

Infrastructure planning report

Europe



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The latest trends, opportunities and challenges for digital businesses seeking data center infrastructure in Europe

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2024 to 2034

European snapshot **30%** OF THE GLOBAL MARKET **= \$76.8 billion**

2034 FORECAST GROWTH \$232.72 billion Source: Precedence Research

2027 Power capacity of Europe DCs to rise to **13.1 GW**

Internet bandwidth usage to **multiply X3** Source: Savill's

The European data center market

Next to North America, which accounts for around 38% of the global market, Europe is the second largest and most mature data center market in the world, with well over 2,000 data centers and 30% of the total market. The data center business in Europe has been growing exceptionally fast over the last few years. According to CBRE Research, the European market grew by nearly 20% year-over-year Q1 2023 to Q1 2024. This overwhelming demand is causing some bottlenecks and issues in established markets, but supply is still rising steadily in key markets and accelerating in other areas.

FLAP: The leading hubs

The leading markets in Europe are in densely populated areas with well developed financial markets and very advanced network infrastructure. Frankfurt, London, Amsterdam and Paris, known collectively as the FLAP markets, are among the busiest data center hubs in the world. London, with over 1 GW of data center capacity, is second only to Northern Virginia, and Frankfurt, the fourth largest market in the world, is similar in size to Tokyo and Sidney. In recent years these four leading hubs have been joined by Dublin ('FLAPD') which is a base for many of the world's leading cloud and IT service providers.

Hub headwinds

For the last three years there has been a supplydemand imbalance across the FLAPD markets, driven to a great extent by mushrooming hyperscale demand for new high-power capacity with which to build their cloud and AI solutions. In 2024, for instance, CBRE Research estimates 440 MW of take-up versus 387 MW of supply in these markets, with particular constraints in Dublin, Frankfurt and Amsterdam where sites are in short supply, regulations are becoming more demanding, or there is a shortage of available power.

New directions

Broadly, the impact of this imbalance is the geographic expansion of these metro hubs to cover adjacent markets which possess available space and power. At the same time Europe has seen major development in key secondary markets, several of which are expected to offer over 100 MW of capacity by the end of 2024, and many new metro markets are emerging fast.

European market projections (MW) 2024 – 2029



Source: Structure Research July 2024

The forecast growth of metro hubs in Europe shows the impact of power and planning constraints in leading markets. A cluster of new high-growth hubs in Milan, Madrid, Berlin and Zurich are expected to overtake Dublin, with Milan competing with Amsterdam in terms of total capacity by 2029.



Opportunities

With over 15% of global GDP, the European market offers highly advanced, efficient and dense digital infrastructure, and similar consumption trends to North America. According to Telegeography, international bandwidth usage in the region continues to double every two years, with around 70% used by cloud and content providers. Data centers are being constructed at an unprecedented rate to meet current demand.

Hyperscale cloud growth

While enterprise and public sector demand remain strong, it is demand from hyperscale cloud providers that provides the single largest force in the market currently. This appears likely to strengthen in Europe over the coming years and be addressed by a diverse mix of in-house and specialist partnership approaches.

Today there is much more owned hyperscale data centre capacity in the USA than in Europe. This is partly because the USA is the first mover market, and partly because Europe is more fragmented and heavily regulated, with data sovereignty per market enshrined in EU regulations.

The cloud is still the key to growth, with an additional wave of Al demand already being felt. According to Synergy Research Group, ten years ago businesses spent twelve times as much on their data centre hardware and software as they did on cloud infrastructure, but today they spend three times more on cloud services than they do on their data centre infrastructure. SaaS, social networks, e-commerce and new higher bandwidth apps continue to drive both hyperscale and colocation expansion.

Global data center capacity trends



Source: Synergy Research Group

Global market trends show the steep rise in hyperscale demand and data center ownership and the rapid drop in on-premise enterprise data centers, as the infrastructure needs of businesses are increasingly met by cloud services and more efficient colocation providers who also lease to hyperscalers on an increasingly large scale.

AI market development

The key driver of growth acceleration will be AI, and it is estimated (by Savill's) that the European AI market will grow at 15.9% over the coming years, driving up existing data center and other infrastructure demand. The majority of AI investments to date have taken place in the USA, but there has been widespread pre-booking of space in Europe to keep ahead of competitor demand.

While AI applications are still in their infancy, it is widely believed that infrastructure for training models will be less location-sensitive than traditional consumer clouds. Locations like the Nordics or southern Europe and other secondary hubs are expected to be popular initially, given the constraints around power in the FLAPD markets. Where these developments offer a mix of hyperscale and colocation space, they can offer new and more competitively-priced opportunities for enterprise and other medium-to-large cloud users.

However, bearing in mind EU data regulation, national boundaries and data sovereignty, over time training facilities are likely to be located in the markets being served, as with hyperscale cloud services.

Self-builds & specialists

While it will not cover all requirements, there has been significant hyperscale self-build activity recently. Microsoft has announced self-builds in the UK, the Netherlands and France (Data Center Dynamics). Google is building in the UK and Norway and has announced plans to increase self-built capacity in Belgium, Finland and the Netherlands (Structure Research).

Sustainability: renewables and efficiency

As of 2024, half of European power generation was renewable, while low-carbon nuclear energy maintained a stable share, contributing 24%. 55% of Europe's current data center power can be mapped to renewables, either indirectly via VPPAs or directly via on-site or on-grid generation.

Efficiency levels are generally very good in Europe, with major improvements over the past 10 years, and according to EU figures the current average PUE is 1.6. New data centers will aim much higher, and in some markets this will be regulated. In Germany, for instance, all new data centers must achieve 1.2 PUE from 2026.



Issues

Most of the issues facing the European data center market are either related to space or power scarcity, or tied to Europe's ambitious sustainability targets.

Supply v Demand

CBRE estimates that 601 MW of space was leased in the 14 largest European markets between Q1 2023 and Q1 2024. Meanwhile, only 561 MW of new space became available. Their initial forecast for 2023 was 480 MW of take-up and 524 MW of new space - demand is rising faster than expected. The key FLAPD markets are the main locations fueling this imbalance. In Q4 of 2023, there was a 41% jump of take-up in these markets (252 MW). This was mainly due to pre-let capacity in Dublin, London, and Paris.

Pricing & Pre-booking

According to Savill's, data centre construction costs increased by 6.5% in 2023 to \$9.1 million per megawatt. Widespread pre-booking of space in anticipation of Al-driven demand, along with supply pressures in FLAPD markets, is pushing prices up steadily.

Power costs

Power pricing varies considerably across Europe. Electricity in Germany and the UK is more expensive, with France and the Netherlands significantly cheaper, and the Nordics (Norway, Sweden) cheapest. The volatility of power pricing has been impacted by the Russian invasion of Ukraine.

Sustainability Regulation & Reporting

Europe is a world leader in sustainable data center design and operations. Most of the markets are covered by broader EU climate regulation such as the Energy Efficiency Directive (EED). The EED quotes a 2030 data center power consumption estimate of 3.21% of all EU power, and aims to reduce overall EU energy consumption (all

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sectors) by 11.7% by 2030. Under the latest version of the EED, all data centre operators over 500 kW now need to report their KPIs annually.

Reportable metrics include PUE, temperature set points, waste heat utilization, water usage and renewables deployment. All data centers with capacity of over 1 MW must provide energy recovery or heat sharing if technically or economically possible. Equipment efficiency, cooling upgrades, virtualization and server consolidation are strongly promoted under the legislation.

The EU's Corporate Sustainability Reporting Directive (CSRD) also affects data center design and build, requiring new levels of scrutiny of the materials used to build materials data centres and other core reporting metrics such as WUE and CUE.

This legislation means that over the coming years, Europe will have a wealth of data on embodied impact, energy efficiency, renewables and low-carbon deployment. The industry in Europe has responded positively to the legislation, but there are some areas such as heat reuse and low-carbon materials where practical progress is slow.



Key Hubs

Europe's core FLAPD hubs are well established, densely connected, and in huge demand, reaching dynamic and prosperous marketplaces. However, the European data landscape is changing fast, and it is likely that in a few years new groupings of key and secondary markets will emerge.



Frankfurt

A data crossroads between western and eastern Europe, Frankfurt is the fourth largest data center market in the world. It is the financial capital of Germany and home to DE-CIX, the world's busiest Internet Exchange. Demand is exceptionally high currently, but sites, permissions and power are hard to come by, and <5% vacancy is forecast by CBRE, the lowest in the region.



London

The world's second largest data center market after Northern Virginia, London is the leading transatlantic data hub, offering over 1 gigawatt of capacity, with over 300 MW under construction. Much of London's capacity is located in Slough to the west of the city, and the current government is pushing to simplify greenfield planning regulations.



Amsterdam

Home to AMS-IX and NL-IX, two of the top 10 global Internet Exchanges, Amsterdam is Europe's third largest data center market, ideally equipped and placed to handle transatlantic data, serve the Benelux markets and beyond, and link Northern European markets with the South of Europe. However space and power are hard to come by, and there is currently a government moratorium on larger facilities (over 70 MW).



Paris

After a few sluggish years, both demand and growth in Paris are currently strong, as clouds invest in expanding their availability zones in France. 70% of French power is nuclear-generated, and the country is a leader in renewables, providing a range of power options.



Dublin

Dublin is currently suffering from its success at attracting IT investment. Take-up is forecast to oustrip supply this year, and with capacity problems from the national grid operator Eirgrid and the fact that 16% of the country's total power usage is now powering data centers, new developments face significant scrutiny and challenges.

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With plenty of renewable power and space, infrastructure in the Nordics is growing fast. According to Cushman & Wakefield, Denmark, Finland, Norway, and Sweden are currently contributing 12% of the region's data center pipeline. (The Beerenberg volcano on the island of Jan Mayen, Norway)

Cloud service providers are increasingly looking to deliver services to local markets from in-country, as opposed to in-region, and this, combined with the many constraints in key hubs, is leading to the strong growth of markets beyond FLAPD. In addition to land and power availability, a mix of factors are driving these new hubs, including population density, industrial and economic activity, and gateway potential, e.g. proximity to major intercontinental or transcontinental backbone cables. Between them, the top 15 secondary markets are expected to account for just over 40% of all data center take-up by end 2024.

Secondary markets

According to CBRE, 90% of this new capacity will come from just five markets:

- > Berlin
- > Madrid
- > Milan
- > Oslo
- > Warsaw

Stockholm and Oslo are also now becoming sizeable markets not only for local international content and business but also for high-intensity computing which is not latency-sensitive. These form the new and dynamic second tier of European data center capacity.

Emerging markets

Many other markets are growing fast across Europe. Notable high-growth hubs include cities such as:

- > Brussels (Belgium)
- > Marseille (France)
- > Barcelona (Spain); Lisbon (Portugal)
- > Rome (Italy)
- > Leipzig and Munich (Germany)
- > Vienna (Austria); and Zurich (Switzerland)

Growth map: key hubs, clouds & connectivity

New

cloud zones

Oslo

Cloud investment

Europe provides roughly the same number of cloud availability zones as the USA, but fewer than APAC. To drive uptake and support new AI apps, cloud providers are investing significant amounts in expanding cloud regions and creating new on-ramps and enhancing availability. According to Structure Research current major cloud region and availability zones investments cover nine large metro markets with more in the pipeline.



Market Capacity

Primary (over 400 MW built) The FLAP markets -Frankfurt, London, Amsterdam, and Paris - still dominate Europe's data center landscape and will account for the majority of upcoming growth. They offer from 495 MW (Paris) to 1030 MW (London) of built capacity with a huge pipeline of new infrastructure either under construction or pre-booked.

Secondary (100 - 400 MW built) Secondary markets (100 to 500 MW) account for a growing proportion of overall expansion. With ready access to renewable power feeds, Nordic metros are also becoming sizable markets for high-intensity computing which is not latency-sensitive.

Emerging (<100 MW built) A wide range of other metro hubs are emerging, democratizing the European data landscape. Many of the newer hubs are either major consumer and business markets in their own right or crossroads for international connectivity.

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New cable connectivity

While there are alredy over 200 submarine cables running to North and South America and Asia and carrying much of the traffic for Africa and the Middle East, there has recently been a surge in new connections. 20 new submarine cables, equivalent to 10% of existing capacity, are due for completion by 2027, adding roughly 150,000 kilometres of cable and increasing traffic flows and resilience. Italy, Greece, France, Portugal, Cyprus, Spain, Norway, Sweden, and the UK stand to directly benefit from these new connections, and there will be new landing points in Barcelona, Genoa and Crete.

Sources: various, including Cushman Wakefield and Telegeography. Figures approximate.

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Outlook

The European data center market is growing faster than ever, with a huge amount of new capacity either under construction or in the pipeline. Underlying data growth and processing requirements, particularly from enterprises, the cloud and AI, will continue to support this trend.

Changing landscape

The landscape is changing fast. This is partly due to record demand levels, but also due to the current concentration of infrastructure in a limited number of metro hubs, plus patchy national power infrastructure struggling to keep pace with the transition to renewables. While there is no indication that demand is dampening in the well-established FLAPD markets, lack of sites, power and planning constraints are creating headwinds for developments in certain cities.

This is creating opportunities elsewhere. There are clear indicators of more distributed data center development adjacent to and beyond existing core FLAPD markets. When latency is satisfactory, these fastemerging hubs which spread from Sweden in the north, to Spain in the south and Warsaw in the east, will provide new competitively-priced and scalable infrastructure locations for data center users of all types. Their double-digit growth will change the nature of the regional market over the next few years.

Innovation

Power and land constraints, climate regulations, and emerging Al requirements demand new solutions, however the European market is mature, expert and equipped for change. Data Center operators are adapting fast to new conditions, while innovating in power procurement, site selection, design, build and operations. A more dynamic and distributed infrastructure market is taking shape which will continue to meet the needs of data center users while supporting Europe's ambitious efficiency and decarbonization targets.



Iron Mountain Data Centers in Europe

Iron Mountain Data Centers owns and operates a range of highly scalable data center campuses and stand-alone facilities across Europe.



London: LON-1, LON-2

LON-1 & LON-2 are located in the heart of the Slough data centre corridor to the west of the M25, and offer a combined total of more than 35,000 m2 of space and 36 MW of power. Based on a 4.5 acre site, LON-1 offers 10,400 m2 of space and 8.7 MW of power capacity distributed across six data halls. LON-2 provides a further 25,000 m2 of customer space and 27.3 MW of load capacity. The data centers are connected to the LINX exchange and have dark fiber access to hundreds of other networks, clouds and service providers.





With scope to grow to be one of Spain's largest data centers, MAD-1 is a 4,000 m2 facility in northeast Madrid, just 10 minutes from Barajas International Airport. The carrier-neutral data center is on top of the main Barcelona-Madrid fiber backbone, and in the heart of Madrid's new cloud availability zones, giving a huge range of connectivity options. Powered by 100% renewables, the campus has huge growth potential, with a total 79 MW of customer power allocated for high-speed development over the coming years. In a few years MAD-1 will be the largest data center campus in Spain.



Amsterdam: AMS-1

AMS-1 is one of most dynamic and connectivity-rich colocation facilities in the Amsterdam Metropolitan data hub, with huge scope for expansion. In an area where carrier-dense space with long-term power agreements is at a premium, AMS-1 has a 23-acre campus with ample room to grow from its current 17,000m2 of customer space with 13.1 MW of power up to 40,000 m2 and 30 MW. With hundreds of customers including 60 carriers and worldleading IXPs, a vast amount of valuable traffic passes through the data center, creating high-value interconnected ecosystems.

Frankfurt: FRA-1 & FRA-2

Iron Mountain FRA-1 is a brand new 26,000 m2 27 MW facility, now fully leased. FRA-2 is a 38,500 m2 facility located in the Am Martinszehnten Industrial Park, close to both the city center and airport in the heart of Frankfurt. It offers over 10.6 MW of power in a wide range of configurations. The facility gives customers easy access to hundreds of leading networks and clouds with on-site connection to the world-leading DE-CIX Internet Exchange.

Sources

Global Market Forecasts & Trends

precedenceresearch.com cbre.com

Regional Hyperscale & Al Trends

blog.neterra.cloud euro.savills.co.uk rolandberger.com thetechcapital.com

Renewables

edie.net

EU Joint Research

joint-research-centre.ec.europa.eu

Power Pressure & Pricing

arizton.com economist.com theguardian.com

Legislation

energy.ec.europa.eu capacitymedia.com

Key Hub Capacity

datacenterdynamics.com

Secondary Hubs

datacenterdynamics.com datacenterdynamics.com cushmanwakefield.com app.dcbyte.com

Cloud investment (Q4 2023)

structureresearch.net

Cloud uptake mckinsey.com

Connectivity digital-strategy.ec.europa.eu telegeography.com



About Iron Mountain Data Centers

Iron Mountain Data Centers operates a global colocation platform that enables customers to build tailored, sustainable, carrier and cloud-neutral data solutions. As a proud part of Iron Mountain Inc., a world leader in the secure management of data and assets trusted by 90% of the Fortune 1000, we are uniquely positioned to protect, connect and activate high-value customer data. We lead the data center industry in highly regulated compliance, environmental sustainability, physical security and business continuity. We collaborate with our 1,300+ customers in order to build and support their long-term digital transformations across our global footprint, which spans three continents. IRONMOUNTAIN.COM/DATA-CENTERS

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