Navigating Global Growth in Data Centres – Riding the AI Wave

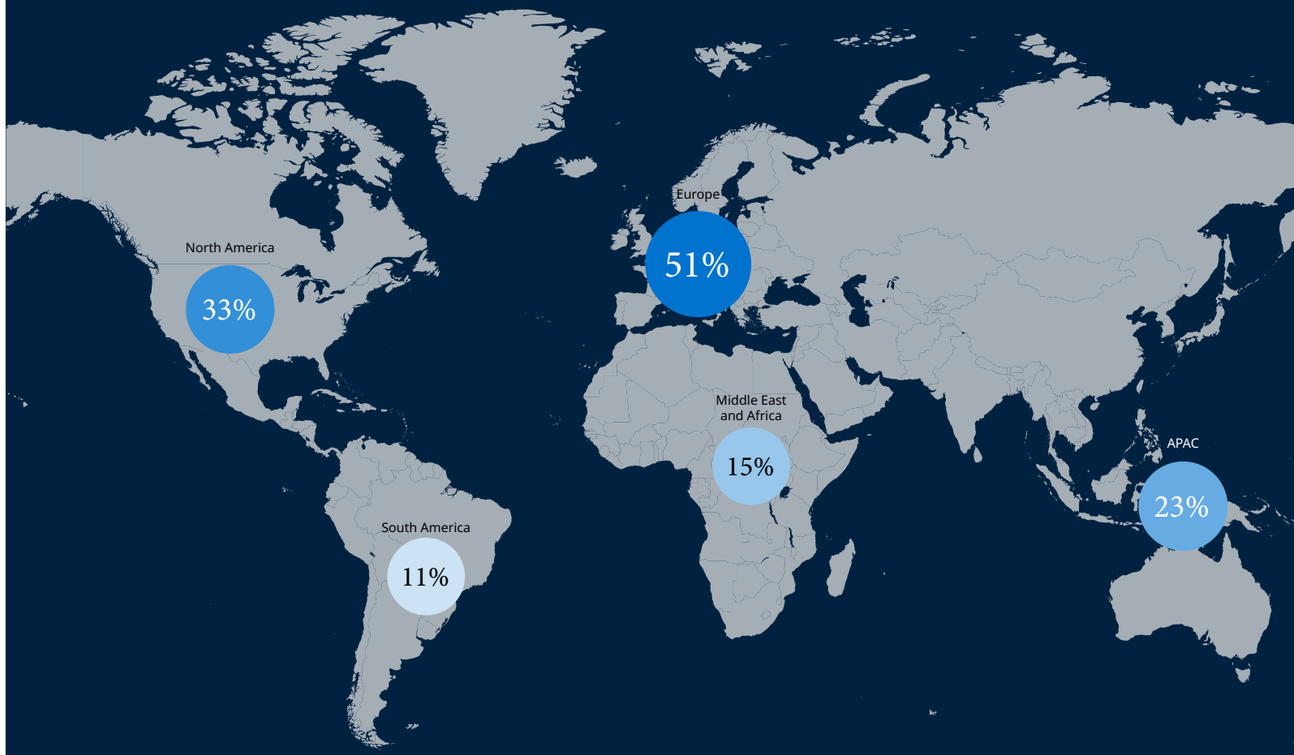
DLA PIPER

TMT Finance

Contents

Regions our respondents operate in

Respondents had the option to select multiple regions.



Methodology

In Q3 2024, TMT Finance, on behalf of DLA Piper, surveyed 176 senior executives on the topic of data centre investment opportunities and related emerging trends, such as access to power and the impact of artificial intelligence (AI).

The respondent group featured a global mix of the data centre investment ecosystem: industry executives, investors, financiers and advisers. Broadly categorised, respondents were split as follows: 25% Debt Providers and Investment Banking; 34% Advisory and Consultancy; 18% Infrastructure Investment and Private Equity; and 23% Data Centre Operators and Telcos (or Other). Over half of respondents had worked on five or more data centre transactions in the past 12 months, while 44% had worked on one to five.

Introduction

Data centre dealmaking has maintained its rapid rise in 2024. The global boom has continued at scale, driven by the proliferation of AI as we usher in the digital decade.

As digital infrastructure continues to underpin global economic growth, the data centre sector remains at the forefront of this transformation. With the exponential rise of AI, cloud services and data generation, the demand for scalable, high-performance data centres is accelerating at an unprecedented rate. Our survey results this year demonstrate that this momentum is not only sustained, but poised for further expansion.

According to TMT Finance analysis, the average valuation of the **global data centre market is expected to be around USD300 billion in 2024**, with a projected average compound annual growth rate (CAGR) of approximately 10% over the next five years.

This projection reflects the growing need for infrastructure that can support AI-driven applications and the increasingly critical role data centres play in enabling advanced digital services.

AI has emerged as a major catalyst, with its computational intensity reshaping the requirements for data centre capacity. Nearly all respondents identified AI as the largest driver of demand, particularly in areas like machine learning and natural language processing. Coupled with the ongoing migration to the cloud, 5G deployment and the rise of edge computing, the sector is primed for a continued surge in investment. This trend aligns with previous findings from 2022, where DLA Piper's report indicated that approximately 40% of respondents anticipated investments would grow by 30-50%.

In the most recent survey, there has been a slight increase in the percentage of respondents expecting investments to rise by over 50%.

In contrast to earlier findings, a larger proportion of respondents now expect AI to be the dominant force behind new developments.

However, the sector is not without challenges. Energy supply concerns have become a defining factor in both development and investment decisions. Issues related to grid connectivity, power availability and infrastructure reliability were raised by almost all respondents, with 98% expressing concerns about the sustainability of power sources. According to a recent estimate from Goldman Sachs Research, they predict that data centre power demand is projected to increase by 160% by 2030.

These constraints are further complicated by ESG considerations, which have risen to the top of the agenda.

More than **70%** of executives expect increased scrutiny around ESG practices, particularly regarding the integration of renewable energy and advancements in energy-efficient technologies.

Moreover, there is growing concern about a potential price bubble within the sector.

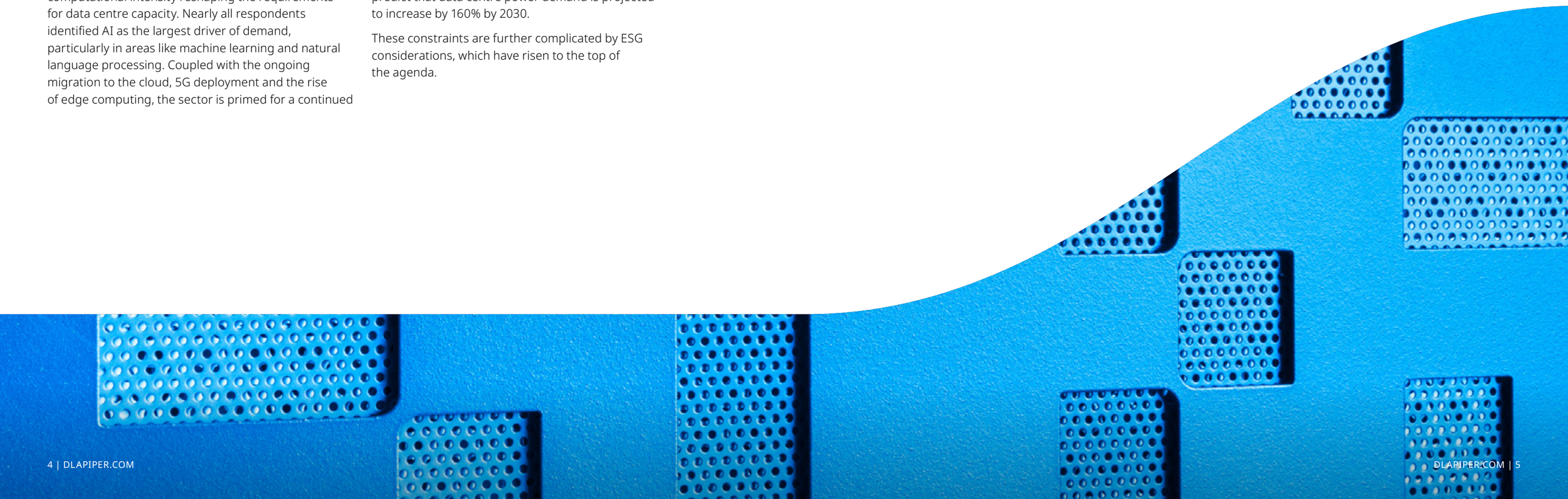
50% of respondents were either unsure if a price bubble exists or think there may be a price bubble growing within the next one to five years.

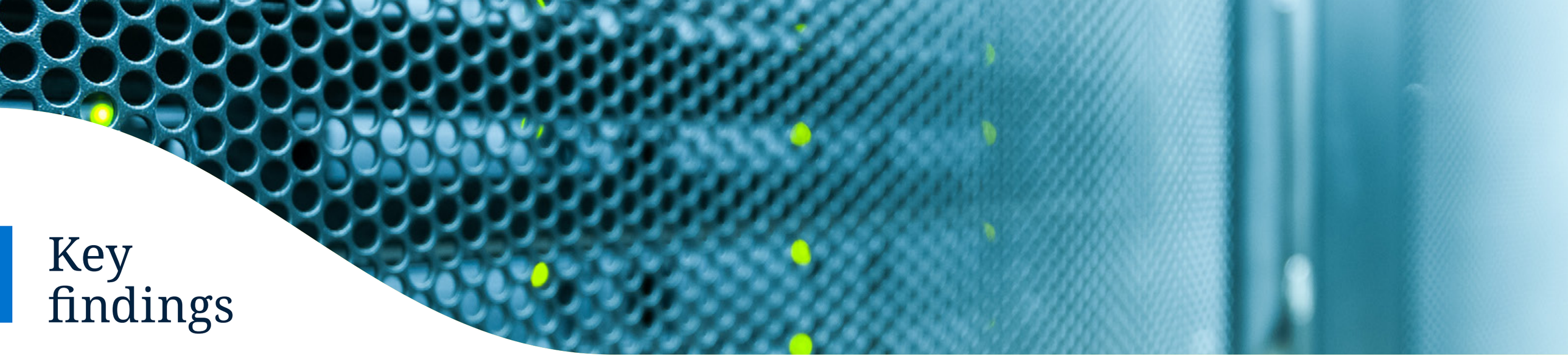
The largest driver of investment remains the strong demand for AI, which requires expansive and energy-intensive infrastructure. We are now seeing the development of hundreds of MW campuses for AI applications, requiring billions of dollars in capital to complete.

Despite these challenges, the fundamentals of the data centre market remain robust. Investors continue to be drawn to the sector's long-term growth outlook, with

70% of respondents expecting overall investment to increase over the next two years.

Additionally, some consolidation and M&A opportunities are on the horizon. As the industry evolves, successful operators will be those that can innovate in energy management, adapt to technological shifts and meet the growing demand for sustainable and scalable infrastructure. As digital transformation accelerates across all sectors, data centres will remain critical to enabling global digitalisation and economic growth, providing the foundation for AI, cloud and other next-generation technologies.





Key findings

AI is driving demand for data centres

Almost all respondents (97%) foresee AI driving demand for data centres, primarily through machine learning and natural language processing. Only 3% believe that demand will stay the same or decrease. The increasing adoption of AI technologies across industries necessitates high-performance computing environments and AI-ready data centres. As the demand for AI continues to surge, concerns about GPU and power availability are likely to become more pressing. Additionally, the expansion of AI technology will influence the future locations of data centres.

Expected increase in investment in data centre projects

A majority of respondents (70%) expect overall investment, including debt, in data centre projects to rise. This anticipated increase is driven by the growing demand for data centre services fuelled by AI adoption, cloud computing expansion and digitalisation trends across various sectors.

Increase in financial and strategic acquisitions

Financial acquisitions by investment funds and financial sponsors are expected to experience significant activity over the coming 24 months, according to 49% of respondents, underpinning the opportunity for M&A and consolidation in the sector.

Strategies to mitigate power constraints

The main strategies identified to mitigate power constraints include adopting more efficient data centre technologies and enhancing collaboration with energy providers. This approach aims to optimise energy usage within data centres through innovations such as advanced cooling systems, energy-efficient server designs and intelligent power management systems.

Concerns about power sources for data centres

Nearly all respondents (98%) expressed concerns regarding the availability and reliability of power sources for data centres. Issues such as grid reliability, capacity constraints and the sustainability of power sources, including the adoption of renewable energy, were crucial considerations.

ESG scrutiny and due diligence

Over 70% of respondents anticipate an increase in Environmental, Social and Governance (ESG) scrutiny and due diligence within the next two years. This expectation reflects a growing awareness and regulatory pressure on data centre operators to enhance their sustainability practices. ESG criteria are becoming increasingly important for investors and stakeholders, influencing decisions on project funding, partnerships and operational practices.

Key growth markets

A significant portion of respondents, ~30% anticipate that the United States (US) will experience the most substantial increase in data centre project investments over the next 24 months. China follows with ~8%, while Europe and Spain are expected to attract similar levels of growth, each cited by ~6% of respondents.

> “The largest driver of investment remains the strong demand for AI, which requires expansive and energy intensive infrastructure. We are now seeing the development of hundreds of MW campuses for AI applications, requiring billions of dollars in capital to complete.”

Anthony Day
Partner at DLA Piper

M&A at the centre: Investment trends and expectations

TMT Finance's proprietary deal data showed that global data centre M&A activity increased substantially year on year (YoY) over the past 12 months – both in terms of activity and average deal value.

A total of 154 announced data centre M&A transactions were tracked globally between 1 October 2023 and 30 September 2024, compared to 101 announced deals in the 12 months prior, showing an increase in activity by 52% YoY.

Deal values also saw a bump of 42% YoY, with the average M&A deal value equating to USD958 million over the past 12 months, versus USD671 million in the previous 12 months.

The acceleration of digital transformation initiatives across industries has fuelled the demand for cloud services. Companies are increasingly migrating their operations to the cloud, requiring more data storage and processing capacity, which, in turn, boosts investment in data centres. Additionally, the rollout of 5G networks, the rise of edge computing and the ever-increasing data demands from AI and big data analytics indicate that the demand for data storage is unlikely to decrease.

Accordingly, half of the respondents (50%) reported that they have developed or invested in more than five data centres over the past 24 months, while 28% indicated they had invested in two. Fifty percent of respondents said they expect to develop or invest in more than five data centres over the next two years, underlining the ongoing demand for capacity in the sector. Meanwhile, the vast majority (90%) stated that they had not sold any data centres in the last two years, signalling a trend towards longer-term holding of assets in the sector, as well as its relative nascency. That may be changing, however, with our survey results predicting an uptick in acquisitions by financial sponsors over the next 24 months, see page 47.

How many data centre projects has your organisation sold over the past 24 months?

> "Data centres provide mission critical infrastructure for the largest and fastest growing companies around the world. The growth in data creation and storage requirements is exponential and this data has to live in physical infrastructure."

Alexis Kantt
Managing Director
at Blackstone

Data centres across continents: From the US to Europe

The US data centre market is experiencing rapid growth, driven by high demand for cloud services, big data analytics, and AI. This surge is prompting significant investments from major tech companies fostering increased competition and innovation. Institutional investors, including Microsoft and BlackRock, are capitalising on the trend, with their recent USD30 billion fund aimed at AI infrastructure.

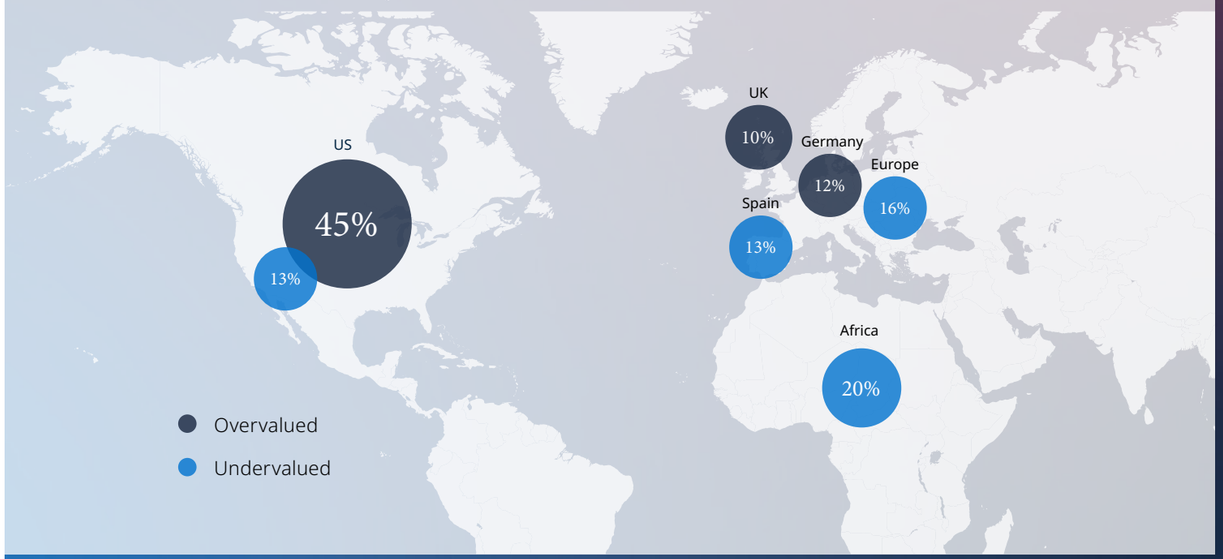
Data centres have become an attractive and politically protected asset class, further underscored by the current US administration's establishment of a Task Force on AI Data Centre Infrastructure. This initiative aims to coordinate policy, support AI data centre development, streamline permitting and address legislative needs for the sector.

As the data centre industry faces a power crisis, the incoming Trump administration's shift in energy policy could significantly impact its growth. While both Trump and Vice President Harris supported expanding data centres for AI, their approaches differ drastically. Biden's administration focussed on renewable energy and nuclear power to address rising demand, while it is anticipated that Trump's plans will promote fossil fuel and nuclear energy, easing environmental regulations to speed up development. Many in the industry expect this regulatory shift to alleviate power constraints, particularly by accelerating the use of natural gas and reducing barriers for energy infrastructure, which could help meet the growing demands of AI data centres. According to research firm Gartner, the Trump administration will likely deprioritise federal oversight on energy consumption and renewable energy use, with state and local regulations on power usage and environmental impact remaining the primary drivers in the near term. The Gartner report, also noted that Europe's stricter renewable energy regulations could push some companies to focus on US expansions, where subsidies and fewer regulations make operations more cost-effective.

In contrast, Europe's data centre market is more fragmented, with varying regulations across countries. While countries like Germany and the UK are leading in terms of investment and development, the overall growth rate is generally slower compared to the US. However, Europe's focus on sustainability and energy efficiency is shaping its market, with many data centres adopting greener technologies to meet regulatory standards and consumer demand for environmentally friendly solutions.

Without prejudice to the above and linked to the undervalued market in Spain, it should be noted that the total economic impact of the data centre industry in Spain in recent years was approximately EUR70 million (around 3% of national GDP). To this should be added the indirect investments derived from the hardware and software needs for the provisions required by these kinds of projects, amounting to an additional investment of approximately EUR20 billion.

Views on the value of key data centre markets



The key pillars to selecting investment

The increasing significance of AI is driving a substantial transformation in the data centre industry, as highlighted in our survey and DLA Piper's recent Tech Index. The demand for data centre capacity is expected to surge, particularly owing to AI applications such as machine learning and natural language processing, which require extensive computational power. This evolution presents an opportunity for investors, with strategies including investments in dedicated AI GPU stacks, advanced cooling systems and enhanced data centre support infrastructure.

Governments, recognising the critical role of data centres in the digital economy, are designating them as Critical National Infrastructure (CNI), which will enhance government support and boost investor confidence. The rise of yield companies (YieldCos) in the data centre sector is another key investment strategy. YieldCos enable operators to lower their capital costs and secure funding through steady cash flows backed by long-term contracts, while a number of industry experts predict that data centre power capacity will double over the next five years and hyperscalers and global investors alike are announcing commitments of upwards of USD25 billion into the sector.

In addition, investing in data centres requires careful consideration of various factors, including location, power consumption and sustainability practices, particularly in light of increasing ESG regulations. Understanding local and international regulatory compliance, as well as market demand and technological infrastructure, is essential for assessing future viability. Investors should also evaluate scalability, the financial stability of the operators and the robustness of security measures in place to protect data integrity. Additionally, supply chain considerations for critical components and a clear exit strategy are vital for long-term success.

A majority of respondents (70%) expect overall investment, including debt, in data centre projects to rise. Partnerships with specialist data centre operators are expected to attract the most investment interest in the next two years, followed by shell and core purchases and speculative development.

> "A majority of respondents (70%) expect overall investment, including debt, in data centre projects to rise. Partnerships with specialist data centre operators are expected to attract the most investment interest in the next two years, followed by shell and core purchases and speculative development."

Jo Owen
Partner and Co-Chair Global Real Estate Sector
at DLA Piper

Blackstone

Alexis Kantt,
Managing Director, Blackstone

How has the data centre (DC) sector evolved and what will be the investment trends in the next two years?

The growth in data creation and storage requirements is exponential – there has been more data created in the past three years than in all previous history combined. This data has to live in physical infrastructure. This all translates into meaningful customer demand for data centre space.

How is access to financing changing?

Digital infrastructure represents critical network infrastructure that provides essential services, with opportunity for strong, long-term, stable bond-like cashflows with some of the best credits in the world. For that reason, there is the required debt capital despite what has been a challenging market backdrop.

FLAP-D locations see the most activity but have limits on power and land. Can you elaborate on other markets of opportunity within Europe?

We are increasingly seeing customer interest to expand beyond the FLAP-D markets, which seem constrained in terms of availability of land and power, towards secondary markets such as Milan, for example. It's a similar trend to what the US has experienced over the past three years.

Where are we in the broader investment cycle in the DC sector? Are we nearing peak growth?

We are in a transformational technological period and we believe assets in the digital infrastructure sector are positioned to perform well over the long term.

With so much R&D is there concern that some DCs may become obsolete? With new tech emerging, how does that fit an investment thesis?

The biggest technology change we are seeing for data centres is power densification, where servers are getting more powerful and require less square meters. For this reason, we are very focussed on building flexible designs that can easily adapt as customer needs change.

Key drivers for investment

AI's power play

DLA Piper's recently published Tech Index notes that around seven in ten rate AI as either important or very important for their business over the next five years. AI's continued integration within all aspects of modern business and life more widely, is expected to drive significant growth in data centre requirements. This growth will affect all levels of data centres, leading to greater segmentation and an increased focus on GPU availability. AI applications consume significantly more power, that could reach up to 50 times that of traditional tasks – making it a major driver for advancements in technology and cooling systems. While cloud computing currently dominates data centre usage, some predict a potential reversal as AI demands rise. The need for more data centre support systems and dedicated AI GPU stacks will grow, and AI's impact will likely lead to increased general data usage.

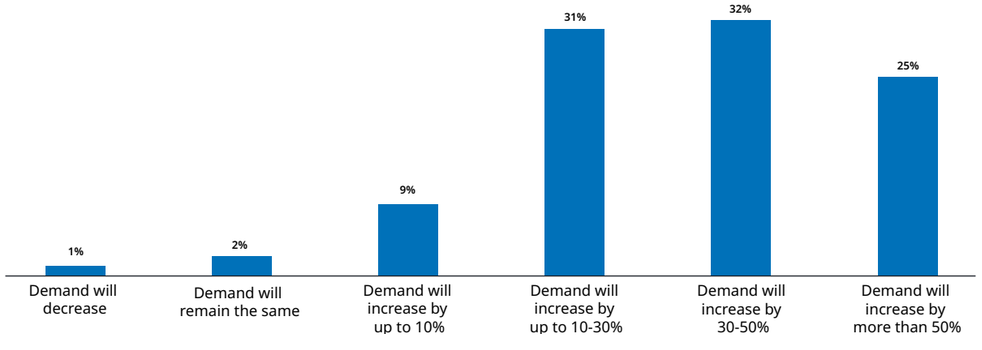
AI is still a nascent sector but there is widespread consensus on a forthcoming surge in computed power requirements. According to our survey, 32% of respondents anticipate that AI-driven demand will surge by 30-50%, while 31% expect a rise of 10-30% and 25% predict an increase of over 50%.

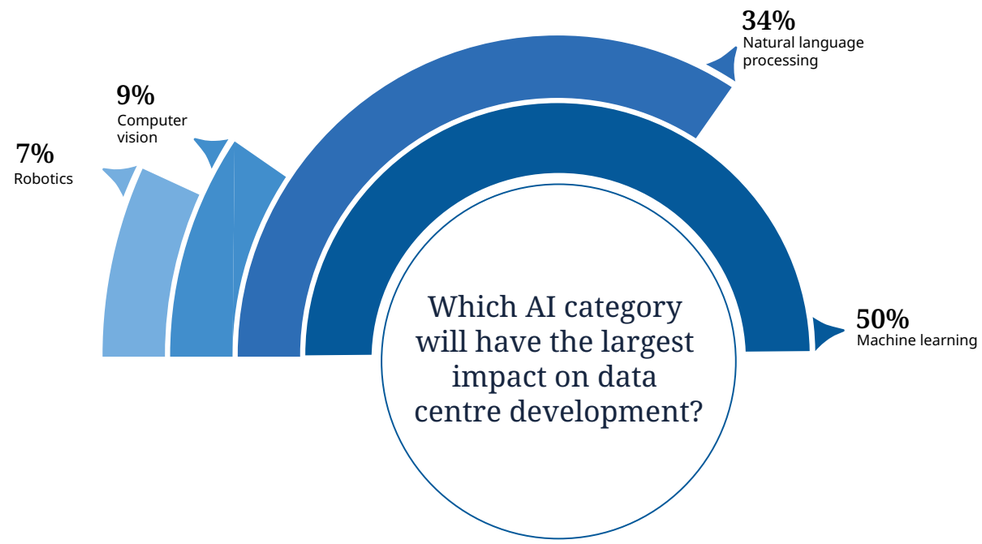
AI applications, such as machine learning, natural language processing and computer vision, require substantial computational power and data storage, which in turn drives the need for more data centres. Half of respondents (50%) believe machine learning will be the largest demand driver, followed by natural language processing (34%).

> With nearly 80% of respondents here seeing GenAI as a key driver of demand and 70% of our Tech Index clients seeing AI as important or critical to their business, there is little doubt of the impact it will have over the next decade.

Mark O'Conor
Partner, MD for Sectors at DLA Piper

How much extra demand for data centres is being driven by the provision of AI?





> AI capacity is not just for today or near term, buyers must think about medium term needs. It makes sense to purchase with years of visibility as to where you'll need to grow.

Ani Satchcroft
Co-Head of Infrastructure Asia-Pacific and Senior Managing Director at Macquarie Asset Management

The vehicle for investment: the role of yieldcos

Yield companies, or yieldcos, originally emerged in the early 2010s within the power industry, particularly in the renewables sector. They gained popularity but quickly declined following the SunEdison bankruptcy in 2015, which led to a significant loss in market value. However, yieldcos are now making a comeback, driven by digital infrastructure investors seeking to raise substantial capital for building AI-supportive computing capacity.

The resurgence is fuelled by the growing demand for AI applications, which require extensive data centre capacity. A number of industry experts predict that data centre power capacity will double over the next five years; hyperscalers and global investors alike are announcing commitments of upwards of USD25 billion into the sector.

To secure the necessary funds, data centre operators are exploring various financial structures, including asset-backed securities, project finance and preferred equity. Yieldcos are particularly attractive because they allow operators to lower their cost of capital and obtain equity to build high-performance data centres. Investors benefit from steady cash flows backed by long-term contracts with major hyperscalers.

The amount of debt raised for greenfield projects has significantly increased, with infrastructure project sponsors using a mix of commercial bank debt and capital market transactions. Yieldco deals are being priced with mid single digit cap rates, varying according to asset quality[1].

Overall, the revival of yieldcos in the data centre industry reflects a strategic approach to capitalising on the growing demand for AI and digital infrastructure, leveraging stable, income-generating assets to attract investment and support ongoing development. As institutional investors increasingly recognised their lack of exposure to the data centre market, demand for yieldcos is only likely to rise.

At the confluence of law and politics: a push from the political realm

As already touched upon, governments aren't shy about protecting data centres given their centrality to the digital evolution currently taking place. The UK is another prime example, with data centres recently designated as Critical National Infrastructure (CNI). This classification places them alongside essential services such as energy supply, water supply and healthcare facilities. The move reflects the growing recognition of data centres as the backbone of modern digital infrastructure.

As part of the Critical National Infrastructure, data centres will receive enhanced government support during major incidents, such as cyber-attacks, to minimise disruptions and ensure the continuity of critical services. The designation is expected to boost investor confidence and support economic growth, with significant investments already planned, such as the proposed GBP3.75 billion data centre in Hertfordshire, England, as reported by the BBC.

1 https://ionanalytics.com/insights/infralogic/analysis-data-centers-resurrect-yieldcos-in-quest-for-cash/

Current data centre focussed planning reforms in England

In July, the UK elected its first Labour government since 2010 and at the heart of the new administration's agenda is economic growth. The UK's planning system is often seen as a barrier to growth because of its slow, cumbersome and often unpredictable nature. Reform of that system in England (planning is devolved in the rest of the UK and so beyond the reach of Westminster) has therefore been an early priority for the new government. The role that data centres play in underpinning other growth sectors has given them particular prominence in the proposed reforms, alongside other high-tech developments such as gigafactories and life science facilities.

The National Planning Policy Framework (NPPF) sets out central government's planning policies for England. It's a critical document that sets out the direction of travel for the whole of the planning system. Being a policy document rather than legislation, it's therefore relatively easy to change. Unsurprisingly therefore, it's where the government has chosen to start the task of planning reform.

A public consultation on proposed changes was held over the summer and a new version of the NPPF is expected to be published before the end of 2024. Some of the key proposals relating to data centres are:

- Recognising data centres as critical infrastructure for which there is an urgent need. This increases the weight to be given to approving applications for new data centre developments.
- Requiring councils to identify and then meet the need for new data centre development in their local planning policies.
- Where local policies are not meeting need, engaging the presumption in favour of sustainable development for planning applications relating to data centres.

Critically, the changes to the NPPF recognise that this support needs to extend to supporting infrastructure, notably the power grid. At the very least, this is a clear demonstration that the new government understands how critical infrastructure is to the continued development of data centres and the attractiveness of the UK as a data centre hub.

Data centres have historically had a mixed reception in the UK. Some areas have welcomed the development of a cluster whereas elsewhere they have been opposed. Often the opposition has been to the clustering and the cumulative impacts this brings (notably on power and other services) and the perception that they do not bring benefits in the form of employment that might justify these impacts.

The NPPF changes should provide welcome policy support to offset some of this historic opposition. They will be particularly powerful where a council refuses a planning application and the developer submits and appeal to the Secretary of State. As the NPPF is the Secretary of State's policy document, it should enable developers to approach appeals with more confidence than might have been the case previously.

Alongside these policy changes, the government has consulted on other ideas, including taking data centres into the infrastructure consenting regime to remove the need for a planning application to the local council. There is also more to come with a Planning and Infrastructure Bill due to be presented to Parliament in early 2025.

Macquarie Asset Management

Ani Satchcroft,
Co-Head of Infrastructure Asia-Pacific and Senior Managing Director, Macquarie Asset Management

How has the data centre (DC) sector evolved and what will be the investment trends in the next two years?

It is interesting how hyperscale data centres have become a sub sector in the industry. In recent years, we've seen a rise in capacity requirement, which is partly driven by increased data creation, use and storage, the move to the cloud, and AI, which consumes approximately 10 times the amount of power of traditional usage. Another trend is the increasing importance of social license to operate, including power type availabile plus site selection.

How is access to financing changing? What deal structures are you deploying?

On the equity side, the risk profile has changed. When we were first investing, hyperscale was relatively new. Building at this scale required a level of risk higher than today. Now, the risk profile has come down. There's a track record and understanding of which operators have access to power and water and you've got some sense of the ramp up profile. On the debt side lenders are now more familiar with data centres as an asset class. As a result, cost and availability of financing has improved in recent years.

What fundamentals do you look at when considering a DC investment?

For our type of capital, hyperscale is a great fit, with stable cash flows and revenue escalation. Another interesting aspect is increased regionalisation. One part of our investment thesis is the ability to provide a regional solution; i.e. an operator that's able to provide services across multiple sites.

To what extent does ESG impact your DC investment strategy?

We think a lot about the social license to operate, starting with DC design and how this can be optimised, including making sure that sustainable sources of power are used. Sharing that information and learning within the industry is important as well.

How is GenAI affecting the broader investment thesis in DCs and over the next two years?

AI is important with respect to capacity. It's led to larger contracts being signed, is important in terms of power availability and has de-risked entry into new jurisdictions. Having a large contract anchoring entry into a new jurisdiction is preferable to having a smaller contract and taking a view on lease up. AI capacity is not just for today or near term, customers must think about medium term needs. It makes sense to purchase with years of visibility as to where they'll need to grow, rather than purchasing short term and then having to find another site in a different location.

Where are we in the broader investment cycle in the DC sector? Are we near peak growth?

It's important to consider how the risk return equation has changed. Now that we've had several years of track record, knowing which operators can build on time and on budget, we are familiar with the contracting pattern. As a result, we know how quickly deals get contracted and with this AI tailwind contract sizes are increasing again. Therefore, the logical capital provider for this sub sector has become lower risk. This attracts investors that have an ongoing ability to fund. These can be open ended funds, or funds such as pension funds and superannuation funds, as well as investors with lower risk profiles.

What new DC technologies will become most prominent?

Along with AI, corresponding technology such as cooling become important. Another aspect is safety. Considerations such as modular building and prefabrication are also interesting.

Greening the grid

ESG considerations in the data centre industry

As the demand for data continues to surge, data centres have become central to our digital infrastructure, driving unprecedented growth in the industry. However, this rapid expansion comes with a significant challenge: the enormous energy consumption required to power these facilities. Consequently, ESG considerations have transitioned from being optional to imperative in the development of and investment in data centres.

Since 2020, the EU has implemented three particularly significant pieces of legislation that put a spotlight on ESG considerations for all large EU businesses, including data centres. The Corporate Sustainability Reporting Directive (CSRD) and the Taxonomy Regulation both establish mandatory reporting obligations for companies meeting certain size thresholds. The information to be reported is broad and includes environmental matters such as GHG emissions, energy usage, pollution and waste, in addition to social issues like the protection of workers within both a company's own workforce and the workforces of those companies within its 'value chain'.

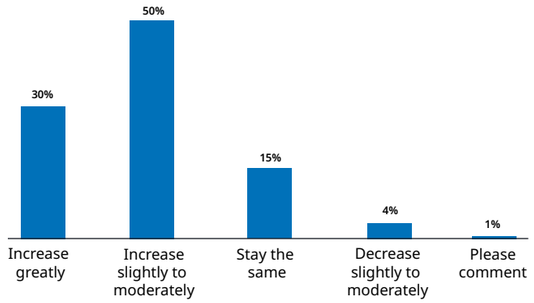
The most recent piece of relevant legislation is the Corporate Sustainability Due Diligence Directive (CSDDD), which requires in-scope businesses to put in place extensive due diligence policies and procedures to prevent and mitigate adverse environmental and social impacts identified through that due diligence. The CSDDD also requires companies to implement a climate change transition plan in line with the Paris Agreement. Together, CSRD, Taxonomy Regulation and the CSDDD create a robust framework that encourages data centres to adopt sustainable practices, improve energy efficiency and reduce their environmental impact. By integrating these regulations into their ESG strategies, data centres can play a crucial role in advancing the EU's climate and environmental goals, while also benefitting from the growing demand for sustainable and responsible business practices.

Our survey confirms that ESG scrutiny and due diligence are on the rise. Almost half (42%) of respondents said they've seen a slight to moderate increase in ESG scrutiny over the past two years, while 30% reported experiencing a significant increase.

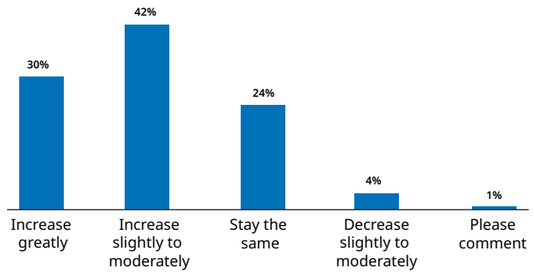
This scrutiny is expected to grow, with 50% of participants saying that ESG scrutiny and due diligence are expected to increase slightly to moderately over the next two years. Almost a third (30%) think scrutiny will increase greatly.

Among those surveyed, 46% actively track ESG-related metrics for data centre projects, while 21% monitor certain metrics. Additionally, 17% do not currently track ESG metrics but plan to implement this practice within the next 24-months.

How do you expect ESG scrutiny and due diligence to change when making data centre investment decisions at your organisation over the next 24 months?

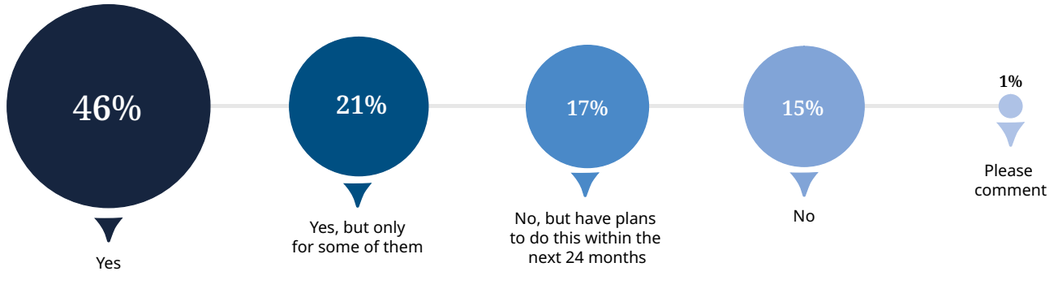


To what extent did ESG scrutiny and due diligence change when making data centre investment decisions at your organisation over the past 24 months?



> "EU-based data centre operators have to navigate an increasingly complex set of obligations relating to the collection and publication of ESG focussed data from across their 'value chain'. This is a big shift from the earlier voluntary approach and requires these companies to take a step back and consider how their approach to ESG is going to be perceived in comparison with their competitors."
>
> **Nick Rock**
> Partner at DLA Piper

Do you actively track ESG-related metrics on the data centre projects your organisation invests in/finances/develops?



Measuring the future – metrics that are shaping the industry

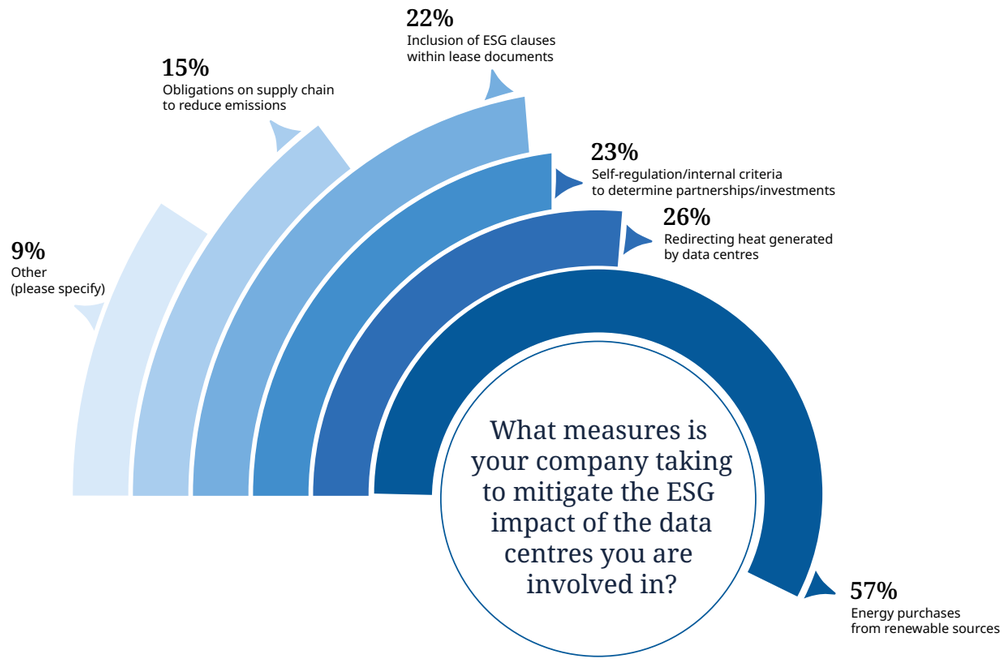
Power usage effectiveness (PUE) comes to mind as the most prominent metric when measuring ESG efficiency. However, to gain a more comprehensive understanding of a data centre's sustainability, emerging metrics such as water usage effectiveness (WUE), carbon usage effectiveness (CUE) and energy reuse factors (ERF) are becoming increasingly common. As Alex Thomas, Head of European Communications Infrastructure, RBC Capital Markets, explains: "Measures like PUE or power-to-IT power conversion improve through smart design and better usage, but water is important too; 'WUE' (water utilisation and efficiency) is becoming prevalent."

The survey highlights that access to green energy is considered a pivotal measure to implement ESG considerations, as it plays a prominent role in reducing carbon footprints, enhancing sustainability and meeting regulatory and stakeholder demands for environmentally responsible operations. Over half (57%) said they bought energy from renewable sources. In addition, redirecting heat generated by data centres (26%) and self-regulation (22%) are also tipped as important means to make data centres more ESG-friendly.

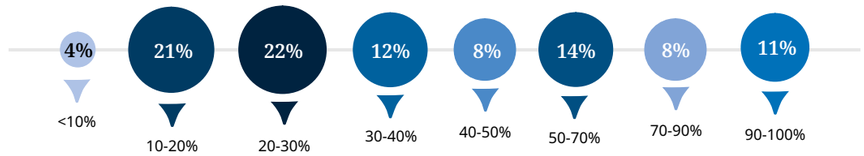
For data centres connected to renewable energy sources, 22% of those surveyed expect that 20-30% of the power will come from renewable sources. Another 21% anticipate this figure to be 10-20%, while 13% foresee a higher range, with 30-40% of the power being renewable.

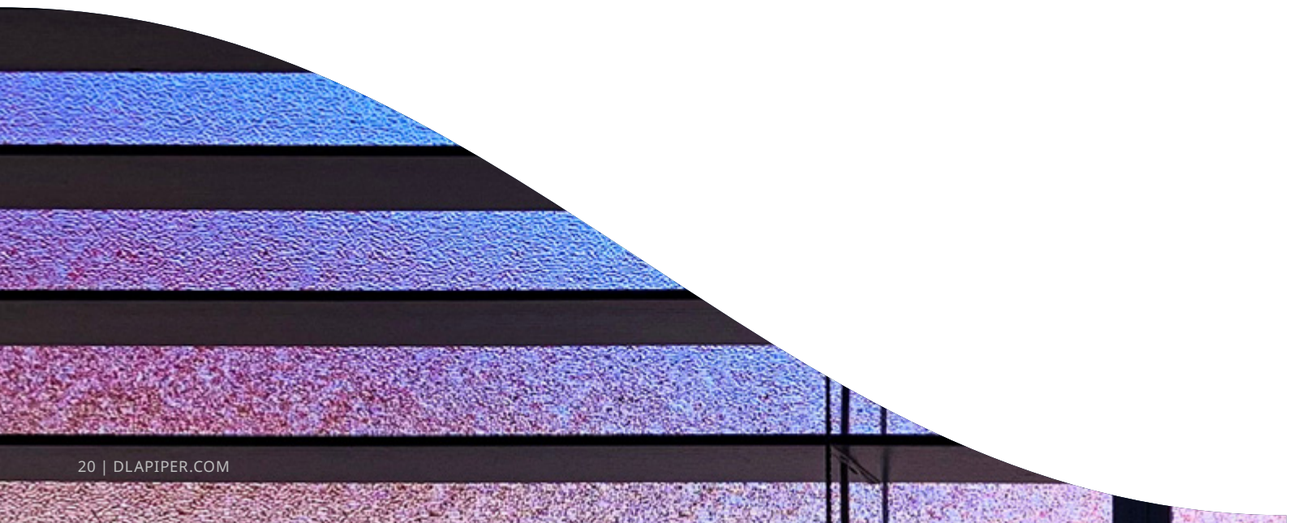
> "Demand will continue. The biggest task for data centre operators is to grow sustainably."

Vincent Gerritsen
Head of UK and Europe at Morrison



In a data centre which has a renewably-tied power provision element, what is the most common percentage of power you see coming from renewable sources?





RBC Capital Markets

Jonathan Atkin,
Managing Director, RBC Capital Markets

How has the data centre (DC) sector evolved and what will be the investment trends in the next two years?

There continues to be growing demand for hyperscale capacity. The emphasis now is as much, if not more, on energy than on real estate and increasing investment flows into the sector to meet capital needs of the major DC platforms.

How is access to financing changing?

All parts of the capital stack are used: asset backed debt, CMBS debt, bank credit, corporate, corporate credit, equity; the demand for capital continues to grow and operators are tapping all parts.

Is access more diversified in terms of types of financing?

It has been diverse for a while; I don't see it changing. You've got private real estate capital, infrastructure capital, pension funds and sovereign wealth funds. Listed companies are just the tip of the iceberg; most DC development is done by unlisted companies.

What are the fundamentals that sponsors look for?

Sponsors are looking for proven ability to execute on behalf of the largest Internet companies. All regions are growing; APAC the most in percentage terms. Established and tier two markets across EMEA, Americas and APAC continue to offer significant opportunities.

Do you think we'll see a change in the length of contracts?

In the last two years contract length has increased. Seven to 15 years was normal, but now we're in the middle to upper end for hyperscale contracts; not just AI, but cloud, social networking and software as a service; even technology companies are doing large deals.

To what extent does ESG affect DC investment strategy?

There's always going to be a preference for renewable energy. Fossil fuels like natural gas are experiencing a longer tailwind of demand given the size of requirements. Fossil fuels as clean as possible are not a lesser part of the mix, they remain significant and should for some time.

How is GenAI affecting broader investment theses in DCs, through speed, amount, rate of return and/or other areas?

GenAI is a significant demand driver; large foundation models are more location agnostic/less latency sensitive. It provides developers with more flexibility. GenAI makes it easier for projects outside availability zone architectures to meet demand. Cloud is, however, more specific on location.

Where are we in the broader investment cycle in the DC sector? Are we nearing peak growth?

The rise in building and leasing continues and I don't see it ending. I think it depends on one's view of cloud and AI growth. There'll be more megawatts leased each year, but the degree to which growth continues after two or three years is uncertain.

Are there industry concerns on technological obsolescence? With new tech coming out every year, how does that fit into the investment thesis?

Most rack density requirement for AI is going into DCs that are just now being delivered, and most contemporary designs are compatible with liquid cooling techniques needed for AI, so there does not seem to be obsolescence risk. Technical requirements for AI are conforming to what the DC industry can deliver, rather than the other way around.

Are there other design changes we should anticipate?

The principal design change will be liquid cooling 'direct to chip'. This requires operational standards and practices that are still being worked out. I don't see technological or supply-chain constraints in meeting this; 'direct to chip' will be the workhorse for the next several years.

Are we realistically going to be able to meet the exponential power demands, especially in the US market, are there concerns around how we get there?

I don't think there are long-term constraints. There are temporary ones on transmission. Each jurisdiction will look different, but in general, these are solvable through time and capital deployment.

Watt's next? Power at the core yet again

The power capacity of data centres has increased significantly over time to accommodate the growing demand for data processing and storage, driven by the rapid growth in demand for digital services, cloud computing, AI and big data. As Morrison's Head of UK and Europe, Vincent Gerritsen, explains: "A few years back we were talking about 1 to 5MW, then 10MW+, and now 100MW and 200MW+ which has increased location flexibility."

In response to rising demand, data centre companies are implementing strategies to enhance capacity. This includes investing in the expansion of existing facilities and building new ones in regions with favourable regulations and power availability. A notable trend is the shift towards renewable energy sources, such as wind, solar and hydroelectric power.

Additionally, some firms are opting for powered shell developments, which allow for rapid deployment and scalability by enabling the interior infrastructure to be developed as demand increases.

Aside from nuclear power, many data centres are also investing in on-site power generation technologies, like solar panels and combined heat and power (CHP) systems, to enhance energy security. Furthermore, alternative fuels – including natural gas, biofuels and hydrogen – are being explored as viable options.

Energy storage systems, such as batteries, allow data centres to manage excess energy generated during low-demand periods, contributing to grid stability. Advanced technologies like AI and machine learning optimise energy consumption by analysing usage patterns, while edge computing distributes processing power closer to data sources, reducing the energy load on centralised facilities.

Despite these proactive measures, the rising electricity demands strain existing grid capacities in many regions, resulting in delays and restrictions on new data centre developments. Furthermore, stringent regulations regarding energy consumption and environmental impacts can impede the approval and construction processes for new facilities. As mentioned above, public opposition often complicates development efforts, as local communities frequently resist the establishment of new data centres due to concerns about energy consumption and environmental implications.

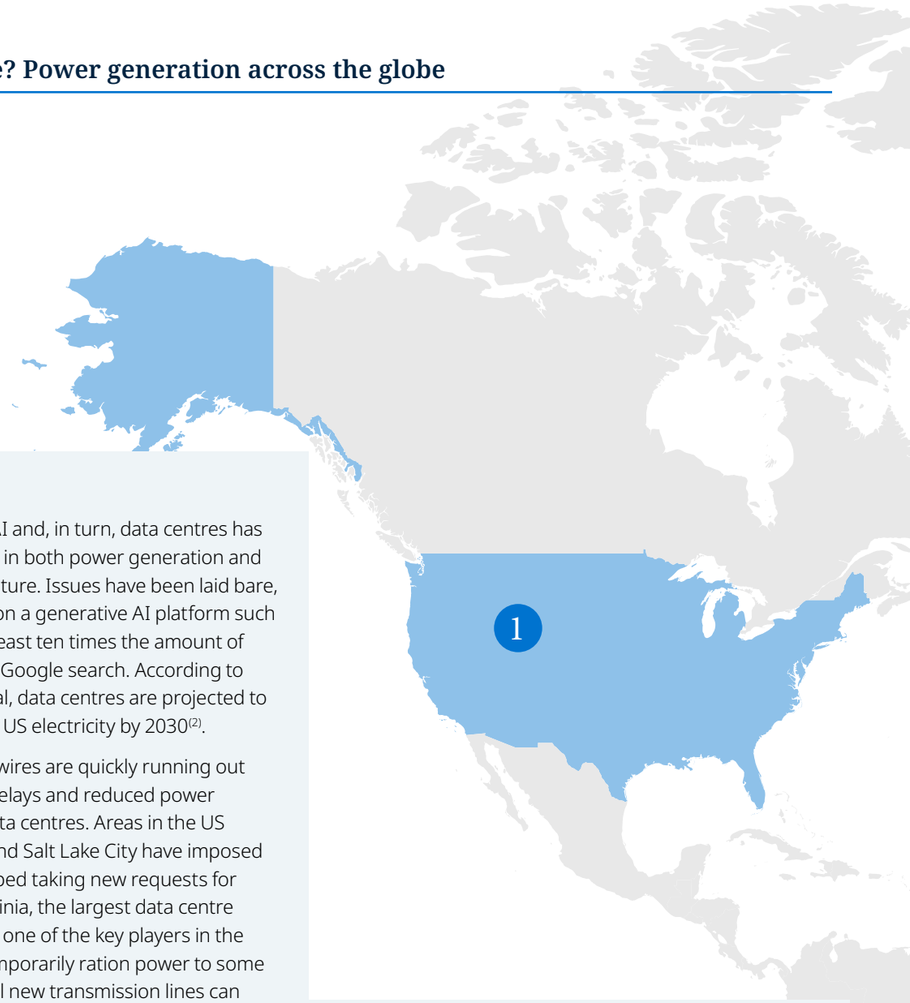
According to The Wall Street Journal, data centres are projected to consume up to 9% of US electricity by 2030[2]. This surge is straining the existing electric grid, leading to moratoriums on new projects in areas like Santa Clara and Salt Lake City and power rationing in Virginia's data centre market.

Globally, similar issues are emerging; in Australia, the increased power demands of data centres come at a time when Australia is decommissioning its base load coal-fired power stations and transitioning to renewables and while South Korea and Singapore face public opposition and limited resources for new developments. Ireland has imposed a moratorium on data centre growth in Dublin until 2028 to maintain grid stability.

> "There are many well capitalised companies buying land, entitling it for data centres and attempting to bring massive amounts of power to the site. This has resulted in utility companies being inundated with power delivery requests that they will not be able to satisfy until the 2030s."

Mike Rechtin
Partner at DLA Piper

An isolated issue? Power generation across the globe



1. US

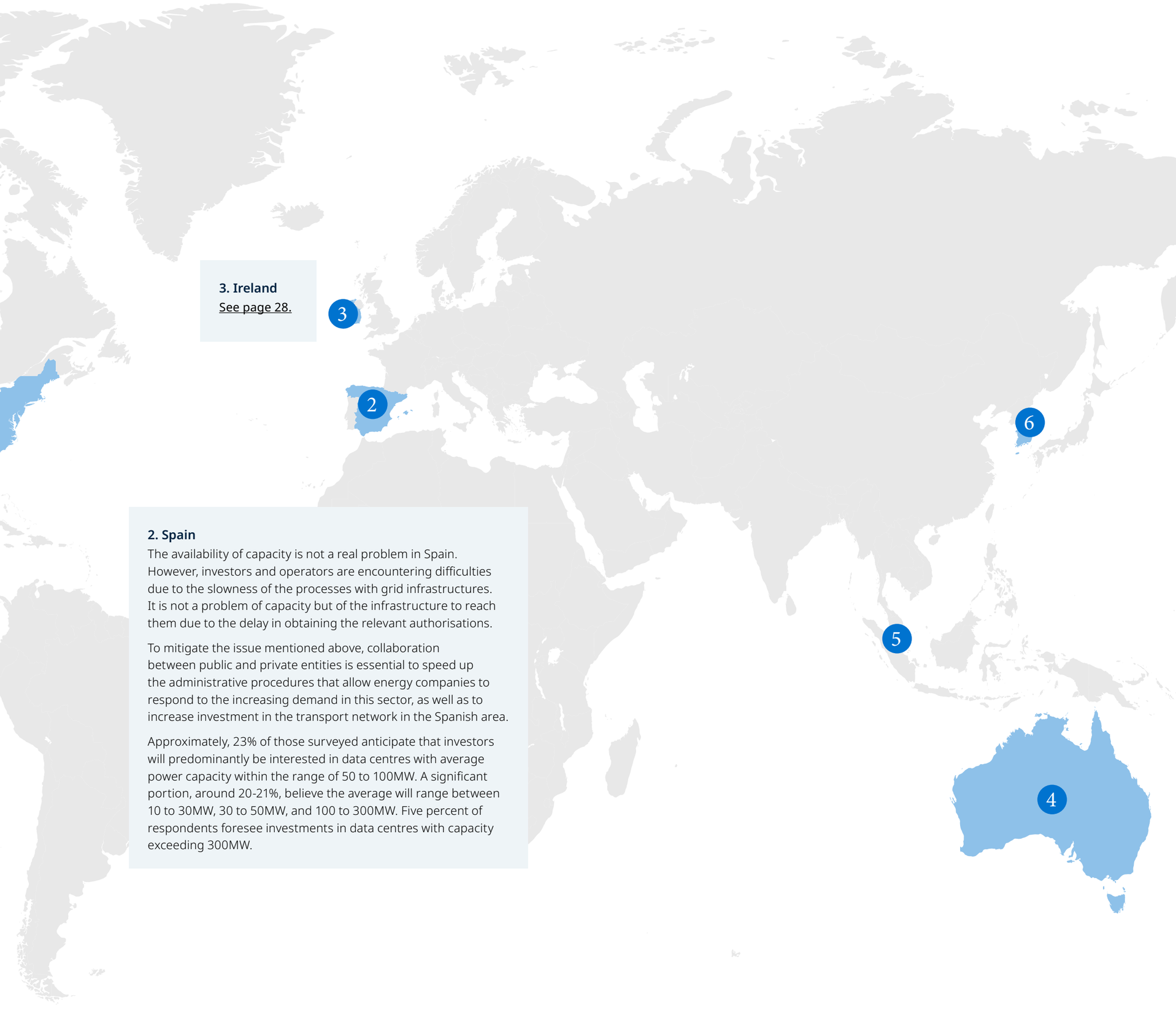
The rapid growth of AI and, in turn, data centres has quickly exposed gaps in both power generation and data centre infrastructure. Issues have been laid bare, with a simple search on a generative AI platform such as ChatGPT using at least ten times the amount of energy as a standard Google search. According to The Wall Street Journal, data centres are projected to use as much as 9% of US electricity by 2030[2].

High voltage electric wires are quickly running out of capacity, causing delays and reduced power availability for new data centres. Areas in the US such as Santa Clara and Salt Lake City have imposed moratoriums or stopped taking new requests for large projects. In Virginia, the largest data centre market within the US, one of the key players in the market has had to temporarily ration power to some new data centres until new transmission lines can be finished.

Efforts to expand electric power transportation and favourable tax policies like the Inflation Reduction Act are adding pressure. Utility providers are responding by proposing higher rates and long-term contracts to secure commitments from data centre providers, ensuring protection for residential customers if big tech companies later withdraw. Take-or-pay contracts are also being considered to give utilities the financial security needed to fund costly grid upgrades. Whether these efforts will work will be a question of patience for utility providers as data centres become increasingly desperate for a share of America's waning power supply.

Mike Rechtin, Partner, DLA Piper comments: "There are many well capitalised companies buying land, entitling it for data centres, and attempting to bring massive amounts of power to the site. This has resulted in utility companies being inundated with power delivery requests that they will not be able to satisfy until well into the 2030s. The utility companies have become wise to this (as they have limited resources to devote to bringing power to sites) and are now requiring large upfront non-refundable payments from these land speculators and a committed off-taker of that power. If the power is not used in the quantities brought to the site in a timely manner, there are financial penalties to the utility customer to compensate the utility for the difference between the expected income from power use and the actual power use. Finally, the utilities are compelling developers to pay upfront for all the critical infrastructure needed to bring power to the site (such as substations). Some buyers who have paid land prices based on data centre-powered land have experienced utility companies either reducing the amount of power they will bring to the site or pushing out delivery by, in some cases, many years".

2 https://www.wsj.com/business/energy-oil/ai-data-center-boom-spurs-race-to-find-power-87cf39dd



3. Ireland
See page 28.

2. Spain

The availability of capacity is not a real problem in Spain. However, investors and operators are encountering difficulties due to the slowness of the processes with grid infrastructures. It is not a problem of capacity but of the infrastructure to reach them due to the delay in obtaining the relevant authorisations.

To mitigate the issue mentioned above, collaboration between public and private entities is essential to speed up the administrative procedures that allow energy companies to respond to the increasing demand in this sector, as well as to increase investment in the transport network in the Spanish area.

Approximately, 23% of those surveyed anticipate that investors will predominantly be interested in data centres with average power capacity within the range of 50 to 100MW. A significant portion, around 20-21%, believe the average will range between 10 to 30MW, 30 to 50MW, and 100 to 300MW. Five percent of respondents foresee investments in data centres with capacity exceeding 300MW.

6. South Korea

In South Korea new data centre developments in the Greater Seoul area are facing significant challenges. Limited power capacity is a major hurdle, as the existing infrastructure struggles to meet the growing demand. Additionally, there is increasing public opposition to these developments, which further complicates the situation for developers looking to expand in this region.

5. Singapore

Singapore is experiencing similar constraints, with limited space and power supply posing significant challenges to new data centre developments. As a result, development interest is spilling over into neighbouring countries, where there is more available and and fewer restrictions on power usage. This trend highlights the regional impact of Singapore's constraints on the data centre industry.

4. Australia

The boom in data centre development comes at a time when Australia is in the process of decommissioning its coal-fired power stations and steadily transitioning to renewable sources of energy. The transition period will create challenges for data centre operators and developers and the Australian energy sector, as base load power comes offline and the demands for power for data centres increase over time and continue to compete with the demands of other power consumers. Although the introduction of nuclear power is being raised at a political level, the absence of a local nuclear industry and deep social aversion to nuclear energy make this an unlikely solution in the short term. The transition to renewables is also seeing the development of extensive new transmission infrastructure, opening the map for the location of new data centres and creating opportunities for data centre developers to access stable power off modern 'smart' transmission networks.

3. Ireland

Spotlight on Ireland – Electricity grid access for data centres

Large scale new investment in Irish data centres have led to concerns and policy responses. Initially the concern was security of supply and connection policy was updated set against EirGrid plc (the Irish transmission system operator) seeking emergency generation. Following a government policy statement which acknowledged the economic importance of data centres but also considered climate impacts, the focus expanded to include greenhouse gas emission targets. Consequently, the Commission for Regulation of Utilities (**CRU**) is currently reviewing large energy user connection policy. Whilst the review is ongoing, there is uncertainty about connection policy for data centres and few connection offers are issuing.

> Although Ireland is far from alone in security of supply and decarbonisation concerns, digital infrastructure and tech are substantial high value sectors for the Irish economy. Consequently, it is hoped that following the current CRU policy review, a clear and achievable path for connection of new data centres will be available.

William Marshall
Partner, DLA Piper

Data centre connection offer policy and process

EirGrid identified security of supply challenges in 2018 and engaged with the CRU on measures to address the rapid increase in data centre applications. The Data Centre Connection Offer Policy and Process (the DCCOPP) was published by EirGrid in 2019 and updated in 2020.

The DCCOPP introduced requirements:

a) for "flexible demand" in constrained areas. Requiring data centres to reduce electrical load on instruction from EirGrid; and

b) for customers connecting in constrained areas to obtain firm connection, to provide new dispatchable generation to EirGrid to reduce the impact of the connection on that constraint.

The CRU direction

On 27 May 2021, EirGrid wrote to the CRU regarding security of supply matters for Ireland's electricity system and highlighted data centre demand.

Following a consultation process, in November 2021 the CRU issued directions to EirGrid and ESB Networks DAC (ESBN, the Irish Distribution System Operator) (the SOs). The CRU directed the SOs to assess applications for data centre connection by reference to the following criteria to determine whether a connection offer could be made within the system's stability and reliability needs:

- whether the applicant is in a constrained area.
- the ability of the data centre applicant to provide onsite dispatchable generation or storage equivalent to or greater than its demand.
- the ability of the data centre applicant to provide flexibility in its demand by reducing consumption when requested to do so to support security of supply.
- the ability of the data centre applicant to provide flexibility by reducing consumption during system constraints.

The above criteria are of equal priority.

This was seen in the data centre sector as restrictive and slowed the issuance of new connection offers.

Government policy

In July 2022, the government published a Statement on the Role of Data Centres in Ireland's Enterprise Strategy (the "**Statement**"). The Statement discusses enabling twin transitions of digitalisation and decarbonisation and acknowledges data centres are core to both. However, it notes in the short term, there is limited capacity for further data centre development as upgrades to infrastructure and connection of renewables are required.

The Statement provides six principles for decisions on data centre development:

1. economic impact;
2. grid capacity and efficiency;
3. renewables additionality;
4. co-location or proximity with future proof energy supply;
5. decarbonised of data centres by design; and
6. SME access and community benefits

In addition to grid connection policy, these principles affect other State decision making such as planning and have been reflected in planning permission conditions. For criteria 5, the government stated its preference for data centre developments that can demonstrate a pathway to achieve net zero.

CRU call for evidence

The CRU published a Call for Evidence for a Review of Large Energy Users (**LEU**) Connection Policy in June 2023 (the **CFE**) to develop a new direction to the SOs to replace the Direction. Gas connections were also considered (the dominant fuel for thermal electricity generation in Ireland). The CRU provided the following as interim measures:

- for applications for connections following the CFE, the SOs must consider the expected emissions profile of the facility proposed and its contribution to decarbonisation when determining if it is in the public interest to provide additional capacity; and
- for prior applications who met the Direction's requirements, the SOs must consider their obligations under the Climate Action Act and engage with applicants to explore options for emission reduction.

These interim measures coupled with the Direction led to a reduction in connection offers for data centres and was reported in some cases as a moratorium.

CRU large energy user connection policy review

Following consideration of responses to the CFE, the CRU published a Review of Large Energy User (**LEU**) Connection Policy (the Review) for consultation to determine criteria for assessment of LEU connections. The Review seeks responses on points including:

- The category of connections to which the LEU policy will apply.
- As regards renewables/decarbonisation:
  - the requirement for indigenous sources of renewable energy. Comments were also requested on how storage of renewable energy would be captured.
  - the approaches used to account for net zero emissions. This could include timestamped GOs or renewable certificates.
- As regards the location of LEUs:
  - if LEUs should be located close to areas of renewable energy generation/storage or within energy parks?
  - what exemptions could be provided?
- On firm connections for LEUs:
  - if non-firm connections should be introduced and if so, should they be enduring or temporary, and if temporary, the triggers to them becoming firm?
  - how should the SOs deploy flexibility of non-firm demand.
- LEU demand flexibility including:
  - if demand flexibility should be mandatory or voluntary and if it should support decarbonisation or the system or both
  - if demand flexibility is voluntary, what incentives should be introduced to encourage adoption of these services?

The review closed on 26 February 2024 and the outcome has not yet been published. As mentioned above, it is hoped that a clear pathway for connection will be provided and that its requirements for flexibility and renewables will be achievable and enable the digital and decarbonisation ambitions provided in the Statement.

Mitigation strategies

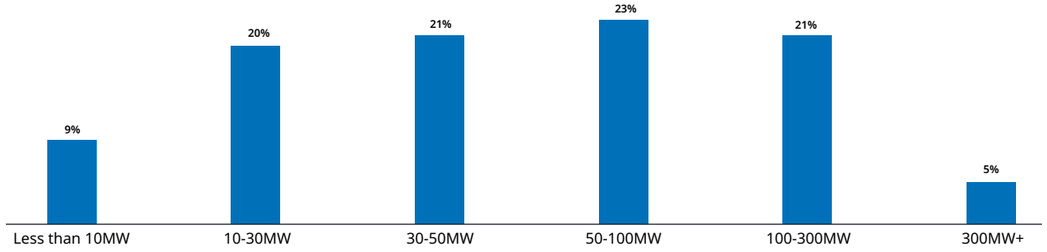
To address these challenges, data centre companies are employing various short- and long-term mitigation strategies. In the short term, capacity rationing may be utilised, allowing companies to temporarily limit the number of new data centre projects to manage existing resources effectively. Negotiating contracts with utility providers, including take-or-pay agreements, can help secure power commitments and alleviate risks associated with supply constraints. Active community engagement in planning processes is crucial for mitigating opposition and addressing concerns regarding new developments.

In the long term, data centre operators are investing in new power generation and transmission infrastructure to enhance capacity and reliability.

Nuclear power has been central to a lot of the discourse in the market. Nuclear assets have becoming increasingly popular among the investor class as data centre providers look to secure long term power security. Strategic partnerships with renewable energy providers and utility companies are essential for ensuring a sustainable power supply. Furthermore, embracing new technologies that improve energy efficiency, cooling methods and power management is vital for future growth.

While some issues are manageable, such as technological solutions that involve investments in energy-efficient technologies and renewable energy, and operational flexibility that allows companies to adapt their operations and strategies to navigate short-term challenges, others are less controllable. Regulatory and community resistance often lies beyond the control of data centre operators, requiring ongoing dialogue and negotiation. Global supply chain issues can also arise due to geopolitical factors, pandemics, or natural disasters, severely impacting the availability of critical components and creating challenges that are difficult to predict or control.

What do you expect the average power capacity of data centre campuses being invested in over the next 24 months to be?



This rise in demand for power raises short-term concerns about whether power can be sourced quickly and efficiently to meet this demand. Although there are abundant renewable resources, there are challenges in scaling up and directing renewable energy to data centres.

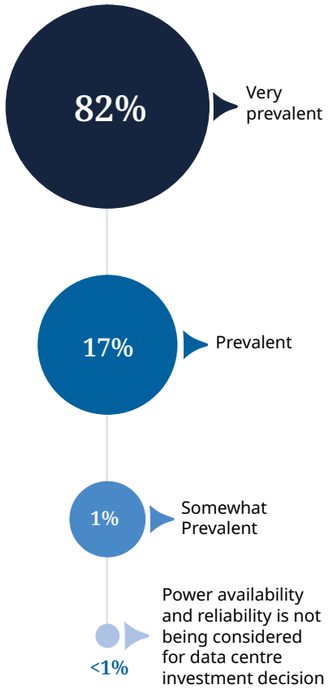
Access to power has emerged as a critical issue in data centre development and investment. A significant majority, 82% of respondents, described concerns over power supply as being “very prevalent”, while an additional 17% indicated that these concerns are “prevalent”.

Around half of the respondents indicated that their top priority is improving the efficiency of data centre technologies. Close behind, just under 50% expressed a preference for greater collaboration with energy providers. Additionally, 31% of respondents hope to see advances in developing new geographical locations for data centres, while 25% are looking for increased government involvement. Meanwhile, 21% identified progress in nuclear power investment as a key area of focus.

In addition to power being reliable, affordable and clean, there is increasingly a fourth requirement emerging- that power be available, and this is one of the key considerations driving data centres in their energy procurement decisions.

For some data centres this may mean co-location of nuclear, for others it might mean other onsite renewable generation, to the extent that the scale and topography of the site allows. The scale of those on-site projects however is not always sufficient to match the required load and we see some data centres contracting with solution-providers who can also utilise, in particular, rooftop space on nearby industrial sites to provide additional generation capacity and start to expand the definition of what constitutes “behind-the-meter” to capture any generating asset which falls within the same distribution network as the data centre.

When considering a data centre project, how prevalent are concerns over the availability/ reliability of proposed or existing power supply in decision making?



> “I don’t think there are long-term constraints. There are temporary ones on transmission. Each jurisdiction will look different, but in general, these are solvable through time and capital deployment.”

Jonathan Atkin
Managing Director
at RBC Capital Markets

What has become clear is that data centres increasingly target 24/7 locally generated carbon-free energy matching, which can pose a challenge given the intermittent nature of energy generated by renewable sources such as solar. For on-site solutions, solar-plus-storage may be one way forwards as excess solar energy can then be stored ready for later consumption, with the ultimate aim of limiting reliance on the grid and providing a steadier profile. We are also seeing data centres diversify their off-site energy procurement portfolio to cover a variety of technologies for the same reason.

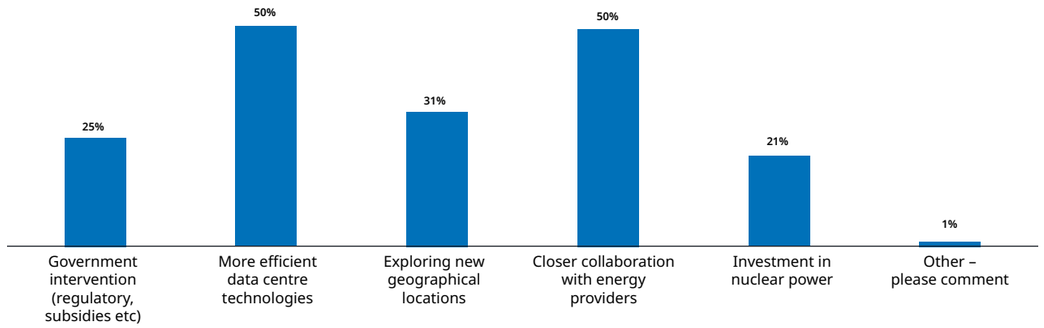
Currently, 33% of respondents observe the use of demand response programmes, 30% see microgrids, and 25% report load shedding. In contrast, expectations for the future show a shift: 37% anticipate microgrids playing a significant role in mitigating constraints, 30% expect demand response programmes to be important, and 26% foresee continued reliance on load shedding. Regarding the effectiveness of current strategies, 47% find them fairly successful, 44% see no notable impact, and 7% believe the strategies have not been successful.

> “Big tech” companies have brought corporate power purchase agreements into the mainstream over the past decade through large scale procurement of renewable energy for their data centres, and we anticipate that both on- and off-site PPAs will continue to form a large part of the solution in terms of serving the huge load that data centres create.

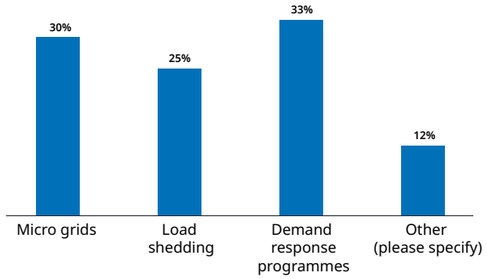
Jennifer Keogh
Of Counsel at DLA Piper

Respondents’ views on power constraint mitigation strategies

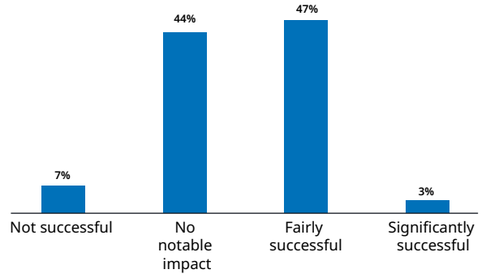
In seeking to mitigate the impact of power constraints, which avenue/s of intervention are you hoping to see progress most in the next 12 months?



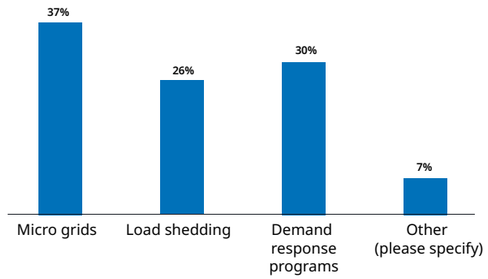
Which, if any, of the below strategies to grid constraint mitigation are you seeing already being employed?



Of the previous options, how successful have the strategies you have encountered thus far proven in relation to maintaining a reliable grid?



Which, if any, of the below strategies to grid constraint mitigation are you expecting to see being employed?



Natixis

Pim Rothweiler,
Head of Telecoms & Technology,
Americas, Natixis

How has the data centre (DC) sector evolved and what will be the investment trends in the next two years?

Probably not a lot of people could have imagined how fast and how exponential the growth was going to be. And I don't see that upward trend change any time soon. There's going to be so much demand for compute, the vast majority of which will be housed in data centres – existing, but very much also data centres that have not yet been built. All this will require financing, with a big role for the banks to play. At Natixis Corporate & Investment Banking we expect to continue to support a lot of the hyperscale construction projects, but there are also interesting things happening at the edge. In relation to the hyperscalers, we see requests now for 300MW projects and are even starting to talk about 1GW campuses. Back of the envelop calculation would tell you that a 300MW project would require some USD3 billion capital, most of which would be debt financed. Obviously at some point, banks are going to run out of limits, so exploring new avenues of capital and the recycling of bank debt after the construction phase will be very important. Banks look to distribute this stable, low-risk paper with long tenors to other investors, such as insurance companies.

What types of deals will be prioritised by debt banks?

If there is a long-term offtaker contract with a high-investment grade cloud company in a good location, with power and permits in place, the deal will be pretty straightforward and quite easy for most banks to commit to. Sometimes however tenors are shorter, a lease maybe weaker, offtakers non-investment-grade, maybe potentially focussed solely on AI. If then banks have to choose between deals because their appetite for data centre exposure is finite, they are likely to opt for the more straightforward one. This is where you might see direct lenders and credit funds become more active. When we talk to hyperscalers we discuss all these avenues and work with them to find the best possible access to capital.

What are the fundamentals that institutional investors will look for in an investment?

For the securitisation market, the data centre assets need to be stabilised, however, in the USPP market, we are starting to see that they will allow for some construction risk, giving institutional investors an opportunity to invest at an earlier stage. This is an interesting trend and has a lot to do with the rating agencies getting more experienced in the sector and the way they are starting to look at these developments. Ultimately institutional investors will look at similar risks as the banks, so things like location, power, tenor and nature of the contract. Is it triple net lease, modified gross? Is it a single asset or a portfolio? Who are the offtakers and what are their credit ratings? And given their often longer investment horizon, they will focus on amortization profile and very much on renewal and refinancing risk. Finally, ESG is often an important consideration.

Are we nearing peak growth in the broader investment cycle? What size would you estimate the total market opportunity to be?

In 2023 people were talking about data centre demand growing to 40GW by 2030. Now a number that gets thrown out is 60GW globally by 2027. At approximately US$10mm per megawatt, and 60 gigawatts by 2027, you're talking some USD600 billion of investment! And we hear even bigger numbers. There is talk of USD1 trillion CapEx spend by tech, utilities and other companies on data centres, chips, other cloud and AI infra and the power grid to finance GenAI in the US.

What about ESG and how does it affect the investment thesis?

Given the accelerating electrification of society and the insatiable demand from the data centre companies, there is a real power issue both with regard to generation and transmission. That also means green power isn't always available, while it is an important consideration for both offtakers and investors. As mentioned before, ESG is important for investors, and they are becoming more sophisticated. That also means they're going beyond just looking for best in class PUE. They are looking into the specifics of the renewable energy procurement, water usage, global warming potential of refrigerant gases, and community considerations. The good thing is that data centre companies have realised early on that they must be good corporate citizens. One way is to offer rest heat back to district heating companies. Interesting example was how the Olympic pool in Paris was heated by rest heat from Equinix data centres.

Are there any topics that aren't talked about enough regarding the continued evolution of the DC industry?

Edge is becoming more interesting again; it's one thing to build 1GW campuses for AI training and cloud, it's another to accommodate the inference part, which requires lower latency to process data in real time and therefore requires data centres to be closer to users and applications. These data centres also generally use less power. There is a real market opportunity for companies that focus on these smaller edge deployments.

Lot of talk of course about power, but fiber is also important, and we see data centre companies talking more about this. One example is Microsoft partnering with large enterprise fiber providers like Lumen, but there are also companies like Bandwidth IG that are successful by focusing purely on offering DC-to-DC dark fiber connectivity.

All in all, there will be a lot of work for us around all things Digital Infrastructure!

Nuclear: the answer we've been waiting for?

Nuclear energy is increasingly recognised as a viable solution to address the growing power demands of data centres, primarily due to the stable and reliable electricity supply offered by nuclear power plants. As a result, several global hyperscalers have started investing into nuclear energy solutions.

For example, leading cloud services providers are acquiring data centre campuses adjacent to nuclear power stations or collaborating with nuclear technology firms to incorporate small modular reactors into their operations.

Furthermore, several companies are repurposing former coal power stations into data centres. As these coal facilities are phased out in the US and Europe, their industrial sites offer advantageous features for data centre campuses, including high power capacity, existing transmission infrastructure, and proximity to water sources.

With the AI's growth spearheading ever-increasing demand for electricity, nuclear power is uniquely placed to be a major player in the energy market in the coming decades. Interest in nuclear stocks has already begun to increase. Investors looking to gain exposure to the energy source with the potential to power the AI age have plenty of reasons to be optimistic. With the discourse centred on expanding the existing nuclear fleet in America, it will be interesting to see how this space develops as we seek to ensure our energy security and meet carbon reduction goals.

Hydropower and geothermal energy – powering the nordic data centre revolution

Areas with wet and cooler climate, accommodating better PUE and lower costs for cooling, like the Nordics may get an advantage in new AI developments. Although further away from the classic key regions, the Nordics can offer lower energy costs than most European countries, high stability in the power grid, renewable energy and accessibility to development land. Some regions in the Nordics can offer close to 100% renewable energy, mainly from hydropower, and hence a significantly lower carbon footprint of electricity. Connectivity and latency can be less critical for AI developments and large language models, although the Nordics has seen development on the connectivity side and increasingly better latency.

> "The Nordics have long been a logical home for capacity given their green power and low total cost of ownership. We expect the region to attract some of the larger deployments we're seeing in North America now."

Magnus Løvlien Lutnæs
Partner, Head of Real Estate – Norway at DLA Piper

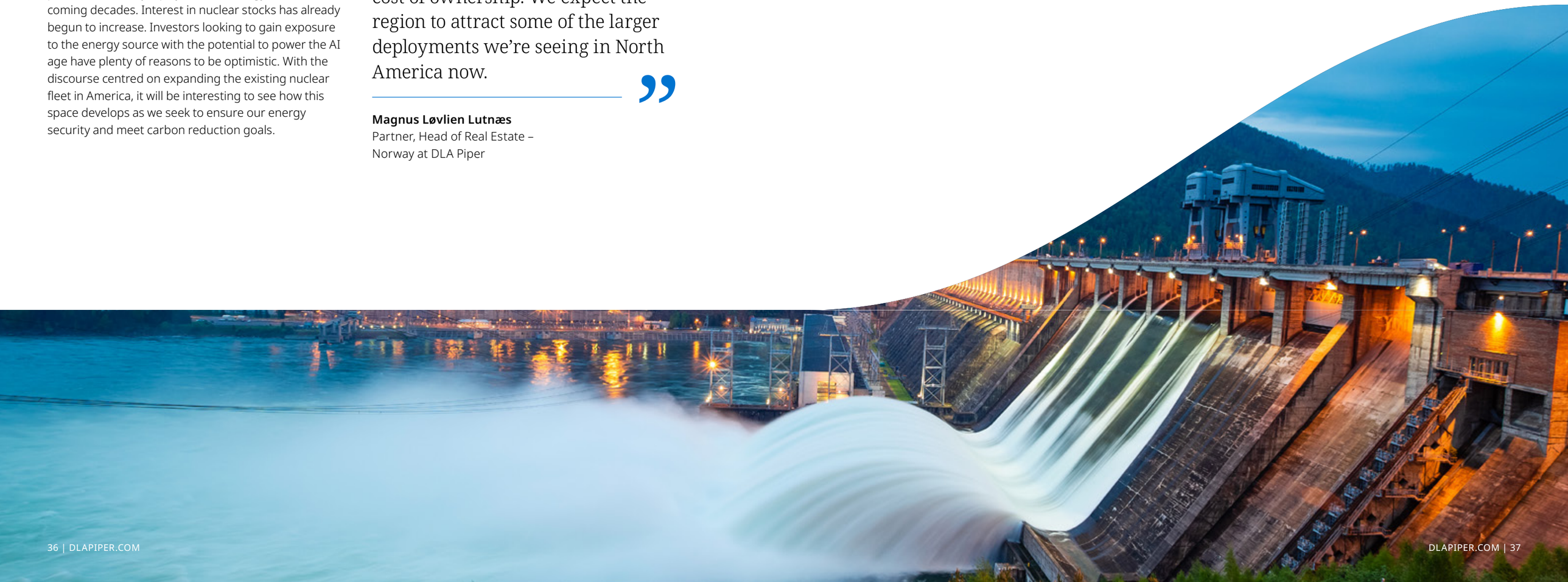
The case for solar and wind: spearheading the African data centre surge

Africa's digital revolution is well underway, with data centres set to play a crucial role in supporting this growth. The adoption of cloud services more widely is a major driver for this expansion, with global hyperscale giants looking to establish cloud regions across the continent. Despite the promising signs in this nascent market, significant hurdles remain in the African market. Of these obstacles (being infrastructure limitations and regulatory hurdles among others), energy security and reliability appears to be the most substantial. Obtaining a reliable power supply remains a critical challenge across the continent. Even in South Africa, which has the most developed data centre market on the continent, loadshedding is still commonplace. As this market continues to expand at pace, innovative solutions are required to manage energy consumption and security.

Given the hot, arid environment in Africa, solar offers the most logical solution. However, implementing these technologies is not without its own obstacles.

Solar farms require vast amounts of land, while edge data centres need to be located close to urban areas to ensure fast and reliable connections. Nevertheless, as battery storage technology improves in parallel, blended approaches are becoming more likely. Co-locating edge data centres with existing solar infrastructure has been one option discussed, with the aim being to provide a significant portion of electricity baseload with solar plus storage. Additionally, rooftop solar for inner city locations has been proposed as another potential avenue in conjunction with batteries. These batteries would only kick in and supply data centres in the event of an emergency shortage, however, could soften grid related price and outage shocks.

For investors, Africa's data centre market shows a great deal of promise. With major hyperscale giants seeking to broaden their reach beyond South Africa, investment opportunities may be plentiful in adjacent industries. Investors have reason to be optimistic about solar technologies in particular, given that these could be the future cornerstone for providing sustainable and reliable energy for Africa's growing data centre market.



KKR

Projesh Banerjea,
Director, Member of the Asia Pacific Infrastructure team, KKR

How has the data centre (DC) sector evolved and what will be the investment trends in the next two years?

There are two major trends: migration of data to the cloud and AI. AI requires different DC design, configuration, and architecture and is driving a step change in demand. The overall trend is to much larger deployment sizes; customers are asking for tens of MWs, or hundreds.

How is access to financing changing? What deal structures are you deploying?

Access to financing has become very sophisticated in both debt and equity. There is huge depth in the bank market and private credit space; lenders are comfortable providing senior leverage or mezzanine solutions. On deal structures, this is probably one of the hottest sectors. It's no longer just about infrastructure or real estate managers, or conventional lenders.

What are the segments of the market and fundamentals that institutional investors look for in an investment?

There are three: the carrier hotel, a smaller deployment but interesting profile; enterprise play, and finally, hyperscale. The largest dollar amount is in hyperscale; it caters to cloud and AI. Investors look for land, power, utilities and fibre connectivity, and quality of management, especially of low power usage effectiveness (PUE). A lot of real estate players and power companies want to get in; it sits at an intersection. Our recent investments in Asia are growth equity rounds where we are putting primary capital into businesses to scale them up.

How are markets evolving and which offer the most potential globally, and in APAC?

Traditional tier one markets continue to grow, but growth is everywhere. We don't take a view on markets regarding potential, but more on risk. There's potential for overbuilding. We focus on traditional tier one markets because we can continue to deploy large capital. We look at platforms building in tier two markets that show promise.

What about ESG and how does it affect the investment thesis?

There's been convergence between what customers and investors want; a focus on low power, efficient design and low water consumption. The main metric is PUE, but there are geographic limitations, such as cooling; there's a lot of technology that can improve efficiency.

How is GenAI affecting broader investment theses?

The effect differs by market. There are many where AI is not the main driver, especially in Asia. We're seeing a step change in contract size, and hyperscaler demand; architecture/configuration must change. Older DCs need investment to retrofit. For some older, more inefficient DCs you can sometimes use the existing location to be more AI ready. Our investment in Nxera ties into this. Singtel takes power allocation it has from older first/second generation DCs and is building a newer fifth generation AI ready DC.

What impact has this had on valuation multiples?

With falling interest rates during Covid, you saw a spike. When they rose, there was a drop in certain sectors. Large, listed DC companies were resilient because of structural tailwinds and AI demand. If a business has invested well in assets such as land, power and PUE, they should be well positioned to capitalise. Multiples can be very high on an LTM basis, less on a forward contact basis.

Are we nearing peak growth in the broader investment cycle? What size would you estimate the total market opportunity to be?

According to some latest data the global DC market is somewhere between USD75-100 billion/year (installed capacity excluding servers) and is expected to rise over five years to 2-3x this; representing USD750 billion – USD1 trillion of DC spend. Regarding peak growth, it's a function of location and installed base; APAC is not at peak, it is just starting off, with cloud adoption significantly below the US and Europe. There's substantial growth to come over the next decade. Even with the existing large installed US base, you're seeing meaningful growth.

Reflections on the impact of the EU digital decade on the data centre industry

With the advent of the EU's digital decade, we must consider the regulatory framework which will play a central role in the data centre market in the years to come. These regulations will shape the operational standards and practices within the data centre industry, ensuring growth in the data centre market aligns with the EU's digital goals.

1. EU AI Act

Scope of the EU AI Act

The EU AI Act (the "**AI Act**") establishes a comprehensive legal framework for regulating AI development and use. The AI Act captures organisations both in the EU, and in non-EU countries where AI system outputs are used within the EU. This extra-territorial reach means global data centres operators must consider the application of the AI Act's obligations. This section will focus on those most relevant to the data centre sector – high-risk AI systems.

What is high-risk AI?

High-risk AI systems are broadly categorised as those that pose significant risks to health, safety, or fundamental rights. The AI Act identifies eight specific areas where AI use is considered high-risk, with the most relevant to the data centre sector being systems used: (1) as a safety component in operating critical digital infrastructure (eg AI for monitoring systems for water pressure or fire alarms); (2) in relation to employment, workers and access to self-employment (e.g. automated CV screening); and (3) for biometric processing (eg the use of facial recognition or fingerprint scanning for access controls to the data centres).

> "We recommend that data centre organisations obtain certification with the requirements of ISO/IEC 42001 to demonstrate responsible accountability for their high-risk AI systems."
>
> **Linzi Penman**
> Partner at DLA Piper

Obligations

Once a high-risk system has been identified, in-scope entities must ensure the AI is developed and used compliantly depending on the role of the entity. In addition to investing in advanced infrastructure to ensure robust cybersecurity, some key requirements are:

- **Oversight –** Appointing staff with sufficient competence, training and authority to oversee the use of the AI system in accordance with the AI Act. Human oversight should help ensure systems operate within ethical boundaries.
- **Monitoring** – Monitoring the operation of high-risk AI systems ensuring performance tracks against its intended use instructions. This is to ensure anomalies in the system's outputs, such as biases, can be identified and corrected. Otherwise, the use of the system can be suspended.
- **Impact assessments** – Conducting detailed impact assessments for high-risk AI systems used in connection with data centre operations. Many organisations are looking to leverage existing data protection impact assessments for this.
- **Record keeping** – Keeping automatically generated logs for a period appropriate to the intended purpose, or otherwise for a minimum of six months. This is to ensure traceability of the system's functioning. There is also a separate requirement for providers to conduct a technical conformity assessment.

It is worth noting that companies complying with "harmonised standards" will benefit from a presumption of conformity. This means companies will be presumed to comply with specific elements of the AI Act, unless there is evidence of non-conformity. On 18 December 2023, the world's first standard on AI management was published – ISO/IEC 42001. This is expected to gain the status of a harmonised standard.

2. NIS2 – EU's bolstered new cybersecurity law

Introduction

17 October 2024 marked the implementation deadline of the second Network and Information Systems ("NIS2") Directive. One of the key differences between NIS2 and its 2018 predecessor is its significantly enhanced scope. NIS1 focussed its remit on core national infrastructure such as water, transport and financial services. NIS2 has greatly expanded the list of industries it considers to be "critical" infrastructure. This now includes listed digital infrastructure providers including data centres.

What is NIS2?

Recognising the ever-growing threat which cyber-crime poses for the economic stability of the EU, NIS2 aims to harmonise cyber-resilience through:

Risk Measures – Ensuring appropriate and proportionate cybersecurity risk management measures are in place following an "all-hazards" approach which is proportionate to risk, entity size, the likelihood/severity of a security incident.

Supply chain diligence – Assessing and assuring the cybersecurity practices of its supply chain including cybersecurity contractual mechanisms.

Three-stage reporting obligations – Upon the occurrence of a "significant incident," reporting an early warning within 24 hours of first awareness. This should be followed by a second, more comprehensive notification, within 72 hours, and a detailed report within a month.

Executive approval and oversight – Overseeing the implementation of its cybersecurity risk management measures at the board level. Directors are **personally liable for any fines** which might result from a breach.

Enhanced supervision and enforcement – In addition to powers of audit, and temporary suspension of management obligations (of Essential Entities pending remediation), fines can be issued up to EUR10 million/ 2% of total global annual turnover for Essential Entities and EUR7 million/ 1% for Important Entities.

Which entities will be in-scope of NIS2?

To be in scope, an entity must provide the relevant services in the EU, and must also be a "medium-sized enterprise". That is a business employing more than 50 but fewer than 250 persons with an annual turnover not exceeding EUR50 million, and/ or annual balance sheet not exceeding EUR43 million. Relationships with certain "linked" or "partner" enterprises can be considered to assess the status.

What are the rules around Member State jurisdiction and territorial application of NIS2?

Since NIS2 is a Directive, it must be transposed into national Member State law to be enforceable. There is currently a patchwork of implementation across the EU.

Organisations that fall within a "digital sector" including data centres, benefit from the "main establishment" rule. This means they will fall under the jurisdiction of only one Member State where the entity provides services and has its main establishment. To work out where an entity's "main establishment" is located, you should first consider where cybersecurity risk management decisions take place. If this does not provide an answer (because for example those decisions are taken outside the EU), the alternative will be the Member State in which cybersecurity operations take place. Otherwise, it will be where the relevant entity has the most employees in the EU.

What is the situation in the UK?

As a final remark, the Cyber Security and Resilience Bill being proposed in the UK is not dissimilar from NIS2 although current indications are that its scope will not extend as wide as NIS2.

Next steps

Businesses can prepare now by looking at the cyber security management controls set out in NIS2 and applying those security controls ahead of time for consistency and efficiency. Given the personal liability for directors, this is a board-level issue and the time to act is now.

3. DORA

Regulation (EU) 2022/2554 on digital operational resilience for the financial sector will apply from 17 January 2025 ("DORA"). To address the risks presented by the reliance of the financial sector on digital service providers, DORA aims at consolidating and upgrading information communication technology (ICT) risk management requirements.

In-scope entities

DORA applies to a wide range of EU-regulated financial entities, including banks, payment institutions, investment firms, crypto-asset service providers, insurance and re-insurance undertakings, intermediaries, credit rating agencies, statutory auditors and crowdfunding service providers. It will also directly apply to vendors designated as critical ICT Third Party Service Providers – and this category is expected to include certain data centre operators.

Key obligations likely to filter through indirectly to data centre operators

ICT risk management requirements – A requirement to implement a 'sound, comprehensive and well-documented' ICT risk management framework. This will include ensuring hardware, servers, and data centre premises are adequately protected from risks including damage and unauthorised access or usage.

ICT-related incidents – Establishing appropriate processes to ensure consistent monitoring and handling of ICT-related incidents, so root causes are promptly identified and resolved. Data centre operators will have to support in-scope entities to report incidents to the regulators in line with the regulatory requirements.

Note: DORA provides that financial entities may exchange cyber threat information and intelligence with each other in certain circumstances. This includes raising awareness in relation to cyber threats and threat detection techniques which could apply to use of data centre infrastructure and connected networks and involve sensitive data sharing.

Digital operational resilience testing – ICT systems should be tested by independent parties at least yearly, and weaknesses must be addressed. Threat led penetration testing should also be carried out at least every three years. This must cover all underlying ICT systems supporting critical services, including those contracted to service providers e.g SaaS vendors/data centre operators (who should participate).

Key contractual provisions – There are specific contractual requirements in DORA that financial entities must ensure are included in their contracts with ICT service providers. The level of the requirements will depend on whether the services support critical or important functions. Generally, this includes:

- a description of all services to be provided by the third-party service provider indicating if sub-contracting is permitted and on what conditions;
- provisions on accessibility, availability, integrity, security and protection of personal data and on ensuring access, recovery and return in an easily accessible format of personal and non-personal data;
- full-service level descriptions and quantitative and qualitative performance targets with appropriate corrective mechanism if these are not met; and
- termination rights and related minimum notice periods.

Oversight framework applying to critical ICT third-party service providers – European Supervisory Authorities will designate ICT third-party service providers as 'critical', considering factors e.g. based on their substitutability and how systemic they are. The designated ICT third-party service providers will then have direct obligations to the financial services regulators for the first time in the EU. If you anticipate that you might be designated and therefore subject to the enhanced oversight framework of DORA, do reach out to your DLA Piper contact.

RBC

Alex Thomas,
Head of European Communications Infrastructure,
RBC Capital Markets

How is access to financing changing, and what deal structures will attract interest?

Access to capital is key. Globally, annual capex in the sector is approaching USD100 billion, with Europe accounting for a significant part. Where customer contracts are in place, funding can be addressed by debt but demand for equity and debt capital will be significant.

How much do you think is going to be financed through different structures?

A DC platform is often a bundle of some low-risk and more speculative prospective cashflows. As the numbers get larger, it makes sense to think about isolating and packaging up different components to appeal to different investors.

What returns are people seeing and potentially may see?

For infrastructure investors you're looking at core infrastructure equity returns for stabilised assets. For a near term high confidence development pipeline, it would be closer to mid-teens %, and additional pipeline upwards of this.

We're seeing more REITs; will this continue?

Investment comes from other infrastructure and real estate classes as investors want to increase their exposure to digital assets. As different structures emerge, we see this widening to include other longer-term capital providers.

How can we solve the power issue?

Constraints are biting and causing delays in new capacity across leading markets. Given the scale, we expect more capacity will need to be close to power generation. Historically, providers wanted to locate their equipment near each other in availability zones. In the FLAPD markets in Europe, this has led to supply constraints due to power availability, land scarcity and local resistance. The Nordics have long been a logical home for capacity given their green power and low total cost of ownership. We expect the region to attract some of the larger deployments we're seeing in North America now.

Which new places may become DC hubs?

Public cloud deployments are likely to be around key metros, where there is lots of connectivity and demand. As powered land becomes scarce, these zones will widen. Public cloud providers are always looking for new metros. Growth in MENA is an example (UAE & KSA). Central and Eastern Europe is also an option.

Are we nearing peak growth in investment? Have we still got a long way to go?

We're not near peak growth. There is hype around AI and, although some business models for AI applications are unproven, it's hard to bet against further increases in processing demand and ability when you consider chip advances.

What about valuations? How have multiples changed and will this continue?

Although investors are generally underwriting on the basis of levered equity returns, multiple of contracted EBITDA is commonly used as a valuation metric. Growth forecasts will continue to be revised up but the value of deploying each new MW has tightened, as the spread between development yields and weighted average capital costs narrows. With these offsetting one another multiples for good platforms will remain robust.

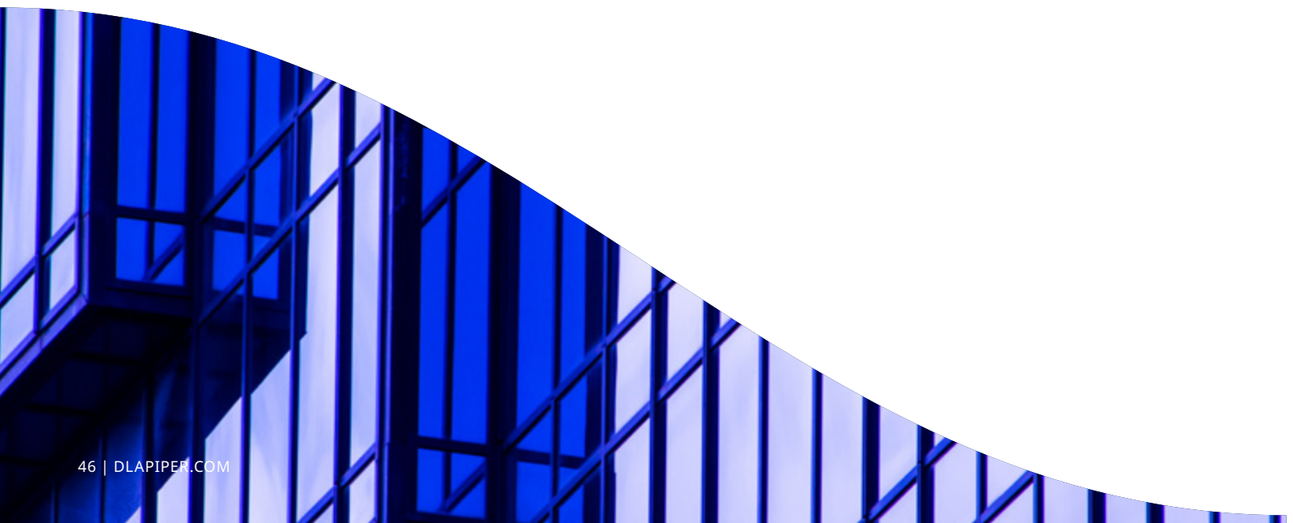
Looking ahead: The industry's next steps

In 2023, people were discussing data centre demand growing to 40GW by 2030. "Now, a figure being mentioned is 60GW globally by 2027. At approximately USD10 million per megawatt, and with 60 gigawatts by 2027, this equates to around USD600 billion of investment" explained Pim Rothweiler, Head of Telecoms and Technology, Americas, Natixis.

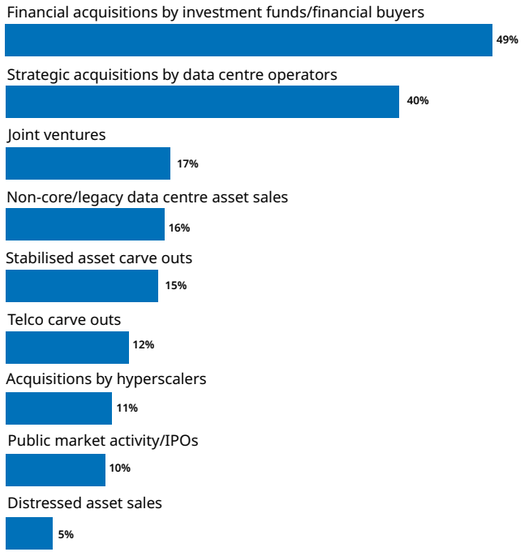
The survey results provide a similarly bullish outlook for the data centre sector over the next two years, with 31% of respondents anticipating that investments will increase by 10-29%. Just under a fifth (19%) expect them to stay the same, while 18% predict a rise of 30-50%. In comparison, in 2022, an average of 29% of respondents globally expected investment values to increase by 10-29% until 2024. Around 40% of respondents at the time thought this increase would be between 30-50%, and 29% expected the increase to be over 50%, according to DLA Piper's 2022 data centre report.

Reflecting a drive towards growth and development in this sector, partnerships with specialist data centre operators are expected to attract the most investment interest in the next two years (44%), followed by shell and core purchases (31%) and speculative development (24%).

An increase in M&A is also predicted, with 49% of people predicting acquisition by financial sponsors to see the most significant increase in activity (49%), followed closely by strategic acquisitions by data centre operators (40%). Other deal types that are expected to come to the market in the next two years include non-core and legacy data centre asset sales (16%), stabilised asset carveouts (15%), joint ventures (17%), IPOs (10%), acquisitions by hyperscalers (11%), telco carveouts (12%), and distressed asset sales (5%).

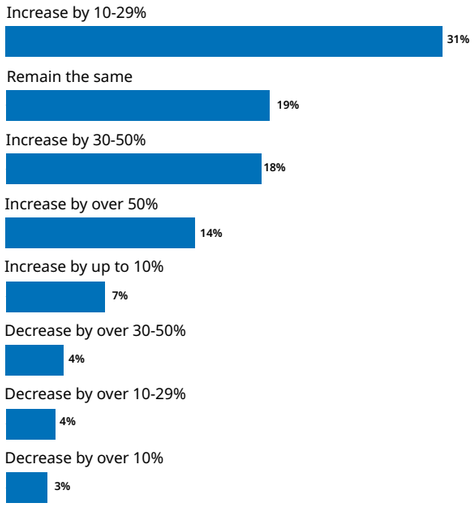


Which type of transaction will see the largest increase in activity in the next 24 months?



Which of the following types of data centre investments do you think will see most investment interest over the next 24 months?

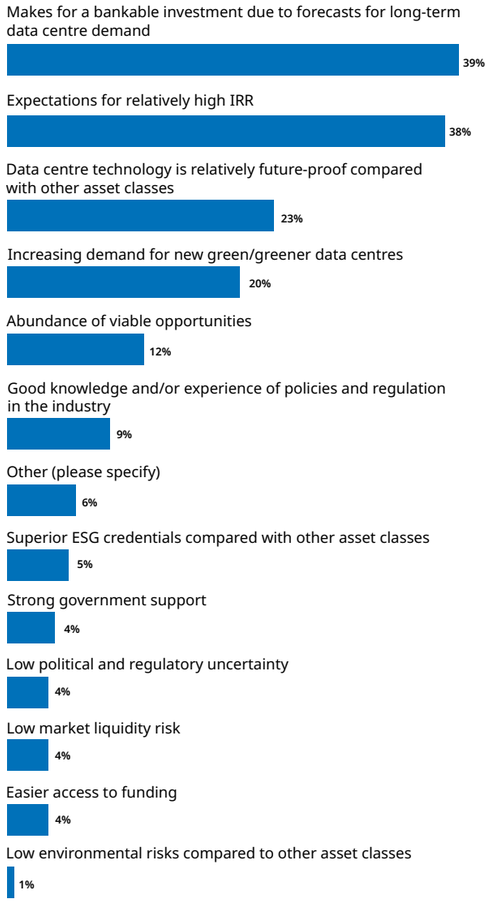
How will the overall value of investment (including debt) in data centre projects change in the next 24 months compared to the previous months?



Biggest drivers of data centre demand

- Adoption of GenAI
- Ongoing cloud migration
- General consumer demand for data capacity
- Shift from on-site to off-site colocation/ public data centres
- Data sovereignty and geopolitical factors

What do you consider to be the biggest drivers to investing in data centres for your organisation?

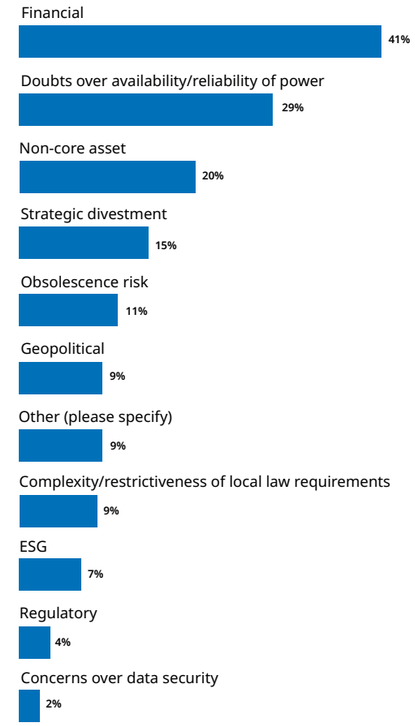


The survey reveals that the adoption of GenAI is currently the most significant topic in the data centre industry, with 78% of respondents identifying it as a major driver of demand over the next two years. Additionally, a general rise in consumer demand for data capacity (42%) and ongoing cloud migration (54%) also remain key factors. Other important trends include a shift from on-site data centres to off-site colocation and public centres (22%), concerns about data sovereignty and geopolitical issues (32%), the continued rollout of 5G (7%), and crypto mining (3%).

This expected growth in demand is reflected in the survey, with 39% of respondents saying they believe the data centre industry is a strong investment due to projected long-term demand. Meanwhile, 38% highlighted the high expected internal rate of return (IRR) as a key factor driving their investment decisions. Additionally, 20% pointed to the increasing demand for new sustainable data centres, and 23% viewed data centres as a relatively future-proof asset class compared to others. Other factors influencing investment included a deep understanding of industry policies and regulations, a wealth of viable opportunities, superior ESG credentials, low market liquidity risk, strong government support, minimal political and regulatory uncertainty, and easier access to funding.

Respondents consider expectations of relatively high IRR (50%) and projected demand for data centres (47%) as the primary factors driving their overall investment in the sector.

Where you (or your clients) have made divestments or declined investment opportunities over the last 24 months what have been the key drivers?

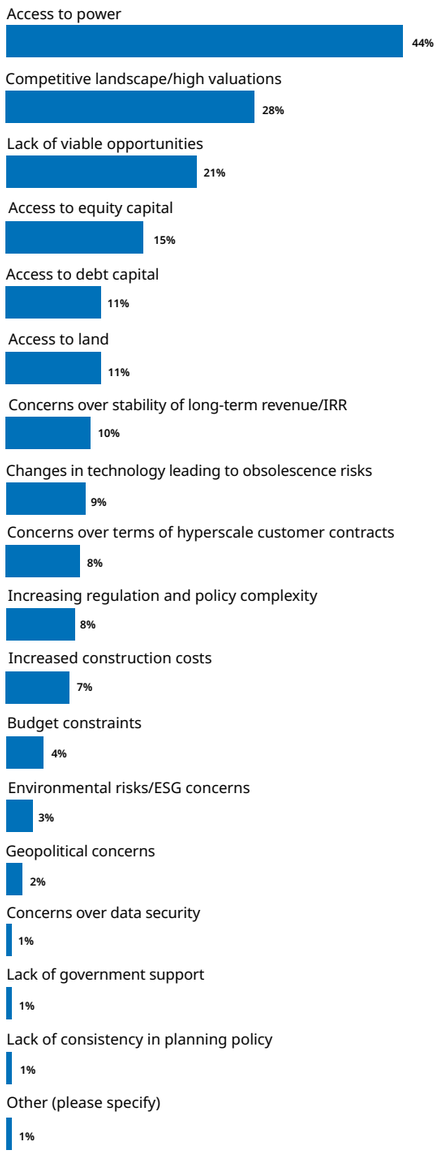


> We're not near peak growth. There is hype around AI and, although some business models for AI applications are unproven, it's hard to bet against further increases in processing demand and ability when you consider chip advances.

Alex Thomas
Head of European Communications Infrastructure at RBC Capital Markets

What do you consider to be the biggest drivers to investing in data centres for investors in general?

What do you consider to be the biggest obstacles to investing in data centres for investors in general?



Spotlight on the Middle East

A number of large cloud vendors and data centre operators have recently announced investments in the region.

1. Major Qatari telecoms operator, Ooredoo, recently announced that it has secured USD552 million in funding for its data centre expansion plans; and
2. Microsoft and G42 have announced a partnership to open two new data centres in the UAE dedicated to "responsible" AI initiatives.

These investments are in addition to the large, existing, and rapidly expanding footprints of Equinix, Khazna, Gulf Data Hub, and Center3. This will soon include Khazna's new 100MW AI-optimised data centre in Ajman, UAE, which looks set to be the largest development in its portfolio.

This growth is largely being driven by the continued efforts of the region's governments to move their economies away from a historical reliance on oil. Digital transformation and the adoption of emerging technologies is a cornerstone of numerous national development strategies such as Saudi Vision 2030, Saudi's National Strategy for Data and AI, We the UAE 2031 and the UAE's National Strategy for Artificial Intelligence 2031. The UAE is making a conscious effort to position itself as a global leader in AI.

These strategies, and the region's various smart city initiatives, are heavily reliant on implementing the necessary digital infrastructure to support widescale adoption of high-computational technologies such as AI, machine learning, IoT and blockchain.

Demand for data centre capacity in the region is also being driven by public and private sector companies' increasing awareness over where their data is processed and stored, owing to ever-increasing regulation of data. This is particularly the case for companies in regulated sectors, such as financial services, healthcare and telecommunications, where storage in-country is not only desirable, but, in some cases, necessary to comply with data localisation requirements.

> "The strategic vision of the region's governments towards diversified and tech-driven economies looks set to drive data centre investment in the Middle East."

Sam O'Neill
Senior Associate at DLA Piper

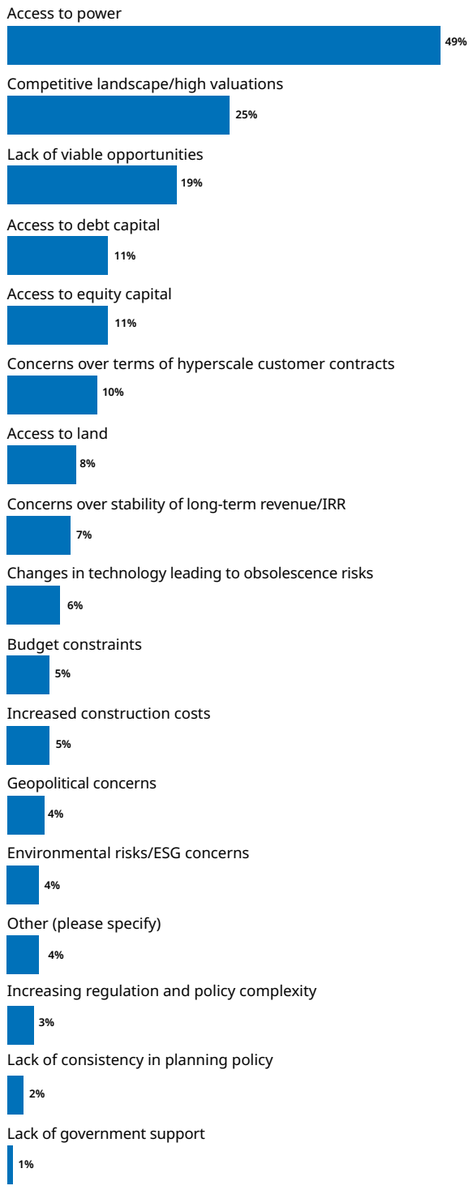
Respondents' reluctance to invest in data centres largely stems from financial concerns (41%) and uncertainties about power supply reliability (29%). Other reasons include the fact that data centres might not align with their core business interests (20%) or strategic goals (15%). Further, issues such as environmental, ESG considerations, geopolitical and regulatory challenges, restrictive local regulations, data security risks, and potential obsolescence also play a role in their investment decisions.

For both the surveyed individuals and the data centre industry as a whole, access to power is identified as the principal barrier to investment, with 49% of respondents highlighting it as their main concern. Another significant issue for over 20% of respondents is the competitive landscape and high valuations in the data centre market. Additionally, around 20% of respondents find the lack of viable investment opportunities to be a major impediment in the industry. Finally, 10% of respondents are concerned about the terms of contracts with hyperscale customers. In comparison, the 2022 report by DLA Piper highlighted technology and obsolescence risk as the primary concern, followed by market liquidity risks. This shift underscores an increasing worry about power accessibility.

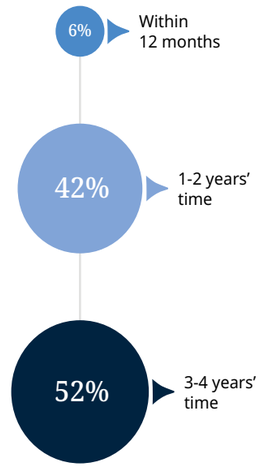
> "Regarding peak growth, it's a function of location and installed base; APAC is not at peak, it's just starting off, with cloud adoption significantly below the US and Europe. There's substantial growth to come over the next decade. Even with the existing large installed US base."

Projesh Banerjea
Director, Member of the Asia Pacific Infrastructure team at KKR

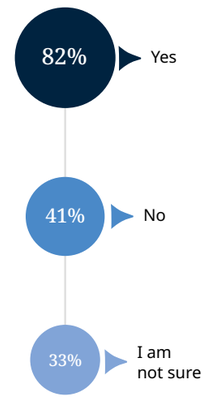
What do you consider to be the biggest obstacles to investing in data centres for your organisation



When do you think the price bubble is most likely to burst?



Do you think data centre infrastructure is currently experiencing a price bubble that could burst in the coming months or years?



Additional concerns cited by the industry include access to debt (11%) and equity (15%), budget constraints, and the growing complexity of regulatory and policy frameworks. Other issues include worries about long-term revenue stability, the risk of technological obsolescence, ESG considerations, geopolitical uncertainties, insufficient government support, and rising construction costs. These factors collectively contribute to the challenges faced by the industry and influence investment decisions.

Despite a quarter of participants naming high valuations as the main obstacle to investment in the sector, views on the existence of a price bubble were mixed. Half (50%) do not believe a bubble exists, 33% are unsure, and 18% anticipate a bubble that could burst in the next one to four years. In 2022, 20% of respondents believed that the data centre industry was experiencing a price bubble.

The industry is also divided when it comes to valuation expectations, with overvaluation seen as significant by 48% of respondents, who estimate it between 26-50%, while a further 16% believe it could exceed 100%. However, this disparity could also be viewed through the lens of regional differences, with respondents identifying projects in the US (44%), Germany (12%), and the UK (10%) as the most overvalued while 20% agreed that projects in Africa are the most undervalued.

Brookfield managing partner Udhay Mathialagan argues the high price tag of data centre infrastructure merely reflects the strong demand in the sector: "Multiples tend to be quite high because there's enough growth to justify them."

> "The strong data centre market in Germany presents a new opportunity for many investors among traditional asset classes. However, ESG requirements (for example, pursuant to the EED) remain a limiting factor to be considered."

Lars Reubekeul
Partner at DLA Piper

Spotlight on Australia

The Australian data centre market continues to grow rapidly, positioning itself as a key player in the Asia-Pacific region due to its strategic location, stable economy, and commitment to digital infrastructure.

Market growth and investment trends

The Australian data centre market is poised for substantial growth in the coming years. Leading global players, including Equinix, Microsoft, NEXTDC and Google have significantly expanded their presence in Australia, particularly in Sydney and Melbourne. Meanwhile, local leaders like AirTrunk and Macquarie Technology are strengthening their market share. Recent projections forecast the market to nearly triple over the next five years. This growth is primarily fuelled by rising demand from sectors such as cloud computing, AI, and fintech.

Increasing need for onshore capacity

The federal government's sovereign data policy requires that all nation-critical and sensitive data be kept within Australia, fuelling investment in local data centre infrastructure. Similarly, many of Australia's leading businesses are now rehousing data stores onshore – this is due to their own risk mitigation strategies along with expectations from many of their own clients to keep third-party data safe and secure. This increased need for onshore data centres is supported by government assistance via tax offsets and grants, innovation and technology programs as well as a regulatory environment focussed on the longer-term importance and value of data.

Green energy and sustainability initiatives

Due to the intense energy requirements to operate and maintain data centres, many players are investing in renewable energy sources, including solar and wind, to power infrastructure. Energy-efficiency keep costs down (and in time makes maintenance cheaper), while sustainable practices also address their environmental impact. For instance, NEXTDC has committed to achieving net-zero emissions by 2030, and several operators are exploring battery storage and hybrid power solutions to minimize their carbon footprint. Given the energy intensive nature of data centres, operators must also consider Australia's commitment to reducing carbon emissions by 43% by 2030 – while they are not yet a major focus as an energy consumer, the rapid growth in the sector will likely see data centres as a major consideration by governments sometime in the near future.

> "The data centre industry in Australia is experiencing explosive demand: developers are building but are under pressure to keep up with demand and with the cost of capital high – we are seeing operators look to creative strategies to fund these developments."

Kate Pickthall
Partner and Head of Real Estate – Australia at DLA Piper

Power and infrastructure challenges

The rapid growth of data centres continues to put pressure on Australia's power infrastructure. Utility providers in key areas, such as New South Wales and Victoria, have seen a surge in power requests from data centre operators, creating challenges in timely power supply. This has led to discussions on power grid upgrades and alternative energy solutions. Meanwhile, the shift from Australia's reliance on fossil fuels to renewable energy also requires investment in grid modernisation. This investment, particularly in regions housing (or identified as prime locations for) data centres must account for future energy needs from data centres alongside other energy-intensive industries and local consumer and community need.

Regional hubs and key markets

Sydney and Melbourne continue to dominate the Australian data centre landscape, with around 80% of the country's total data centre capacity concentrated in these cities. New South Wales, particularly the Sydney metro area, accounts for a large portion of Australia's data centres due to its robust infrastructure, proximity to major business hubs and access to the subsea cables. Meanwhile, Perth is starting to gain traction as a connectivity hub for Asia-Pacific, supported by its proximity to Southeast Asia. As a large number of federal government departments and agencies are centrally located together (and surrounded by ample rural land to support renewable energy sources), Canberra is also shaping up as a key data centre hub to house sensitive government data, such as in defence and health.

Challenges and future outlook

While Australia's data centre market outlook is strong, challenges remain. The rising cost of land and energy prices are influencing operators to explore secondary markets and even rural areas for future data centre builds. Additionally, Australia's geographical remoteness poses challenges in terms of connectivity and data transfer latency compared to other major markets. However, government investments in digital infrastructure and ongoing subsea cable projects are expected to alleviate some of these issues.

Australia is set to remain a key player in the Asia-Pacific data centre landscape, benefiting from continued investment, government support, and sustainability initiatives. While challenges exist, the commitment to infrastructure improvements and green energy suggests a promising future for the industry.

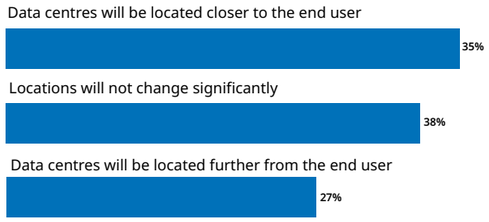
> "Looking ahead, we also expect the continued growth in scale and importance of the sector to drive an accelerated regulatory response as the government becomes more and more aware of how critical it is to secure this data infrastructure."

Shane Bilardi
Country Managing Partner – Australia at DLA Piper

AI and the new frontier – Rethinking where data centres are located

Opinions on where data centres will be located to accommodate AI are varied. Just over a third (35%) believe that data centres will move closer to the end user, 38% think their locations will remain unchanged, and 27% anticipate that data centres will be situated further from end users. As Jonathan Atkin, Managing Director at RBC Capital Markets explains: "GenAI is certainly acting as an additional and significant demand driver for the industry, because large foundation models are somewhat more location agnostic and less latency sensitive. It does provide developers with more flexibility around site selection to meet that demand."

How will AI impact where data centres are located?



Cheap land, good connectivity, and abundant power will continue to be critical factors for data centre locations. However, the advent of AI will alter some of these priorities. During the initial phases of AI development, such as training, latency is less crucial, so proximity to end-users will be less emphasised.

As AI technologies advance and applications such as smart cities become more prevalent over the next three to five years, edge computing will gain importance. This will drive data centres to move closer to end-users to manage real-time processing needs effectively.

Meanwhile, Microsoft and Google, have started exploring plans to convert old industrial sites, such as decommissioned power stations, into data centres. These energy-hungry facilities require substantial power, and with traditional data centre locations becoming constrained, companies are increasingly eyeing smaller, more complex sites with existing power infrastructure.

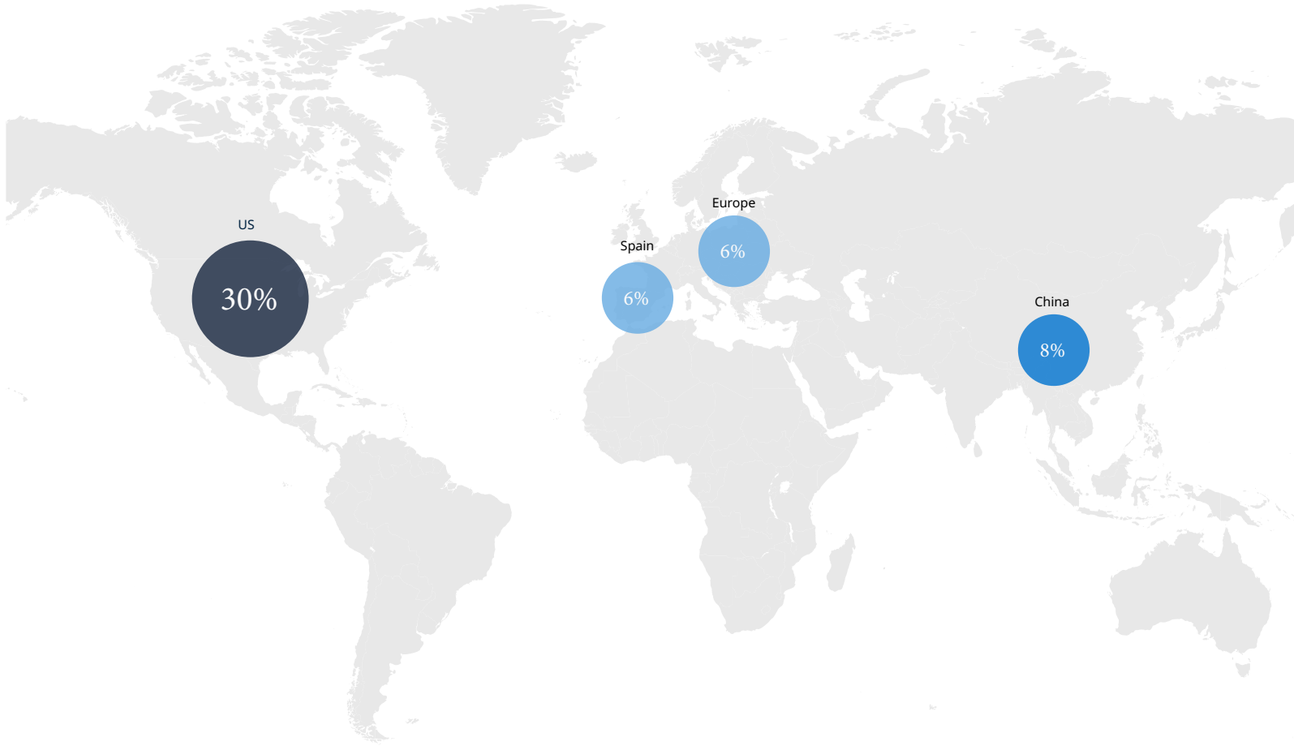
For example, Microsoft plans to develop data centres on former power station sites in northern England, though converting such facilities can be costly and bureaucratic, these sites often have the necessary power and connectivity infrastructure. This trend reflects broader efforts in industries like bitcoin mining, which also repurpose industrial sites for high-energy operations. However, challenges remain, such as reconnecting these sites to the grid.

The size of data centres will also influence location choices, with larger facilities potentially being situated further from metropolitan centres due to cost considerations. Emergency needs may still favour edge locations, but the ongoing densification of data centres will help address latency issues.

Furthermore, AI is expected to generate more traffic between data centres than to end-users. This shift could lead to the development of larger, more cost-effective data centres located away from urban centres, as real estate costs become a more significant factor than latency.

In summary, while traditional factors like connectivity and power will remain important, AI will drive a move towards edge computing for certain applications and favour larger, more cost-efficient data centres situated farther from city centres.

Most substantial increase in data centre project investments over the next 24-months



A significant portion of respondents, 30%, anticipate that the US will experience the most substantial increase in data centre project investments over the next 24-months. China follows with 8%, while Europe and Spain are expected to attract similar levels of growth, with both the region and Spain specifically cited by 6% of respondents, see page 7.

Regarding the growth in the Spanish market and the possible relocation of data centres, Madrid continues to be a prime location for the development of data centre projects. However, Barcelona and Aragón have increased their representation over the past year.

> "The report confirms that the data centre sector in Spain will grow significantly in the coming years. The positive news is that the authorities throughout the country are supportive, which is allowing other regions, in addition to Madrid and Barcelona, such as Aragón, to receive part of this enormous investment."

Orson Alcocer
Partner and Head of Real Estate – Spain at DLA Piper

Brookfield

Udhay Mathialagan,
CEO, Global Data Center Group,
Brookfield Asset Management

How has the data centre (DC) sector evolved and what will be the investment trends in the next two years?

Data is the fastest growing commodity in the world, rising 30%+ per annum. The DC industry is segmenting between large scale operators and mid-sized retail colocation space: a smaller number in the larger space; specialists in the mid-sized market; plus traditional players in connectivity and colocation. The creators and people who want to operate in consumer-based AI applications need physical capacity.

How is access to financing changing?

You need more dollars across a larger build cycle; a campus may take five to 10 years to develop. Owners or sponsors will need different forms of capital for development, build and stabilisation; debt and equity. For debt: project financing during development, or traditional debt once things are stable. For equity players there will be great opportunities for those who can chose between the higher development or stabilisation phases. Very large players can create opportunities for other investors.

What are the fundamentals that sponsors look for? How is that evolving, and where is the most potential?

We look for "platform characteristics" – great leadership and expertise within the management with a history of delivering for large hyperscalers. We have made a number of investments, and I think our focus now is to consolidate where we're invested and support growth. Regarding geographies, we are well distributed. We have data centre businesses in five continents and will expand within these regions where we can add value.

How about APAC? Which markets offer better opportunities?

APAC is disparate, with some large economies and many at different stages. In the advanced economies – Japan, South Korea, Australia, Singapore – there will be early-stage development of larger DC opportunities. Large population centres like India may start slower but the runway won't be long. Southeast Asia is in the middle and picking up; each market is different in phase and size.

To what extent does ESG impact DC investment strategy?

ESG manifests itself in multiple ways, power being the most obvious. Measures like PUE or power-to-IT power conversion improve through smart design and better usage, but water is important too; 'WUE' (water utilisation and efficiency) is becoming prevalent. It's important to think about all these early in a DC design; how we can eliminate transport and assemble closer to the site to lower secondary emissions. This depends on geography; renewable power is not always next door.

How is GenAI affecting broader investment in DCs, through the speed, amount, rate of return and/or other areas?

The large 10 players have their own AI plans, not just consumer/GenAI, but all sorts of specialised AI; and all need capacity. What was 50MW or 100MW is now a hundreds-of-MW campus; takes longer to build, billions of dollars to complete, and may have to work in a particular way for one, or a limited, number of customers. The type of capital needs to match the time frame and the type of credit risk with a counterparty.

What effect has the above had on valuation multiples?

Demand is very strong in the data space, so multiples tend to be quite high because there's enough growth to justify them; so long as a company's proposition is strong then multiples will be healthy.

Are we nearing peak growth? What size would you estimate the total market opportunity to be (in dollar terms)?

Demand is healthy, in terms of the peak we're still at an early stage in the building blocks of AI. It still takes multiple years to produce capacity. We're still at the start of the build out of digital infrastructure – this is the heartbeat of the world economy.

Rent charges and new technology – Out with the old

New technology is expected to boost data centre rent, with 33% forecasting a five to nine percent increase for sites with modern technology in 2024 compared to 2023, and 28% predicting a rise of 10% or more. Power usage efficiency and cooling system technology are drawn out as among the drivers. According to Jonathan Atkin, Managing Director at RBC Capital Markets, "liquid cooling 'direct to chip' will be the principal design change".

Advancements in technology are anticipated to lead to higher rents for data centres, with efficiency in power usage becoming a critical factor. As demand outstrips supply, rents are expected to rise, although newer technologies may help manage density requirements. Specialised data centre usage could regain pricing power in some markets, as hyperscalers are unable to invest everywhere. Providers with superior power and cooling capabilities can command higher prices.

According to recent research by CBRE, the overall vacancy rate The overall vacancy rate in primary markets is approaching a record low at 4%, with most tenants opting to renew existing leases. Increasing power density might offset higher power requirements, leading to stable tariffs. Data centre growth will need to keep pace with inflation and CPI. Increased demand from super-scale players is also expected.

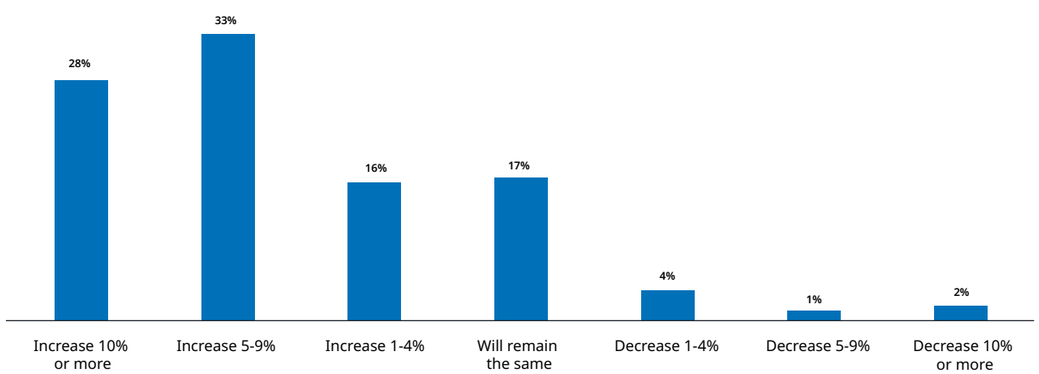
Providers will need to pass on higher build and financing costs, driving up prices, with further rent increases possible if AI proves it can reduce Selling, General, and Administrative (SG&A) expenses for customers. Persistent issues with power supplies and long supply chain lead times will keep rents elevated for the foreseeable future. Bulk leasing might offer some cost advantages. Overall, low vacancies and long lead times for development, combined with the high costs of repatriation and cloud services, are contributing to higher rates. However, there is one perspective suggesting that the market might eventually face an oversupply.

Rents for units with outdated technology are predicted to remain stable, with 37% expecting no change and 17% anticipating only a modest increase. Data centre owners' weaker bargaining position, less room overall for revenue escalation and a potential lack of acceptability from an ESG perspective could all contribute to keeping rents from increasing, participants expounded.

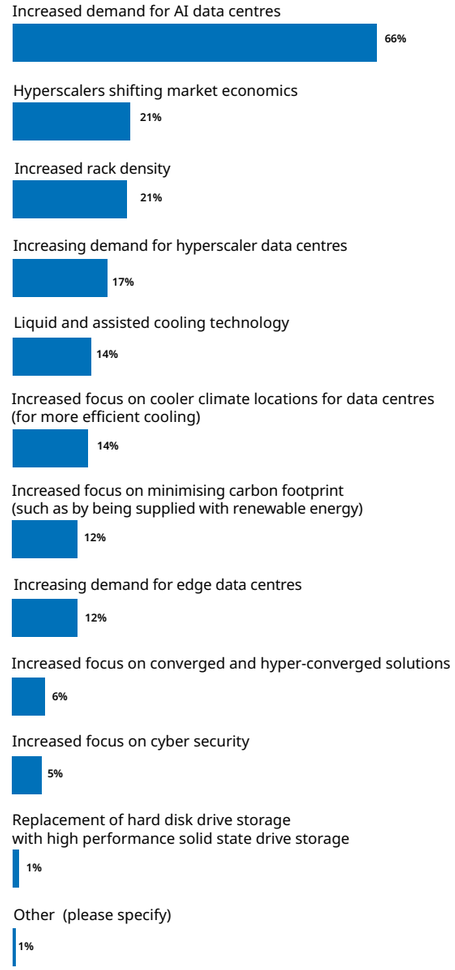
Data centres with outdated technology are likely to face a challenging environment for rent charges. Despite a constrained supply of data centres, which keeps overall demand high, older facilities will need to be more aggressive with pricing due to their inferior technology and weaker competitive position.

Although inventory is scarce, demand for older spaces may still allow for some rent increases, but the overall potential for significant revenue escalation is limited. Migration costs are expected to keep customers in existing facilities longer, while rising energy costs and competitive pressures may balance out rent increases.

How do you expect rent charges in 2024 to change compared with those in 2023 for data centres with superior modern technology?



What do you think will be the overriding trend in data centre infrastructure market over the next 24 months?

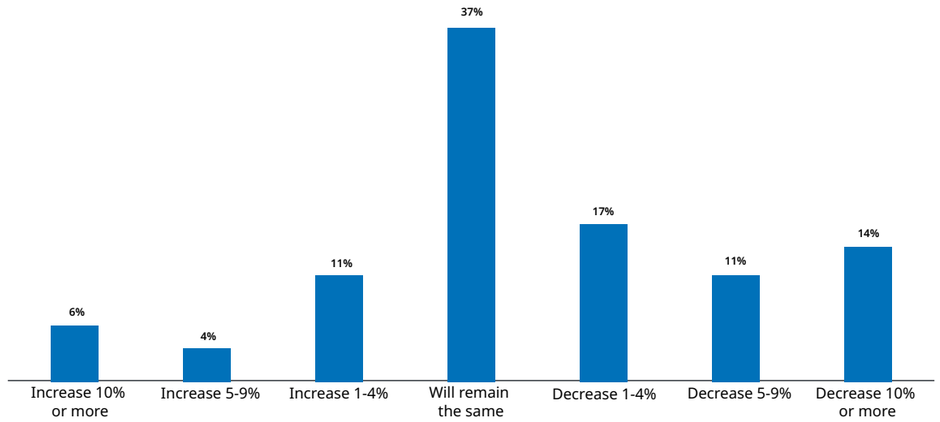


Geographical differences will play a role in how rents are adjusted, and from an ESG perspective, outdated facilities may face scrutiny. Data centres with outdated technology are often owned by operators who plan to invest in more advanced facilities, requiring increased cash flows and adjustments for inflation to cover rising costs.

In Europe, prices are projected to increase by at least two percent per year, one respondent said. Additionally, the market is evolving towards cloud and distributed local data centres, with smaller, numerous edge facilities becoming more prevalent. Efficiency gains will drive investment and usage decisions, but significant consolidation of outdated technology is unlikely to happen quickly.

"The biggest technology change we are seeing for data centres is power densification, servers are getting more powerful and require less square meters", says Alexis Kantt, Managing Director at Blackstone.

How do you expect rent charges in 2024 to change compared with those in 2023 for data centres with inferior outdated modern technology?



Morrison

Vincent Gerritsen,
Head of UK and Europe at Morrison

Tell us about Morrison and its interest in data centres (DC).

Morrison identifies high growth infrastructure sectors before they become 'mainstream'. We started investing in DC about 10 years ago. We had high conviction on data connectivity and linking that to infrastructure investment opportunities. We had discussions around IT infrastructure: what is it? and why should we invest? We believed data processing and connectivity was going to accelerate exponentially.

How would you see GenAI affecting the broader investment thesis in DC?

FLAP-D has power and land constraints, incentivising places further afield. For AI, there's more flexibility for other locations which is a game changer. People are entering the market, but quite a few are struggling in terms of credibility and proven capability. Demand continues to scale. A few years back we were talking about 1 to 5MW, then 10MW+, and now 100MW, 200MW+ which has also necessitated increased location flexibility.

Given Tier-1 markets' constraints on power and land, where else do you have in mind?

We've seen a wave of Tier-2 locations in Berlin, Italy, Milan, near Madrid and Zurich. Those non-FLAP-D cities have come in focus over the last years. There are larger hubs developing strongly; new cloud regions being developed by hyperscalers. Spain is one; it's a gateway to Africa and Latam with increasing subsea cable connectivity (e.g. into Portugal).

Is it possible to estimate the size of the total market opportunity?

Demand has continued to be surprising on the upside mainly from hyperscalers; investment numbers are huge, even for large funds. Owners of fast growing capital hungry platforms are becoming increasingly creative to access capital. For more derisked businesses or parts of operators there is access to debt financing. Opco and propco structures are emerging where derisked parts of portfolios are separated to access lower cost funding. Longer-term focussed institutional investors are entering. If a data centre is built and long term contracted, it's like real estate with low risk and a nice yield on it.

What are some of the risks around this? How would you think about structure?

What type of contracts and risks are allocated to these yieldcos or property companies? Do investors look only at long-term investment grade counterparties or are they open to accessing diversified portfolios? At some point they term out and there's re-contracting risk. In the near term it's likely more derisked to bring in long-term institutional capital and make them familiar with the asset class.

Are there financing structures that can be placed more on the holdco level?

If you have a closed-end fund, you have a finite investment period. Portfolio concentration is highly relevant for when platforms grow. When you hit certain fund concentration limits or run out of investment period but want to keep growing, there will be more partners needed. It also depends on the company's phase of development. Are you mature enough to start working with yieldco, opco and/or devco? We'll see increasing permutations of slicing and dicing of different parts of the portfolio and businesses to bring in different funders to keep growing.

What about ESG, how does it affect the investment thesis?

Demand will continue to grow. The biggest task for data centre operators is to grow sustainably. For operators with old facilities, the power usage effectiveness (PUE) is not best in class and as clients must report scope 3 emissions, this poses increasing risks. Engaging with local communities in a sustainable manner; e.g. explaining what the data centre is used for and how it benefits the community and looking at ways to use residual heat for the local residential area.

How do you ensure that DC remain such a high conviction asset class?

AI, data and processing demand will continue to grow exponentially. What's interesting is evolving use cases that will move closer to the edge. The next wave will be regional cities: augmented reality, connected medical devices, automated transport. You will have even further dispersion over time where you must have super short latency for example to facilitate autonomous driving vehicles.

What are the fundamentals that an investor would look at when assessing a DC investment?

It depends as the DC landscape is becoming increasingly diverse; if you are a long-term lower risk investor, those long term contracted derisked yielding property companies could work well. We were an early DC investor in Australia, New Zealand focussed on growth and value creation through building a leading platform; regarding Europe, we looked at another growth focussed entry point and entered through an HPC/AI focussed platform higher up the risk-return spectrum. Are you a growth focussed investor targeting higher returns and have the capabilities to be at the forefront of new high growth developments able to manage inherent higher risks? Understand what risks you're entering into. We're seeing a few platforms where they have built large portfolios of growth options, but to stay relevant you must progress which means a lot of capital required.

Conclusion

The outlook for data centre leaders and dealmakers in 2024 is overwhelmingly positive, driven by robust demand stemming from the proliferation of AI, cloud services, and data generation. The global data centre market is expected to reach an average valuation of USD300 billion in 2024, with a projected CAGR of about 10% over the next five years.

This growth is largely attributable to the escalating need for scalable, high-performance data centres capable of supporting the computational demands of AI applications, especially in areas like machine learning and natural language processing. Notably, 70% of respondents anticipate an increase in overall investment in the sector over the next two years, underscoring the promising landscape for consolidation and M&A in the medium term.

However, significant challenges must be navigated to sustain this momentum. An overwhelming 98% of respondents express concerns regarding energy supply, grid connectivity, and infrastructure reliability, particularly as according to a recent estimate from Goldman Sachs Research, data centre power demand is projected to increase by 160% by 2030. The increasing energy demands of AI-driven data centres have raised alarms, with projections from The Wall Street Journal. In response, utility providers are implementing higher rates and long-term contracts to secure commitments from data centre operators, highlighting the urgent need for infrastructure upgrades.

The regulatory landscape for the data centre industry varies significantly across countries, presenting both challenges and opportunities. In the US, the rapid growth of AI and data centres has exposed critical gaps in power generation and infrastructure, leading to moratoria on new projects in areas like Santa Clara and Salt Lake City. Meanwhile, Australia is transitioning from coal-fired power to renewable energy, which poses challenges for data centre operators amid rising power demands. In South Korea, limited power capacity and public opposition hinder new developments in the Greater Seoul area, while Singapore's constraints regarding space and power supply are driving interest in neighbouring countries. In Ireland, a focus on security of supply and climate change targets has resulted in uncertainty in connection policies, necessitating alignment with decarbonisation goals.

As the data centre industry continues to evolve, the growing emphasis on ESG criteria further complicates investment strategies. Companies need to consider investing in eco-friendly technologies and transparent reporting mechanisms to meet certain stakeholder expectations and regulatory pressures. While the future for data centre dealmakers looks promising, stakeholders must remain vigilant regarding potential hurdles related to ESG considerations, energy generation challenges, and complex global regulatory frameworks. A proactive approach to navigating these factors will be essential for capitalising on the opportunities within this dynamic and rapidly evolving market.

At a glance: Top five data centre trends for 2025/26

1. Rising demand for AI data centres
2. Increased rack density
3. Increase in hyperscaler demand and related impact on market economics
4. Heightened focus on cooler climate locations
5. Advances in liquid and assisted cooling technologies

Notes

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