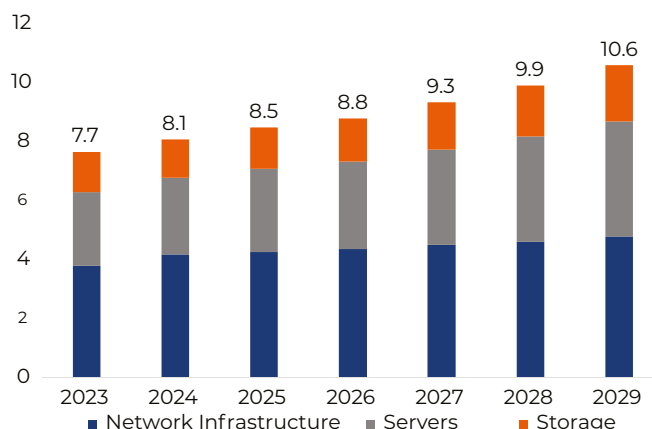
Source: Statista

However, the market's growth is encountering certain challenges, especially in Toronto, where the rising demand for data centers has driven industrial land prices to exceptionally high levels. Competition with industrial users and limited power availability have further complicated construction within the city. As a result, developers are turning to the periphery of the Greater Toronto Area, where more affordable agricultural land offers development opportunities. This shift is expected to benefit secondary markets such as Montreal and Alberta, diversifying the markets for data center development (Cushman & Wakefield, 2024) (ENCOR Advisors, 2024) (Green Street News, 2024) (Govt., 2024) (Sharma, 2022).

Alberta, in particular, offers distinct advantages with its cool climate and deregulated electricity market, which translate into cost savings and improved energy efficiency for data center operations. With projected investments ranging from C$75.0 Bn to C$100.0 Bn ($56.0 Bn to $75.0 Bn) and a planned capacity of 2,000.0MW, Alberta is set to become a key player in the data center market (Calgary Herald, 2024) (Sherwood Park News, 2024). Amazon's C$4.0 Bn ($3.0 Bn) investment in Alberta's cloud region by 2037 to enhance customer support through reduced latency marks a major boost to the province's data center market (AWS, 2023) (AWS, 2023).

Overall, Canada's data center market is set for substantial growth and is positioned to strengthen its standing in the global landscape. While the market holds several competitive advantages that align with global needs, it must navigate emerging challenges and competition from a robust US market.

CHILE
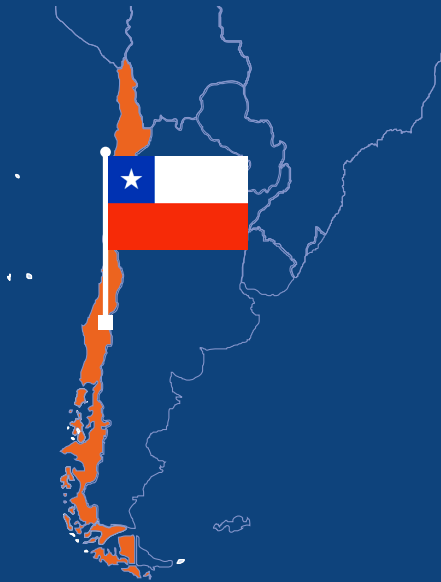
Chile's data center market is steadily expanding, fueled by the growing demand for affordable and adaptable data center solutions. Key drivers include rising data traffic, the adoption of cloud services, and the increasing need for scalable and portable data infrastructure (6WResearch, 2024). The market was valued at $741.0 Mn in 2023 and is expected to reach $1.4 Bn by 2029, achieving a CAGR of 10.8% (Arizton, 2024). In terms of installed capacity, the market is projected to reach 338.3MW in 2025, rising to 554.5MW by 2030, representing a CAGR of 10.4% (Mordor Intelligence, n.d.).

Moreover, the country's stable political and economic environment, combined with abundant renewable energy resources, has made it an attractive destination for data center operators. At present, Chile has a renewable energy capacity of 21.5GW, representing 63.9% of its total installed electricity capacity(IRENA, 2024). In addition, government initiatives, such as the Roadmap for Digital Transformation and incentives for foreign investment, alongside a deregulated energy market, have further bolstered this growth, encouraging both local and global operators to invest in Chile's digital infrastructure landscape.

GDP
(Current Prices, $ 2023)
336 Bn

Projected Average GDP
Growth 2024-28
2.4%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
5.8%

Country Credit
Rating
A

Renewable Energy
Share
38%

Data Center Capacity
(H1 2024)
198MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

Despite its relatively small size and population, Chile has developed a diverse data center market, encompassing retail, hyperscale, and public cloud providers, creating a strong ecosystem within Latin America. In 2024, the country recorded a vacancy rate of just 1.1%, with hyperscale and public cloud providers contributing to rising energy demand (CBRE, 2024).

Chile's data center market has experienced steady expansion, with significant growth in facility development over the past decade. Installed capacity has consistently increased, starting at under 35.0MW in 2013 and more than doubling to 82.3MW by 2018. By the end of 2023, capacity surged to 193.0MW, reflecting a CAGR of 18.6% over the last ten years (Data Center Dynamics, 2024). The momentum continued into H1 2024, with installed capacity increasing by over 66% year-over-year, climbing from 119MW to 198MW (InvestChile, 2024).

Another key sign of industry growth in Chile has been the rapid expansion of space dedicated to data centers, which increased from around 50,000 square meters in 2013 to 350,000 square meters by 2023, reflecting a CAGR of 21.5% (Data Center Dynamics, 2024). This expansion accelerated further, and by the end of June 2024, the total surface area had reached 670,000 square meters (InvestChile, 2024). This impressive growth has been fueled by the adoption of new technologies and the expansion of the fibre optic network across Latin America. These advancements culminated in a significant $300.0 Mn industry investment in Chile in 2023, solidifying the country's role as a leading hub for digital infrastructure in the region (Data Center Dynamics, 2024).

Data Center Market Capacity (MW) & Area (Thousand Square Meters)
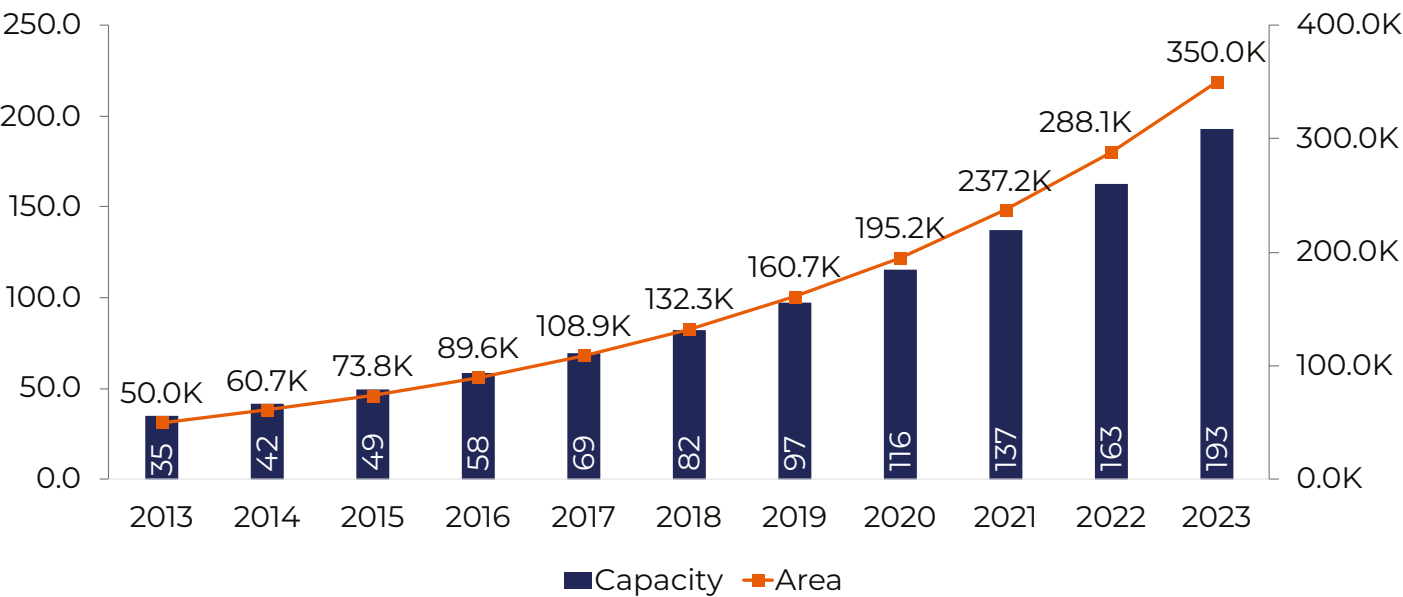
Source: (Data Center Dynamics, 2024)

Chile's data center industry currently spans 31 operational facilities, with significant capacity expansion is anticipated in the coming years, with 20 projects either under construction or in the planning phase. These include new data centers from AWS, Huawei, and Scala, along with expansions of existing facilities like those of Google and Claro. The approved projects represent a total investment of $400.0 Mn, a figure that is likely to increase as more projects are confirmed. Notably, the market is dominated by three major players (Google, Ascenty, and Odata), which collectively account for nearly 70.0% of Chile's installed capacity (Data Center Dynamics, 2024).

Chile's energy mix consists of nearly 50.0% renewable energy generation sources, such as hydroelectric, wind, and solar power. This diverse range of renewable energy options enables data center operators to seek sustainability-linked financing for their projects. In 2022, EdgeConnex secured $150.0 Mn in such financing for developments in both Chile and Colombia. Additionally, Chile's deregulated energy market provides added flexibility, enabling data center operators to directly negotiate power purchase agreements (PPAs) with energy suppliers, including those focused on renewable energy (EdgeConneX, 2022) .

The capital city, Santiago, stands as the epicenter of data center activity in Chile, anchoring the southern and western regions of Latin America (Cushman and Wakefield, 2024). Santiago features advanced technological infrastructure and outstanding connectivity, both essential for data center operations. The city also enjoys strong institutional stability, creating a dependable environment for long-term investments (InvestChile, 2023). The city has attracted significant interest from hyperscale providers, fueling rapid growth in its data center market. Its strategic position is further enhanced by access to a cable landing station, which facilitates six undersea connections to major markets along the Pacific coast of the Americas (Cushman and Wakefield, 2024).

The Chilean government has positioned the capital and its surrounding metropolitan area as one of Latin America's key data center hubs by leveraging free trade agreements to attract new investment. Chile has negotiated 33 trade agreements covering 65 economies which includes major agreements like the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the U.S.-Chile Free Trade Agreement. The CPTPP, which includes countries like Japan, Canada, and Australia, facilitates smoother trade and investment flows and creates a favorable trade environment attracting foreign direct investment (FDI), which is crucial for the development and expansion of data centers (International Trade Administration, 2023). Chile's data center industry currently spans 31 operational facilities (InvestChile, 2024). In addition to government incentives encouraging businesses to offload compute loads, the market's growing renewable energy capacity has also driven increased interest. Moving forward, Santiago is poised for continued growth as hyperscale providers expand their presence and colocation services scale up (Rest of World, 2024).

The growing presence of cloud providers and the rising demand for data and IoT services have simultaneously driven data center expansion in Valparaíso (Aligned, 2024). Located near Santiago, Valparaíso offers a strategic advantage due to its proximity to key submarine cable landing stations, making it an ideal location for data center operations. The city benefits from strong connectivity and its proximity to the Santiago metropolitan area, further enhancing its appeal. Santiago is connected to several submarine cables via Valparaíso, including the $400.0 Mn Humboldt submarine cable project, a public-private partnership with Google, which is set to launch in 2026 and will link Chile to Sydney (CBRE, 2024).

Policy and Regulation

Regulation has become a central topic of discussion, particularly in debates surrounding data center permits and land use across various zones (CBRE, 2024). Recognizing the vital role data centers play in driving digital transformation initiatives, the Chilean government has introduced or is currently enacting, several policies aimed at promoting the growth of the digital economy. These policies include incentives for data center investments, streamlined regulatory procedures, and initiatives aimed at enhancing the country's connectivity infrastructure (6WResearch, 2024).

Although Chile introduced data privacy regulations in 1999, the law quickly became outdated due to weak enforcement. Chile is now updating its data protection laws to align with international standards, particularly the EU's GDPR. Key objectives include creating a Data Protection Agency to ensure compliance and regulate international data transfers, which will only be permitted with entities meeting adequate data protection levels. This new framework will enhance data security and drive growth for domestic data centers (One Trust Data Guidance, 2024) (Carey, 2024).

Chile's data center policies focus on promoting environmentally responsible investments. In December 2024, the country launched National Data Center Plan in consultation with key stakeholders, anticipating investments of approximately $2.5 Bn over the next five years. This plan emphasises the use of renewable energy, low water consumption standards, and public-private partnerships to advance technologies like AI and IoT. However, the country's ongoing drought, expected to continue until 2040, has led to increased pressure from local and indigenous communities to limit water-intensive developments. As a result, data centers must innovate in cooling technologies and prioritise sustainability in both water and energy use, sourcing much of their energy from green sources and adopting eco-friendly practices in construction and operations (The Government of Chile, 2024) (Data Center Dynamics, 2024) (Rest of World, 2024) (Investment Monitor, 2024) (Techtegia, 2024) (InvestChile, 2024).

The lack of unified data center regulations in Chile is creating challenges for operators and developers, causing some to reconsider their investments. For instance, Google paused its $200.0 Mn data center project after a court ruling on environmental concerns, despite securing approvals in 2020. This regulatory uncertainty forces companies to redesign projects to meet stricter environmental standards, such as adjusting water-intensive cooling systems. As a result, new market entrants may delay their plans, while existing players may need to revise designs for sustainability and compliance (2News, 2024) (Investment Monitor, 2024). Although this shift encourages a more environmentally responsible industry, it underscores the need for consistent regulations. In response, Chile is improving its regulatory framework to address environmental and sustainability issues, with companies like Google incorporating air-cooling technology to reduce water usage (GIP Digital Watch, 2024). Additionally, the Cybersecurity Framework Act enacted in March 2024 will introduce new data protection standards for private companies (Illanes, 2024).

Outlook

Despite challenges, the Chilean data center market is expected to maintain its growth trajectory, driven by rising cloud adoption, digital transformation efforts, and significant investments from global technology companies. The market is poised to expand as international firms aim to capitalise on the region's growth potential and Chile's reliable energy supply. However, despite Chile's appeal due to its renewable energy resources and strategic location, challenges such as power grid constraints, and competition from neighbouring markets must be addressed. Infrastructure limitations pose challenges for data centers in Chile. In some regions, the existing power grid cannot meet the rising demand, requiring investments in upgrades or alternative energy solutions for reliability. Additionally, achieving high-speed, reliable network connectivity, particularly in remote areas, is proving to be crucial for efficient data center operations. Moreover, intense competition from neighbouring countries like Brazil and Colombia, which are also improving their data center infrastructure, adds pressure as they compete for the same international investments, leading to aggressive pricing and potential margin squeezes (Credence Research, 2024).

Ensuring a stable workforce and mitigating risks from natural disasters will be crucial for sustaining long-term growth in the market. While Chile has a skilled workforce, there are occasional shortages of specialised talent for advanced data center operations, resulting in increased competition and higher labor costs. Continuous training and employee retention are vital. Initiatives like Microsoft's "Transforma Chile" aim to improve digital skills, but ongoing efforts are necessary to keep pace with rapid technological changes (England, 2020). Additionally, Chile faces natural disaster risks such as earthquakes and droughts. To mitigate these, both the government and private sector are investing in resilient infrastructure.

Projects like the "Strengthening the Resilience of Infrastructure" initiative, supported by the Coalition for Disaster Resilient Infrastructure (CDRI) and the United Nations Office for Disaster Risk Reduction (UNDRR), focus on enhancing the resilience of critical infrastructure (UNDRR, 2023).

BRAZIL

Brazil is leading the data center industry in Latin America and is set to become a key hub for data center installations, indicating a long-term commitment to growth and development in the sector. Several supporting factors, such as the availability of land, abundant water resources for cooling needs and a diversified energy mix that is dominated by hydroelectric and renewable power sources (onshore wind, solar PV), have facilitated its development (Leaders League, 2024).

Consequently, Brazil accounts for approximately 40.0% of all new data center investments in Latin America (Data Centre Magazine, 2024). As the largest economy in the continent, offering access to a market of 580 Mn consumers (Leaders League, 2024), digitalisation has been a cornerstone that has spurred rapid technological investments, in turn driving the expansion of the data center market. The country's digital infrastructure comprises 16 undersea cables and 162 operational data centers (Global News Wire, 2024) (Data Center Map, 2025). The cumulative data center capacity of Brazil is expected to reach 740.0MW in 2024 and is projected to grow to 1,210.0MW by 2029 with a CAGR of 10.3% (Research and Markets, 2024). International property consultancy, JLL, estimates there are over 900.0MW of data center projects currently under construction or in the planning stages (Bnamericas, 2024).

GDP
(Current Prices, $ 2023)
2,174 Bn

Projected Average GDP
Growth 2024-28
2.5%

10-Year Govt. Bond Yield
(12-Month Rolling Average)
12.5%

Country Credit
Rating
BB

Renewable Energy
Share
29%

Data Center Capacity
(2024)
740MW

Note: Renewable Energy Share excludes hydro-power

Market Dynamics and Growth Factors

The Brazilian data center market was valued at $5.3 Bn in 2024 and is expected to reach $7.1 Bn by 2029, growing at a CAGR of 5.8% (Statista, 2024). Sao Paulo has emerged as the focal point of data center development in Brazil, given its economic importance as the country's primary financial hub. The city has drawn investments from Microsoft, Huawei, Cirion Technologies, Ascenty, Scala Data Centers, CloudHQ, and Elea Digital (Brightlio, 2024).

The rapid growth of the Brazilian data center market can be attributed to the growing need for cloud services, as well as the adoption of digital technologies like cloud computing, edge computing, high-density computing, AI and machine learning. A key market driver has been the rapid growth of industries such as banking, e-commerce, and telecommunications, which require dependable and scalable data solutions to support their operations (OpenPR, 2024). According to Brazilian data, the local data center market experienced a 628.0% increase in colocation capacity offered from 2013 to 2023 (Bnamericas, 2024).

Major hotspots such as Sao Paulo and Rio de Janeiro are seeing increased investments in data center infrastructure due to growing digitalisation, the adoption of cloud services, and the introduction of local data security laws, which drive the need for advanced and reliable data infrastructure. The market is expected to see robust expansion, particularly in Tier 3 and Tier 4 facilities, to meet the rising demand for efficient and reliable data services (Datanumero, n.d.). Compared to Tier 1 and Tier 2 facilities, Tier 3 and Tier 4 data centers offer the highest annual uptime and lowest fault tolerance, making them ideal for managing consistently high traffic or processing demands (phoenixNAP, 2021).

Market Size ($Bn)

CAGR: 5.8%

2024	2025	2026	2027	2028	2029
$5.3	$5.6	$5.9	$6.2	$6.6	$7.1
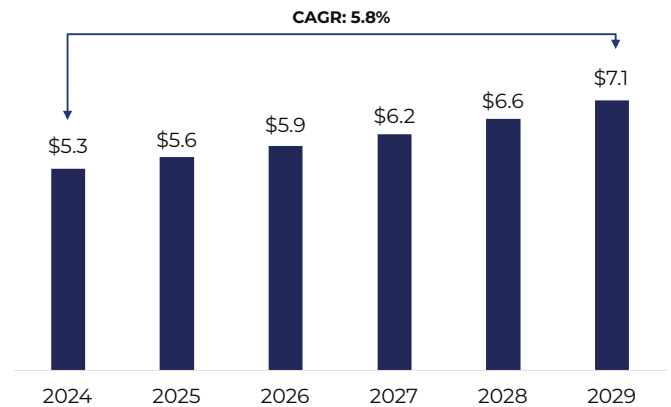
Source: Statista

As of mid-2024, São Paulo, the largest data center market, had a capacity of 330.0MW(Cushman & Wakefield, 2024). It alone accounts for 67.0% of the total data center inventory among the top four countries in the LATAM region (CBRE, 2024). As Brazil's primary commercial hub, São Paulo acts as a strategic gateway to other Latin American markets of Argentina, Chile and Uruguay as well as the United States. Its advanced digital infrastructure, comprising multiple submarine cable landing stations, high-speed internet connectivity and an extensive telecom network, has been a key growth enabler for the data center market. The Campinas region in the São Paulo state is the largest data center hub in Brazil, leading in terms of both operational capacity and ongoing or planned construction of projects (Bnamericas, 2024). However, space and energy constraints are pushing new developments further from the market's core. Certain areas in Barueri and Osasco have gained attention for smaller-scale data center projects due to diminishing land and energy availability (CBRE, 2024).

Rio de Janeiro is Brazil's second-largest data center market and has been steadily growing, driven by the hyperscale market, where growth has been amplified by the demand for cloud services, AI and IoT. Hyperscale data centers are essential to meet this growing demand, providing the necessary infrastructure for large-scale data processing and storage. As certain industrial regions like Barra da Tijuca and Centro reach saturation, new areas such as São Cristovão and Medeiros are emerging, with a focus on expanding energy supply (CBRE, 2024). The state's data center capacity grew by 115.0% in 2023, with additional new deliveries anticipated over the next few years (Bnamericas, 2024). For example, Cirion Technologies has acquired land in Rio de Janeiro to develop a 60.0MW data center complementing its existing facilities which is set to be launched by 2026 (Data Center Knowledge, 2024). Other notable projects include sites from Scala, Equinix, and CloudHQ, among others (Bnamericas, 2024).

The telecommunications industry in Brazil is undergoing a radical transformation, which is having a significant impact on the data center sector, with enhanced connectivity and increased bandwidth fueling the demand for more robust digital infrastructure to support emerging applications and technologies (Internet Aberta, 2024). In this regard, the rollout of 5G networks is significantly increasing the demand for edge data centers, which are essential for supporting low-latency applications. Notably, in August 2024, Nokia announced that it had been chosen by TIM Brasil (TIM) to enhance its 5G radio access network (RAN) coverage across 15 Brazilian states, with the expansion beginning in January 2025 (Helmi Technologies, 2024) (TelecomTV, 2024).

The adoption of cloud-based services is another major driver for the Brazilian data center market. Leading cloud service providers such as AWS, Microsoft, Oracle, IBM, Tencent Cloud, Google, and Huawei Technologies have established a significant presence in the Brazilian data center market. In 2024, Huawei launched its third cloud availability zone in Brazil, further extending its regional footprint (Huawei Cloud, 2024).

As part of its broader decarbonisation strategy, Brazil has committed to tripling its renewable energy capacity by 2030 (The Straits Times, 2024). The country remains a leader in renewable electricity within the G20, with 85% of its electricity in Jan 2025 coming from renewable sources, primarily hydropower (Ember, 2024) (Renewables Now, 2025). Capitalising on this clean energy landscape, colocation and hyperscale operators are increasingly turning to renewable energy to power their facilities, advancing towards more sustainable operations. For instance, in September 2023, Microsoft Brazil signed a 15-year power purchase agreement (PPA) with AES Brasil to secure 150.0MW of wind energy (Helmi Technologies, 2024).

Although hydropower is the dominant energy source in São Paulo, rising investments in solar and wind power have contributed to diversifying the energy mix. In particular, small-scale distributed generation facilities have gained popularity among data center operators, providing cost savings, reliability, sustainability, and energy independence. As a result, São Paulo has become the largest market for distributed solar PV energy in Brazil, with a capacity of 4.6GW as of September 2024 (Statista, 2024).

Policy and Regulation

The Brazilian data center industry still awaits a dedicated public policy that will promote business and stimulate growth. A dedicated data center policy in Brazil could provide a comprehensive framework that supports sustainability, drives investment, and enhances the overall competitiveness of the sector while addressing environmental and regulatory challenges. Nevertheless, industry operators acknowledge that the current administration is supportive of the industry's development and expect more government support and investments in the coming years (Bnamericas, 2024). By seeking greater government support, data center operators aim to create a more favorable environment for their operations, enhance sustainability efforts, and drive overall industry growth.

The Associação Brasileira de Data Center (ABDC) is collaborating with the Ministry of Development, Industry, Trade and Services (MDIC) and other sector organisations to enhance the competitiveness of Brazil's technology industry and attract investment. In November 2023, ABDC proposed a national data center policy, developed with the ministry, aimed at facilitating financing through the Brazilian Development Bank (BNDES) and reducing import taxes on equipment (Bnamericas, 2023). Recently, in September 2024, BNDES announced a R$2.0 Bn ($400 Mn) credit line specifically for data centers, funded by BNDES and the Universalization Fund for Telecommunications Services (Fust). Interest rates for this credit line start at 6.1% for projects in the North and Northeast and 8.5% for other regions (Cox, 2024).

The introduction of data localization legislation, such as the Lei Geral de Proteção de Dados Pessoais (LGPD), has driven investments in data centers by mandating local data storage. The LGPD, which took effect in September 2020, is Brazil's primary data protection regulation and mirrors the EU's GDPR. Compliance with LGPD requirements has led to a shift towards more mature data center operators which offer advanced infrastructure, rigorous data handling processes and security certifications (Arizton, 2024).

Additionally, government authorities have been actively promoting the growth of digital infrastructure through initiatives like the National IoT Plan, which seeks to drive innovation and expansion within the IoT ecosystem. This supportive regulatory environment is drawing substantial investments from both domestic and international players interested in establishing or expanding their data center operations in Brazil (OpenPR, 2024).

Brazilian data center operators are also encouraged to comply with international standards such as the Leadership in Energy and Environmental Design (LEED) certification and the Uptime Institute's Tier standards. LEED certification is a voluntary rating system that emphasises the sustainability of a building across its entire life cycle. Data centers with LEED certification use less energy, water, and natural resources, and are designed to minimise their environmental impact (Delta Power Solutions, n.d.) (U.S. Green Building Council, 2024). The Uptime Institute's Tier Certification of Operational Sustainability (TCOS) offers data center owners and operators an assessment of key operational behaviours and risks. It ensures that data centers not only meet design and construction standards but are also managed to achieve expected performance levels (Uptime Institute, n.d.).

Although voluntary, certifications like LEED from the Green Building Council (GBC) are widely adopted in Brazil. The accreditation process is managed by GBC Brazil and adheres to international standards. As of 2023, Brazil had over 3,500 buildings certified or in the certification process for green standards (Baker McKenzie, 2024). In 2017, there were only 410 LEED-certified buildings out of 1,226 registered for certification. This growth reflects Brazil's increasing commitment to sustainable building practices and its leadership in the green building movement in Latin America (Eco-Business, 2017). Various mechanisms, including tax incentives, are implemented to promote energy efficiency and sustainable construction (Baker McKenzie, n.d.). For instance, some municipalities have enacted laws that offer tax incentives for sustainable building practices, typically in the form of reductions in the Urban Property Tax (IPTU), although the specifics vary significantly (Baker McKenzie, n.d.). Additionally, Eletrobras, a government-owned electric power company, has established the National Program for Energy Efficiency in Buildings (PROCEL Edifica), which certifies energy performance in buildings. There are plans for PROCEL Edifica to become mandatory for all future constructions (Baker McKenzie, n.d.).

As per the Brazilian Association of Telecommunications Infrastructure (Abrintel), land lease costs in Brazil can be up to 40.0% cheaper compared to developed markets. Coupled with other factors, such as labour costs, this adds to the competitiveness of establishing data centers in Brazil. In addition, the country provides a secure environment for real estate transactions, helping to avoid land-related bottlenecks. This is supported by robust legal frameworks that regulate long-term contracts and land use. These factors have been crucial in mitigating the financial risks faced by investors in the Brazilian data center industry (Leaders League, 2024).

Outlook

Brazil is emerging as a key hub for data centers due to its strategic locations, robust infrastructure, and supportive regulatory framework. Investment in data center infrastructure is being fueled by both global technology giants and local companies, all aiming to enhance cloud services, data storage, and processing capabilities. Additionally, renewable energy sources are being integrated to power these facilities sustainably, addressing both operational efficiency and environmental impact (Helmi Technologies, 2024).

Additionally, economic growth, advanced submarine cable systems reducing latency, and political shifts toward more open markets are key drivers supporting the LATAM region's efforts to develop its planned 2.0GW of data center capacity. Brazil, as the continent's largest economy, is leading these initiatives (Data Center Hawk, 2024). For example, the upcoming deployment of the Firmina submarine cable by Google will connect Brazil with Argentina, Uruguay, and the US. At the same time, new entrants like CloudHQ, Surfix Data Center, and EVEO are investing in Brazil, further accelerating the sector's expansion (PR Newswire, 2024).

However, despite this momentum, the Brazilian data center market faces considerable challenges, particularly due to high energy prices and a volatile power sector. The country's heavy reliance on hydropower introduces supply-side risks during droughts, potentially leading to government-imposed energy restrictions that could disrupt data center operations (Singh, 2023) (Data Centre Dynamics, 2021).

To fully capitalize on its potential as a global data center hub, Brazil must cultivate a business-friendly environment, maintain policy consistency, and continue investing in both its energy and digital infrastructure. Given the capital-intensive nature of the data center industry, close collaboration between the public and private sectors will be essential to develop the market. Natural advantages such as geographic positioning and abundant natural resources will have to be complemented by a supportive policy framework to ensure that Brazil realises its potential in the global data center market (Leaders League, 2024).

08

About CleanBridge

About CleanBridge

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Sustainable Energy

Climate Finance

Sustainable Living

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