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REVISION 1.0

BUILDING A SUSTAINABLE DIGITAL INFRASTRUCTURE FOR A STRONG AND COMPETITIVE EUROPE

EUDCA

STATE OF EUROPEAN DATA CENTRES 2025

EUROPEAN DATA CENTRE ASSOCIATION

FROM THE PRESIDENT OF THE EUDCA

As the President of the European Data Centre Association (EUDCA), I am immensely proud to present the first edition of State of European Data Centres, 2025. This milestone achievement is made possible by the invaluable contribution and cooperation of our members, and we are excited to share the results of our comprehensive survey with the public.

This year marks a significant milestone for our sector, as we underwent the first reporting cycle and more recently the second on 15 May 2025, under the Energy Efficiency Directive (EED), emphasising the transparency and sustainability of our operations. The perception of data centres has undergone significant changes, particularly given their role in driving digital innovation and the digitalisation of our society, fuelled by advancements in artificial intelligence (AI).

We stand at a pivotal moment in history, where rapid technological advancements often outpace regulatory responses. Our commitment to powering the digitalisation of Europe remains unwavering, but we call on policymakers for stronger support and clearer signals to encourage investment in Europe.

Continuing our journey toward sustainability is now more crucial than ever. Our goal is to foster a fully sustainable and digital Europe, providing the necessary knowledge and expertise to achieve this vision for our industry.

President of EUDCA, Lex Coors

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EXECUTIVE SUMMARY

The European data centre industry is the backbone of Europe's digital infrastructure, propelling technological innovation, digital transformation, and robust economic development. It is critical that timely, insightful data with informed analysis provides a basis for industry assessment and performance into the future.

The EUDCA's first State of European Data Centres report, in collaboration with European National Trade Associations (NTA) provides an in-depth understanding of the market, identifying its fundamentals, exploring its opportunities, and acknowledging its challenges. The report provides valuable insights to achieve the sustainable development of the data centre industry in Europe. Further reports will gather additional data for analysis, tracking development and progress.

An industry that began as small-scale enterprise facilities has now evolved into a network of hyperscale and colocation data centres in established centres, such as Frankfurt, London, Amsterdam, Paris, and Dublin (FLAPD), with intense activity in emerging hubs in the Nordics and Southern Europe. These state-of-the-art facilities not only fuel innovation but also safeguard data sovereignty, providing essential support for cutting-edge technologies and artificial intelligence.

Beyond the technological significance, the industry profoundly impacts Europe's socioeconomic fabric. Colocation data centres alone contributed €30 billion to GDP in 2023, with projections soaring to €83.8 billion by 2030. In tandem with the economic contribution, the sector fosters job creation, directly and indirectly, while annual investments in construction and operations inject billions of euros into local economies, spurring innovation. As Europe contends with global competition, the data centre industry remains an indispensable force in upholding digital sovereignty and mitigating geopolitical risks.

Sustainability is at the heart of this industry's priorities. The vast majority (94%) of its energy is sourced from renewable sources, positioning it as a leader in the adoption of sustainable practices. Ambitious initiatives, such as the Climate Neutral Data Centre Pact commit operators to achieving climate neutrality by 2030. Progress on this is already evident through impressive metrics: Colocation facilities boast an average Power Usage Effectiveness (PUE) of 1.39, Water Usage Effectiveness (WUE) stands at 0.31 litres per kWh, and over half of the facilities incorporate heat re-use systems. Regulatory measures, such as the EU's Energy Efficiency Directive (EED), further bolster transparency and reinforces environmental accountability—an area in which the industry remains confident, with only 36% foreseeing future compliance challenges.

Despite these strides, the future is not without challenges. The sector faces pressing issues such as limited power supply, delays in permitting, and a widening skills gap. More than three quarters of industry stakeholders identify power access as the most critical challenge within the next three years, even as many invest in innovative solutions such grid stabilisation capabilities and energy trading. Addressing these hurdles necessitates collaborative efforts to enhance grid infrastructure, streamline regulatory procedures, and foster a skilled, diverse workforce. Although the industry already employs thousands and contributes significantly to Europe's economic vitality, it struggles to present itself as an appealing career path, with more than half citing the scarcity of specialised educational programmes as a key factor.

As European economies grow at a rapid pace, digital infrastructure is set to become ever more central to strategic plans and ambitions.

HIGHLIGHTS

GROWTH, SIZE, MARKET

Growth, Size, Market

- Amongst the large-scale data centres (>5MW) colocation is the most common type of data centre, and it represents the largest share of the data centre power percentage in Europe
- EUDCA member operators have a combined market share in Europe of 45%, in the colocation market (retail, wholesale, and scale). Including NTA colocation members, this rises to 64%. (Note: Some NTAs have a mix of colocation and hyperscale operators, with membership for large organisations varying across territories)
- A total of €100 billion is expected to be invested in the sector between 2023-2030

ENERGY

Energy

- The total power growth demand will be on average about 15% per year between 2023-2030
- 76% said the biggest challenge for the data centre sector in the next three years is access to power

SOCIO-ECONOMIC

Socio-economic

- Colocation data centres will contribute €83.8 billion to GDP by 2030 (GDP contribution)
- Colocation data centres employ more than 15,000 full-time employees (FTE)
- One major cause of labour shortages according to the operators surveyed is the lack of data centre-oriented studies (50%)

SUSTAINABILITY

Sustainability

- 94% of energy used is from renewable sources
- The average PUE for colocation data centres is 1.39, significantly lower than the reported PUE of enterprise data centres (PUE 1.85)
- Liquid cooling initiatives are now in place in almost half of the colocation data centres surveyed (41%), but its use is expected to increase significantly in the next two years (84%)
- Almost a quarter (22%) of data centres are providing grid stabilisation services for renewable energy sources, with nearly two thirds (59%) expected to do so in 2 years

INTRODUCTION

Data centres are increasingly important to the European social and economic landscape, serving as crucial components of the digital infrastructure. They house the IT equipment necessary for storing and processing data, enabling the digital transformation of the economy and society. These facilities support the internet, cloud services, digital media, business applications, and artificial intelligence (AI).

The European data centre market is experiencing rapid development. Not only is the market growing very rapidly with demand continuously outstripping supply, but we also see major investments in new data centre locations across Europe. This expansion is attracting billions of euros in investments, boosting the GDP, creating new jobs and supporting digital sovereignty.

While data centres offer substantial economic benefits, they also have a notable environmental footprint. They consume resources such as water, space, construction materials, and, most critically, electricity. As the sector grows, so does its responsibility. Colocation and hyperscale data centres are generally more efficient than enterprise data centres and typically favour renewable energy sources. Continued growth will necessitate ongoing investments in sustainability to minimise their environmental impact.

OBJECTIVES OF THIS STUDY

The EUDCA, as one of the major bodies representing the interests of the data centre community in Europe, has commissioned Pb7 Research, an independent data centre research bureau, to study the European data centre market. The primary objective of this research is to create a solid, reliable data set that objectively qualifies and quantifies the sector's economic and societal impact. This study aims to enhance an understanding of the market's fundamentals, opportunities, challenges and contribute valuable insights to foster the sustainable development of the data centre industry in Europe.

METHODOLOGY

To achieve these objectives, a comprehensive mix of research methodologies and analyses were employed. Extensive desk research was conducted to establish a robust database of colocation and hyperscale data centres, enabling the identification of key trends and developments. All European countries were included, EU and non-EU, with the exception of Belarus, Russia, Ukraine, Moldova, and Türkiye. This foundation allowed the creation of models to quantify various data centre markets and their social and economic impacts. Additionally, a survey was conducted involving 63 key decision makers in European colocation data centres. The findings from these surveys are presented in this report and have been instrumental in quantifying different aspects of the market. More detailed information on the methodology can be found in the Appendix III of the report.

OVERVIEW OF THE DATA CENTRE LANDSCAPE

The history of data centres in Europe reflects the broader trajectory of technological innovation and the increasing demand for digital infrastructure. Over the decades, data centres have evolved from localised enterprise facilities to expansive hyperscale operations, with a critical role in the digital economy. Key regional and technological factors have influenced this evolution, including the dominance of FLAPD (Frankfurt, London, Amsterdam, Paris, and Dublin), advancements in connectivity through submarine cables, the rise of cloud computing, and, most recently, the transformative impact of artificial intelligence (AI).

HIGHLIGHTS

Broadly speaking, impacts can be measured on three levels:

- 9,000+ data centres in Europe
- Amongst the large-scale data centres (>5MW) colocation is the most common type of data centre and the second largest data centre type in Europe

EARLY DEVELOPMENT: ENTERPRISE DATA CENTRES

In the early stages of European data centre development, most facilities were enterprise-owned and operated. These data centres and server rooms were typically located on-premises and designed to support specific organisations. Companies in industries such as finance, telecommunications, and government were early adopters, with a primary focus on reliability and data security. During this period, infrastructure was characterised by limited scalability and a focus on private networks. As digital technology advanced, the limitations of this model became apparent, particularly in terms of cost and inefficiency.

THE RISE OF COLOCATION AND THE FLAPD DOMINANCE

By the late 1990s and early 2000s, the demand for scalable, cost-efficient, and sustainable solutions led to the rise of colocation data centres. These facilities allowed multiple organisations to rent space, power, and cooling infrastructure within shared environments, reducing the financial burden of maintaining dedicated infrastructure, improving redundancy and reducing the climate footprint. The colocation model also enabled faster connectivity and interconnectivity between businesses.

The emergence of FLAPD as Europe's primary data centre hubs can be attributed to strategic geographic and economic factors. The five locations offered access to robust fibre optic networks, reliable power supplies, and major financial and commercial centres. Amsterdam, for instance, benefited from its role as a key internet exchange point through AMS-IX, while London's position as a global financial hub attracted significant investment in digital infrastructure. Dublin's lower corporate tax rates and favourable climate for cooling infrastructure also made it a key player.

CONNECTIVITY AND THE ROLE OF SUBMARINE CABLES

The growth of data centres in Europe has been deeply intertwined with advancements in connectivity, particularly through submarine cable networks. Europe is connected to North America, Africa, and Asia through extensive undersea cable systems, which facilitate the high-speed transfer of data across continents. These cables have been pivotal in enabling low-latency communication and have contributed to the establishment of Europe as a global data hub. For example, the deployment of high-capacity cables such as MAREA and Dunant has further enhanced the region's ability to support bandwidth-intensive applications, including cloud computing and AI workloads.

HYPERSCALE DATA CENTRES AND THE CLOUD REVOLUTION

The advent of cloud computing in the 2010s marked a seismic shift in the data centre landscape. Hyperscale data centres, operated by major cloud providers such as Amazon Web Services (AWS), Microsoft Azure, Meta, and Google Cloud, entered the stage. These facilities are characterised by their massive scale, energy efficiency, and ability to handle diverse workloads. Unlike enterprise or colocation data centres, hyperscale facilities are designed to support the elastic demands of cloud services, offering virtually unlimited scalability. Apart from building and operating hyperscale facilities, these cloud providers started driving demand for ever bigger colocation facilities.

The rise of hyperscale data centres has not been evenly distributed across Europe. While FLAPD remains a focal point, regions such as Scandinavia have also emerged as attractive locations due to abundant renewable energy resources and cooler climates, which lower cooling costs. Countries such as Sweden and Norway have attracted hyperscale investments, further diversifying Europe's data centre footprint.

As cloud providers grow, they are refining their footprint across Europe, launching in more and more regions to be as close to customers as is economically possible. As a result, hyperscale data centres start to emerge in a growing number of countries and the demand for large "scale" colocation facilities is growing very rapidly. The current boost in demand for hyperscale space coincides with the latest technological shift, AI.

THE IMPACT OF ARTIFICIAL INTELLIGENCE

AI has incredibly quickly become a key driver for data centre innovation and expansion. Training and deploying AI models requires significant computational power, similar to the requirements of high-performance computing (HPC). Hyperscale data centres have moved to the forefront of this shift, offering the infrastructure needed to support AI workloads. AI has also influenced the internal operations of data centres, with machine learning algorithms optimising power usage, cooling, and overall efficiency.

The rise of AI has also heightened the demand for edge computing, which places data processing closer to end users, reducing latency. This trend is expected to complement existing data centre architectures, with smaller facilities positioned at the network edge and hyperscale centres handling more extensive computational tasks.

CHALLENGES AND FUTURE TRENDS

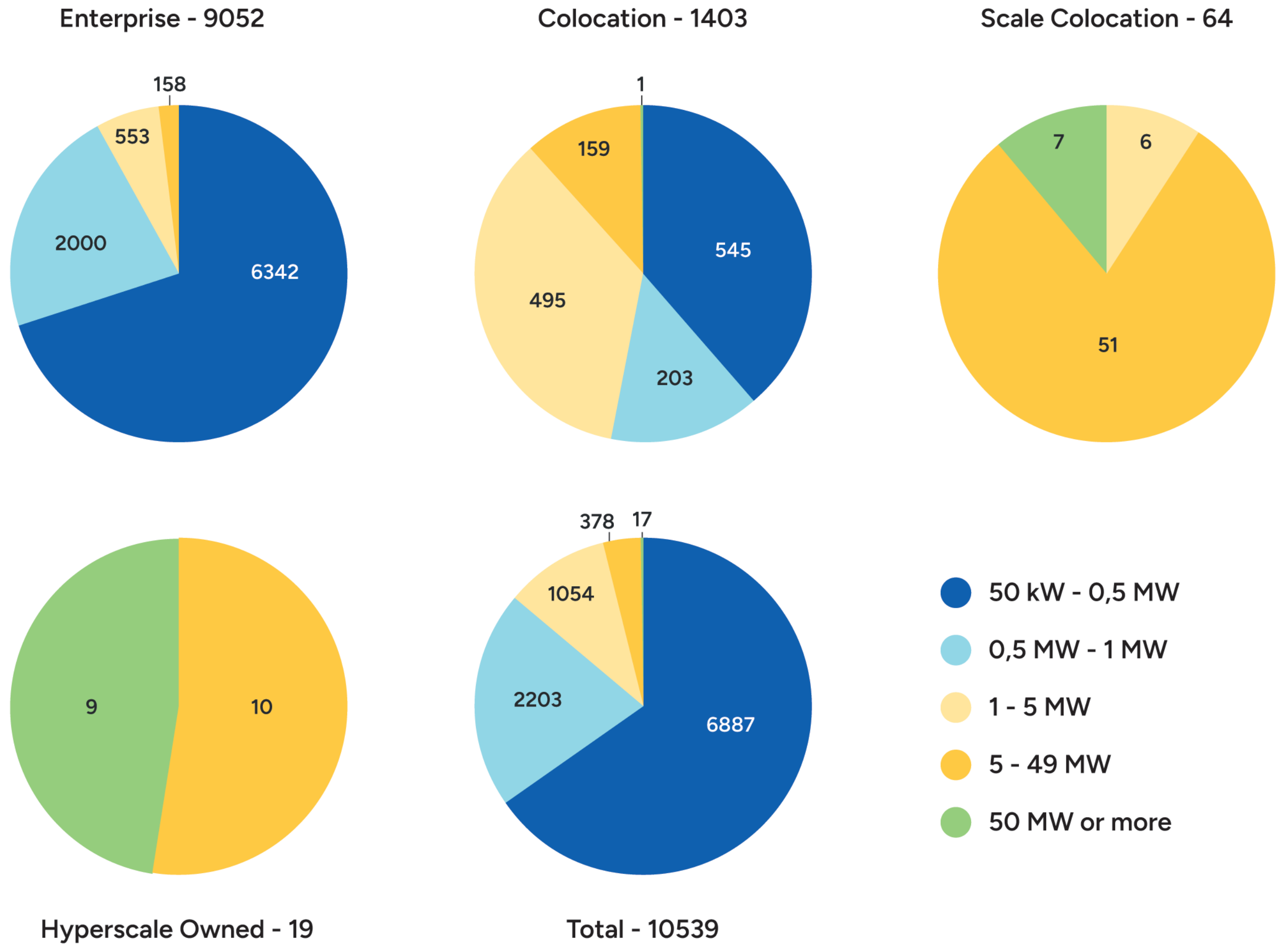
The European data centre industry faces several challenges, including rising energy costs, stricter environmental regulations, and the need for sustainable practices. Initiatives such as the European Green Deal have pushed operators to adopt renewable energy sources and improve efficiency. At the same time, geopolitical considerations, including data sovereignty and localisation requirements, have shaped the strategies of global providers in the region.

Looking ahead, the convergence of cloud computing, AI, and edge technologies will continue to redefine the data centre landscape in Europe. Emerging regions are increasingly challenging the dominance of FLAPD, driven by local incentives and advancements in connectivity as opposed to congestion issues that have emerged in some traditional markets. The industry's ability to adapt to these trends while addressing environmental concerns will determine its role in shaping the digital future of Europe.

THE LANDSCAPE IN NUMBERS

At the end of 2023, enterprise data centres significantly outnumbered colocation and hyperscale data centres. Close to 9,000 enterprise data centres have been identified with a capacity of 50 kW or more, most of which are relatively small. However, when considering large data centres with a capacity of 5 MW or more, colocation data centres dominate. This is because colocation facilities serve multiple customers, offering advantages such as enhanced connectivity, efficiency, security, and continuity. Many distributed enterprise data centres have consolidated into colocation facilities to benefit from these economies of scale.

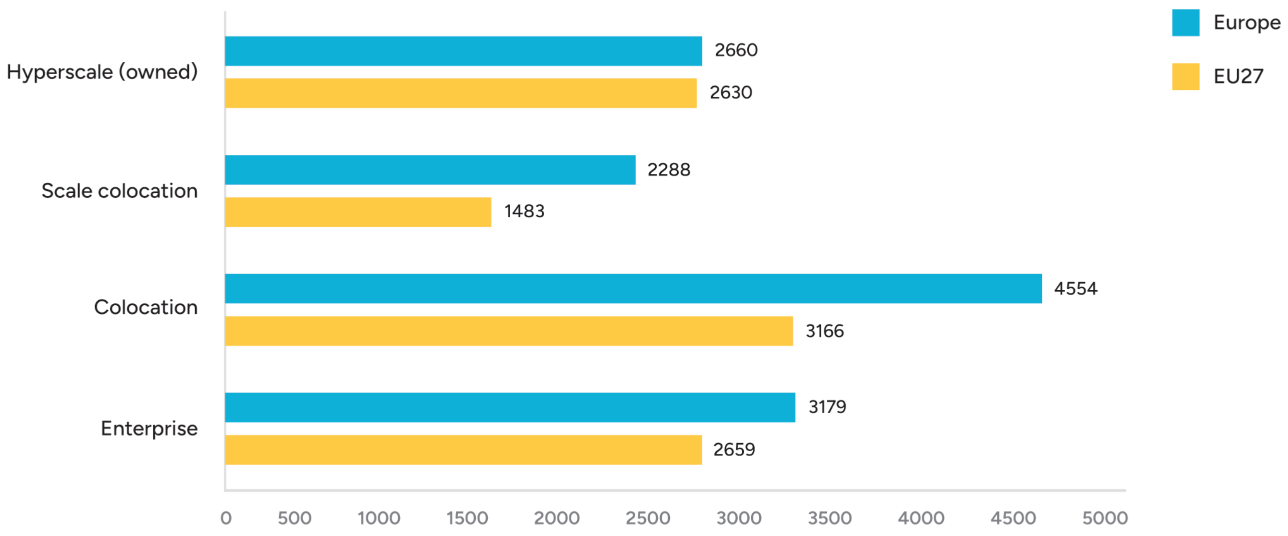
Figure 1. Data centres in Europe by type and IT Power (50kW or more), 2023EY



Source: *Colocation and hyperscale data centre database, Pb7 Research, 2025*

While enterprise data centres remain the most common in terms of numbers, scale colocation and hyperscale data centres have outgrown the enterprise market in terms of IT power years ago, even though this varies very strongly by country. Outside of the FLAPD and Nordic countries, the enterprise market still represents more than 50% of IT power. Colocation and hyperscale facilities are typically more modern and provide higher power (kW) per rack compared to enterprise data centres. Between now and 2030, very strong growth is expected in all commercial segments, but most strongly in the scale colocation and hyperscale markets.

Figure 2. Total IT Power (MW), Europe (12,681 MW); EU27 (9,937 MW)



Source: *Colocation and hyperscale data centre database, Pb7 Research, 2025*

KEY TRENDS AND DEVELOPMENTS

Looking ahead, several key trends are set to shape the European data centre landscape that can be divided into market dynamics, data centre technologies, and regulatory frameworks. Key market trends revolve around the ongoing digitalisation of both global and local economies, including cloud migration, the emergence of edge computing, and the transformative impact of AI. Technological trends in data centres highlight high-density computing, sustainable innovation, and increasing energy demand and constraints. On the regulatory side, a combination of EU-wide legislation and member state implementations, have an impact both inside and outside union member states. Taken together with more localised rules, these and comparable regulations in non-EU countries, can create challenges, especially in the permitting process.

MARKET TRENDS

DIGITALISATION

Digitalisation touches nearly every aspect of life: It transforms media consumption, facilitates remote work and collaboration, automates tasks, and enhances efficiency and productivity in both public and private sectors. It accelerates research and development cycles and drives the creation of new digital services, markets, and business models. This exponential growth in data creation demands an equally rapid increase in compute and storage capacity, supported by advancements in energy-efficient hardware and networking technologies.

CLOUD AND EDGE COMPUTING

Since its emergence nearly two decades ago, cloud computing has grown rapidly, offering businesses instant access to computing resources without the need for significant capital investment. Today, the cloud is ubiquitous, serving as the primary platform for innovation. However, cloud adoption is evolving beyond a one-size-fits-all approach. Enterprises and governments are embracing hybrid IT models, balancing public cloud adoption with private clouds and colocation data centres to address concerns around overspend, data sovereignty, and workload optimisation.

Hyperscalers are responding to this trend by expanding closer to the edge, creating regional cloud zones across Europe. This decentralisation addresses data sovereignty regulations, reduces latency, and improves service quality. Additionally, the rise of the Internet of Things (IoT) and 5G is driving demand for edge computing, where data is processed closer to devices. While small edge colocation data centres are becoming more common in Europe, the business case for such networks remains region-specific and continues to evolve.

ARTIFICIAL INTELLIGENCE

AI, while not new, has experienced significant growth over the past two decades due to advancements in compute power, cloud accessibility, and modern connectivity. AI is revolutionising industries such as automotive, healthcare, and manufacturing by enhancing R&D, optimising processes, and improving sustainability. The global AI market, valued at over €400 billion, sees Europe contributing around a quarter of this value.

The breakthrough of Generative AI has heightened interest in AI, transforming data centre design and driving hundreds of billions of euros in investments in AI-dedicated data centres across the globe. This trend is led by hyperscale cloud providers and colocation data centres investing in facilities capable of handling high-density AI workloads. The combination of regional cloud expansion and the AI breakthrough is driving unprecedented growth in the European data centre sector. The EU is supporting this trend with the upcoming Cloud and AI Development Act[1], and for example, the investments in AI factories[2]. Still, Europe is at risk of lagging behind.

Individually within the EU, Germany has overtaken France for the number of AI start-ups[3] and secured a €3.2 billion investment from Microsoft principally for AI[4]. France saw a flurry of pledged investments at its 2025 Paris AI Summit, totalling €109 billion, including partnership with the UAE for around €50 billion[5]. The union's third largest economy, Italy is somewhat behind the curve, announcing a €1 billion investment fund for AI projects, and also seeing a €4.3 billion investment from Microsoft for AI data centre infrastructure[6].

Currently, the majority of AI infrastructure investments are occurring in the US and China, who are very keen to get ahead, while other countries, including the UK, have made it a clear government-led goal.

For example, the UK is creating "AI Growth Zones", designated areas where planning approvals for data centres are expedited and get better access to the energy grid to attract key investments[7].

[1] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/14628-AI-Continent-new-cloud-and-AI-development-act_en
[2] https://digital-strategy.ec.europa.eu/en/policies/ai-factories
[3] https://www.euronews.com/business/2024/11/21/germany-rises-as-france-falls-in-the-global-ranking-for-ai-startups
[4] https://www.reuters.com/technology/microsoft-invest-32-bln-eur-germany-ai-push-2024-02-15/
[5] https://www.reuters.com/technology/artificial-intelligence/details-110-billion-euros-investment-pledges-frances-ai-summit-2025-02-10/
[6] https://www.reuters.com/technology/italy-set-up-ai-fund-1-billion-euros-pm-says-2024-03-12/
[7] https://www.gov.uk/government/news/prime-minister-sets-out-blueprint-to-turbocharge-ai

Meanwhile, in the US, President Trump was very quick to announce Stargate, a US$ 500 billion investment project for AI infrastructure from a consortium of technology companies[8]. Also, on 23 January 2025, he signed an executive order titled “Removing Barriers to American Leadership in Artificial Intelligence.”[9] This order revokes previous policies perceived as hindrances to AI innovation and mandates the development of an action plan within 180 days to maintain US leadership in AI. Additionally, the administration has set a precedent by declaring a national energy emergency to expedite permits for new energy projects, aiming to bolster the energy infrastructure in America, in a way that enhances economic competitiveness, national security, AI safety, and clean energy necessary to support AI advancements. This is perhaps reflective of the poorly integrated nature of state energy grids generally[10].

Looking at typical AI workloads, it can be foreseen that this will impact the data centre market in the coming years. Currently, most compute power is used for the training of AI models. These types of workloads do not need to be close to the end-user and are typically centralised. The most efficient approach would therefore be to build very large facilities close to affordable power resources. This makes the Nordics very attractive. However, investments are also seen, perhaps more so, in major new campuses across Europe in remote areas where renewable power supply exceeds local demand.

While AI training is still responsible for 50-80% of current AI workloads, the usage of AI inference is expected to grow significantly faster. As a result, the same effect as seen in the history of hyperscale cloud data centres can be expected and they will increasingly move closer to metropolitan areas. For now, most AI inference workloads are placed in existing colocation and hyperscale facilities in (often) optimised halls or rooms. But major demand can be reasonably anticipated for purpose-built AI data centres at these locations.

However, as has been observed with the emergence of DeepSeek AI instance, innovative approaches and new techniques may see even large training models capable of consuming significantly less resources than previous generations[11].

[8] https://edition.cnn.com/2025/01/21/tech/openai-oracle-softbank-trump-ai-investment/index.html
[9] https://www.whitehouse.gov/presidential-actions/2025/01/removing-barriers-to-american-leadership-in-artificial-intelligence/
[10] https://www.energy.gov/oe/grid-modernization-and-smart-grid
[11] https://www.forbes.com/sites/wesleyhill/2025/02/03/chinas-deepseek-ai-reshapes-global-energy/

TECHNOLOGY TRENDS

HIGH-DENSITY COMPUTING (HPC)

Various recent trends in computing and design have seen an increase in rack density. Modern data centres offer typically of 5-10 kW per rack[12], with HPC requiring even more power. The AI breakthrough is accelerating the trend towards high-density computing, with new data centre designs offering more than 100 kW per rack and specialised AI pods with more than 500 kW per rack . This necessitates significant design changes, including a shift to liquid cooling solutions for higher cooling effectiveness and efficiency, and greater potential for heat re-use.

POWER CHALLENGES AND SUSTAINABLE INNOVATION

Data centres are consuming ever-larger amounts of electricity, leading to challenges in securing adequate power supplies and addressing sustainability concerns. The average Power Usage Effectiveness (PUE) for modern colocation and hyperscale centres in Europe is already very efficient, and a significant step up from earlier generations of data centres. Becoming more energy efficient is an ongoing concern and drives ongoing investment from the sector. In general, the focus is shifting from efficiency towards the growing overall energy usage and ensuring sufficient renewable energy sources (RES). Innovations in cooling and heat re-use are also contributing to sustainability.

Still, access to power is becoming a big challenge to the sector. While being close to connectivity hubs has been the primary selection criterium for data centres, it is being replaced by access to RES. In a growing number of locations, the grid is not able to supply the power needed. As a result, data centres move to where the power is. An example is the two recently announced Edged data centre campuses with IT power capacity of up to 1 GW in Extremadura, Spain[13]. The Extremadura region is a major producer of renewable power but only consumes a limited amount. Locating data centres in the region reduces the need to transport electricity and helps combat some of the emerging power transport challenges.

As a result of power challenges, data centres are increasingly exploring large-scale on-site power storage and generation solutions. These include Battery Energy Storage Systems (BESS), natural gas generators, hydrogen fuel cells, and even the potential use of Small Modular Reactors (SMRs). Additionally, data centres and electricity grid operators are collaborating more frequently to enhance grid flexibility, addressing the challenges posed by the variable output of RES, such as solar and wind. And finally, heat re-use projects are contributing to sustainability goals, supporting the EU's green energy strategy.

[12] https://www.datacenterdynamics.com/en/news/nvidias-rubin-ultra-nvl576-rack-expected-to-be-600kw-coming-second-half-of-2027/
[13] https://www.edged.es/news/merlin-properties-and-edged-energy-partner-with-spanish-regional-government-of-extremadura-to-build-two-gigawatt-scale-ai-data-center-campuses

REGULATORY TRENDS

THE EUROPEAN ENERGY EFFICIENCY DIRECTIVE

The revised European Energy Efficiency Directive (EED), effective from September 2023, aims to support the EU Green Deal's sustainability goals. It mandates data centres with an IT power capacity of 500 kW or more to report environmental metrics, including energy efficiency, renewable energy usage, heat re-use, and water consumption. Facilities exceeding 1 MW must adhere to the European Code of Conduct on Data Centre Energy Efficiency and evaluate heat re-use feasibility.

Germany serves as an interesting example, having implemented the directive with additional national regulations under its Energy Efficiency Act (EnEfG). Effective from September 2023, the act mandates stricter PUE targets (1.2 or lower for new facilities by 2026), heat re-use requirements, and a transition to 100% renewable energy. Existing data centres in Germany will also face stricter efficiency and reporting obligations.

LOCAL REGULATION AND CHALLENGES

Europe, including many EU member states, faces varying local regulatory landscapes for data centres. For instance, while some regions streamline permitting processes, others enforce stricter environmental and zoning regulations. The growing concentration of data centres in high-demand areas, such as Frankfurt, London, Amsterdam, and Dublin, has led to grid congestion and local opposition. To address these challenges, a growing number of municipalities, provinces, and regions are introducing measures to ensure sustainable growth.

For example, in Germany, the municipality of Frankfurt launched the Frankfurt Data centre Masterplan in June of 2022[14]. The plan comprises a combination of planning where new data centres will be allowed, with sustainability demands focusing on PUE and using residual heat for heat networks. And in the Amsterdam region, the municipalities of Amsterdam and Haarlemmermeer implemented strict regulations to guarantee sustainable growth[15]. Meanwhile, the Italian Lombardy Region has issued a new directive (20 June 2024), urging municipalities to implement regulations, especially for medium large (5 MW+) and very large and hyperscale (50 MW+) data centres[16]. This includes additional environmental permitting and a preference for brown space developments.

[14] https://www.stadtplanungsamt-frankfurt.de/gewerbefl_chenentwicklungsprogramm_22136.html?psid=86sgqo3jl6288e0pmmc8orc8k3
[15] https://www.noord-holland.nl/bestanden/pdf/Richtlijn%20vestigingsvoorwaarden%20engelse%20vertaling.pdf
[16] https://www.regione.lombardia.it/wps/portal/istituzionale/HP/istituzione/Giunta/sedute-delibere-giunta-regionale/DettaglioDelibere/delibera-2629-legislatura-12

GEOPOLITICAL SHIFTS AND THE NEED FOR DIGITAL SOVEREIGNTY

Digital infrastructure forms the backbone of modern economies, driving innovation, global trade, and the secure exchange of information. In Europe, its significance extends far beyond economic utility, evolving into a strategic necessity for geopolitical resilience, economic independence, and sustained competitiveness. As global power dynamics shift and nations compete for technological leadership, Europe's ability to "stand on its own feet," as Mario Draghi stated[17], will depend on the scale, robustness, and autonomy of its digital infrastructure. This encompasses data centres, cloud computing, high-speed connectivity — from subsea cables to last-mile networks — AI, and quantum technologies. Realising this vision requires addressing the imperatives of digital sovereignty, seizing emerging opportunities, mitigating vulnerabilities, and ensuring sustainable development.

Digital sovereignty has become a central priority in an increasingly multipolar world. Europe's dependence on non-European providers for critical technologies, such as cloud platforms, AI, semiconductors, and networking hardware, has highlighted significant vulnerabilities. These dependencies expose the region to external geopolitical pressures, including shifting policies in the United States and the assertive, state-driven technological strategies of China. Furthermore, Europe's digital infrastructure faces constant threats from espionage and sabotage, particularly in the context of hybrid warfare tactics employed by state actors. Incidents such as cyberattacks targeting Ukrainian infrastructure and recent breaches of subsea cables in the Baltic Sea suggest these threats are not theoretical but ongoing and evolving.

Europe's ability to address these challenges will determine its capacity to thrive in a rapidly transforming global landscape. Investing in resilient, sovereign, and sustainable digital infrastructure is not just a matter of economic strategy but of safeguarding Europe's autonomy and security in an era of heightened global competition.

SUMMARY

In Europe, the demand for data centre capacity is soaring, driven by rapid technological advancements, the digitalisation of economies, and the growing need for a strong, reliable and sovereign digital infrastructure to support. With many billions of euros invested annually in building digital infrastructure, the sector faces challenges related to power availability, sustainability, and regulatory compliance. However, these challenges also present opportunities for innovation in energy efficiency, flexibility and heat re-use.

[17] https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en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COLOCATION IN EUROPE

The European colocation market has been developing very rapidly. Colocation here includes (only) data centres that rent out data centre space, in the form of rack units, racks, cages, rooms, halls, and complete data centres to a single user. In other words, this includes retail and wholesale colocation, including built-to-suit (or powered shell) and scale data centres. As of the end of 2023, 1,303 existing colocation and 64 scale colocation data centres with an IT Power capacity of 50kW or more have been identified, or 1,367 facilities in total.

It is acknowledged that not all small data centres can be accurately identified. Therefore, an estimate was made regarding small facilities with an average capacity of 0.7 MW of 100 facilities in the long tail, resulting in a figure of 1,467 facilities. This represents just 0.6% of the overall supply in IT power (MW). IT equipment is powered by an available 7.0 GW of power.

Colocation data centres are not distributed evenly across Europe. Almost three quarters (72 %) of available IT power supply in Europe is located in the FLAPD countries: Germany (Frankfurt am Main), the United Kingdom (London), the Netherlands (Amsterdam), France (Paris) and Ireland (Dublin). FLAPD destinations have been dominating the international colocation data centre landscape for years, functioning as key hubs for the European market. (Note: For the purposes of this report, when using the term FLAPD, it refers to the entire country, not just the city from which the term is derived.)

Table 1. Colocation and Scale Colocation IT Power Supply (MW) in Europe by Region, 2023

	EUROPE	EU27
FLAPD - Countries	4906	3346
Nordics	649	281
Central and Eastern Europe	614	383
South	497	464
Other	176	176
Total	**6842**	**4649**

Source: *Colocation and hyperscale data centre database, Pb7 Research, 2025*

Over the last 10 years, the Nordic countries, (Denmark, Finland, Iceland, Norway, Sweden) have been up and coming. Driven by the availability of space, relatively low-cost renewable energy and a cool climate, the region first attracted mostly a mix of hyperscale data centres and cryptocurrency miners. These conditions also make the Nordic countries attractive to AI data centre investments, especially for model training purposes.

In more recent years, connectivity with the rest of Europe and other continents has greatly improved with the addition of several submarine cables. As a result, the Nordics have also become attractive to a growing number of colocation operators. Please note that Iceland and Norway, both members of the European Economic Area, but not the EU, hold a big share in the Nordics market. Combining the Nordic countries, they are currently the second largest bloc of data centre countries in terms of IT power supply.

Central and Eastern Europe are very much up and coming regions. We still see a lot of countries lagging behind. Poland has developed as an Eastern European powerhouse, with close to 150 MW of supply in 2023. There are a lot of investments driving continued strong growth in Poland and Romania too. But in many other Eastern European countries, investments are held back by poor infrastructure. As Central European countries, Austria and non-EU Switzerland are relatively mature, and they continue to attract investments at a healthy rate, albeit lower when compared to Poland and Romania.

While there is a lot of growth across Europe, the greatest growth of all is seen in Southern Europe. The region is benefiting from greatly improved intercontinental and European connectivity, a boom in affordable renewable energy and a willingness to attract major new technology infrastructure investments. As a result, we see the traditional data centre hubs of Madrid and Milan expanding very rapidly, especially with scale colocation investments. On top of that, new metropolitan hubs are emerging in Barcelona, Rome, and Athens. Furthermore, scale colocation campuses with 10s to 100s of Megawatts are emerging in more remote regions across Portugal, Spain and to some extent Italy.

COLOCATION DATA CENTRE SURVEY

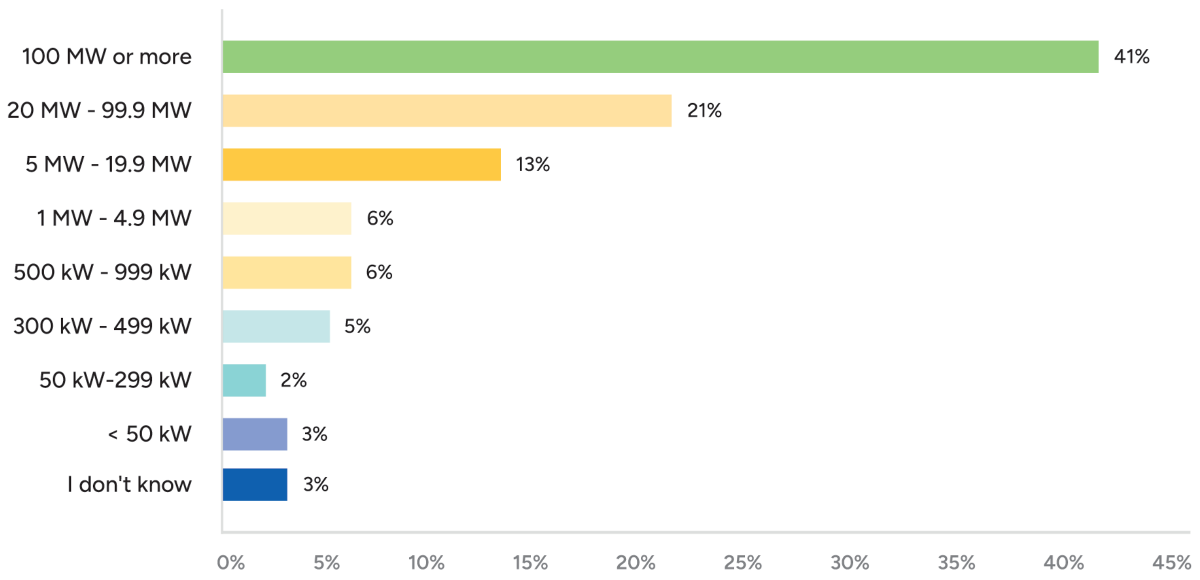
To gain better insight on the structure of the European market and key trends in terms of market impact and environmental footprint, a survey was conducted among the members of the EUDCA, members of the associated National Trade Organisations and non-member data centre operators. The 63 respondents to the survey represent 59% of the European colocation and scale colocation data centre market in terms of IT Power (MW).

Although data centres with IT power facilities of as low as 50 kW were included, most colocation data centres offer more than 1 Megawatt. The number of small colocation data centres is slowly declining, as some mixed organisations (managed service providers or hosting companies) stop offering colocation from their data centres or move their servers to (other) colocation data centres.

Within the survey, efforts were made in so far as possible to align with the market definitions used in the EED. While it is common to measure the market size in terms of the maximum power that is available for IT equipment (as reported in Figure 3), the EED asks for the actually installed nominal IT power based on the installed IT equipment. In Figure 4, based on weighted data, compensated for the size of each respondent, the average installed IT power versus available IT power came out at 48%. This indicates that many colocation data centres have significant room for growth, this may be through either having empty space that may already be leased but not yet used[18], or customers having optioned space for customers to upgrade equipment to a higher density (watts per rack) at a later date. The conclusion is that, currently, only half of the potential power capacity is actually being used[19].

The remainder of this report will reference the answers to questions from the colocation data centre survey, to gain a better understanding of the key trends in the market and the approach to achieving sustainable goals. The data will be supplemented from the Pb7 Research data centre database and investment data to create market forecasts to better quantify the growth in various data centre markets.

Figure 3. How much IT power is available for customer(s) in the total of your data centres within Europe? (MW), N=63



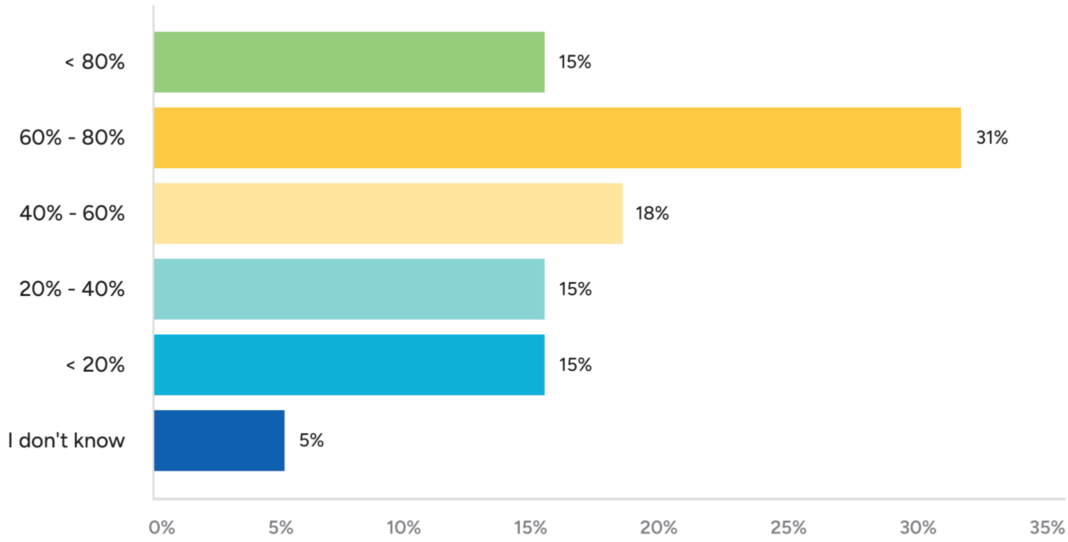
Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

[18] A quarterly study (FIGURES | EUROPE DATA CENTRES | Q4 2023) by CBRE show vacancy rates are between 5 and 20% at the end of 2023 for primary and secondary market.

[19] Also, since not all servers run at full capacity at the same time and all of the time, there is no direct correlation between the total IT power supply and the actual electricity usage.

[20] Please note that is significantly lower compared to the most recent IEA estimates for about 100 TWh in 2022. Cross checks with non-public data from grid companies show this is in line with their actual data. It is also more in line with recent McKinsey estimates for Europe: https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/the-role-of-power-in-unlocking-the-european-ai-revolution

Figure 4. Question: *How much of the total available IT power is "installed IT power", as defined in the EED (the sum of the nominal power demand, in kW, of the network or networks, servers and storage equipment installed in the data centre computer room floor area)?*[20] N=63



Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

DRIVERS AND INHIBITORS

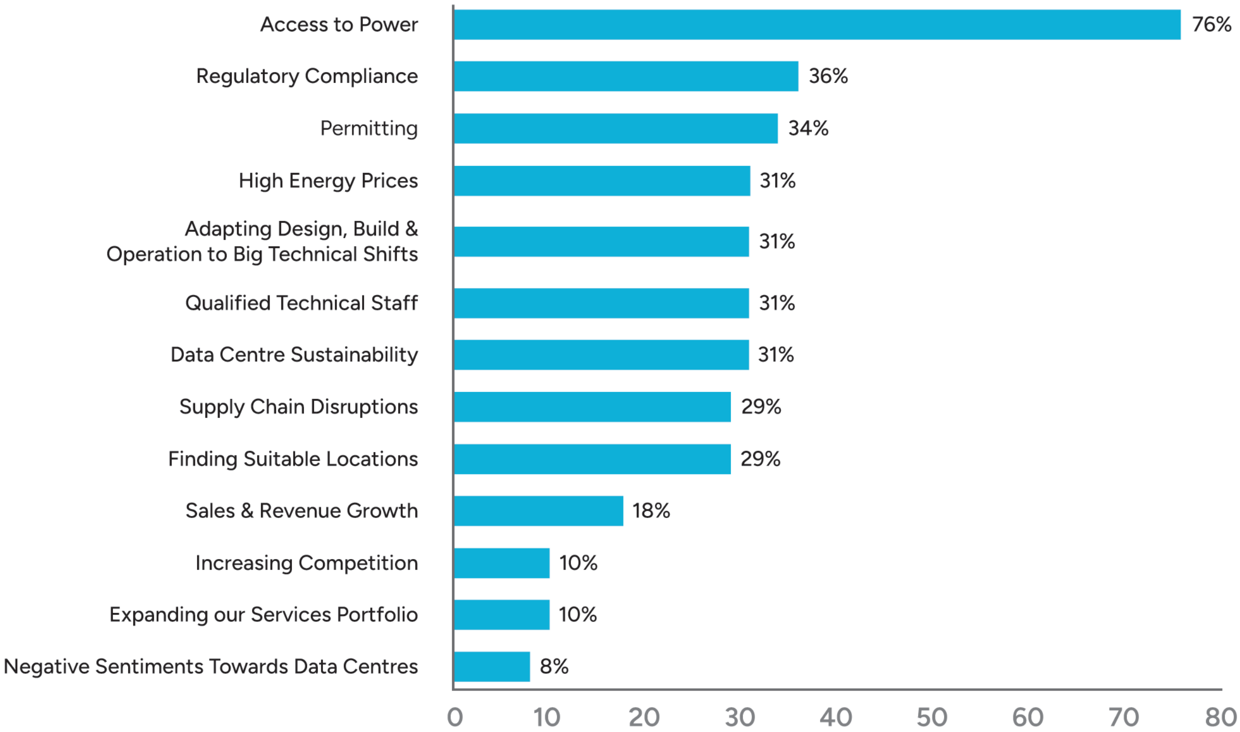
In the first chapter, a number of market, technology, and regulatory trends were identified. These trends drive change in the market. Some trends lead to strong growth, some create barriers, and others transform the colocation market.

Current market trends, such as digitalisation, cloud, and artificial intelligence, drive strong growth in the demand for colocation. While some enterprises, including IT and telecommunications companies, have built out their enterprise data centre capabilities to develop and house their digital solutions, the trend has generally been to move workloads elsewhere. With more and more workloads being moved to the cloud, many enterprises have seen the footprint of their enterprise data centre(s) shrink. A lot of enterprise data centres are outdated in that they are no longer optimised to facilitate the power that modern equipment uses, let alone AI servers; and they do not comply with upcoming data centre regulations in terms of energy efficiency.

When an organisation needs to upgrade outdated facilities, it makes more sense to use colocation for workloads that have not yet been moved to the cloud. As a result, colocation data centres grow at all levels: retail data centres benefit from enterprise demand for colocation, and wholesale and scale colocation grow even faster to cater to cloud providers, who are now also betting heavily on AI.

Strong growth comes with big challenges. As the survey shows, data centres are struggling more than anything with power constraints. This is followed by a mix of regulatory compliance, permitting challenges, energy prices, the impact of AI and other technological shifts, technical skills and sustainability. Interestingly, data centres do not consider negative public sentiments to represent much of a challenge in the medium-term. In several surveys that Pb7 Research has undertaken over the past couple of years, negative public perceptions have been rising quickly as a topic, and then moving down the list quickly as concerns over power accessibility started to overshadow. Subsequently, the political climate towards data centres has become more positive due to a combination of AI opportunities and the debate about digital sovereignty.

Figure 5. Question: *What are the biggest challenges for your organisation for the next three years? [multiple response, top 10 answers]*



Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

POWER CONSTRAINTS

The single most important inhibitor to colocation data centre growth is power constraint. This has a particularly big impact on the FLAPD markets. It is also a growing concern across the European landscape, as grid companies try to cope with a combination of the electrification of manufacturing and transport, and the increase of distributed and variable wind, and solar power generation. As a result, more and more waiting lists for power are emerging and the waiting times get longer, up to 10 years or more.

In Amsterdam and Dublin, the constraints are ubiquitous: Power grid companies are unable to deliver the desired quantities, waiting lists are creating delays, and investors are directing their plans to other locations. Paris, Frankfurt, and London are also dealing with serious congestion challenges. However, these are being tackled in part through the development of data centre zones slightly outside the metropolitan areas. This will require additional investments in communications connectivity. However, since data centre projects are scaling up in size to tens and hundreds of Megawatts, it is increasingly easier to build a business case for that.

HIGHLIGHTS

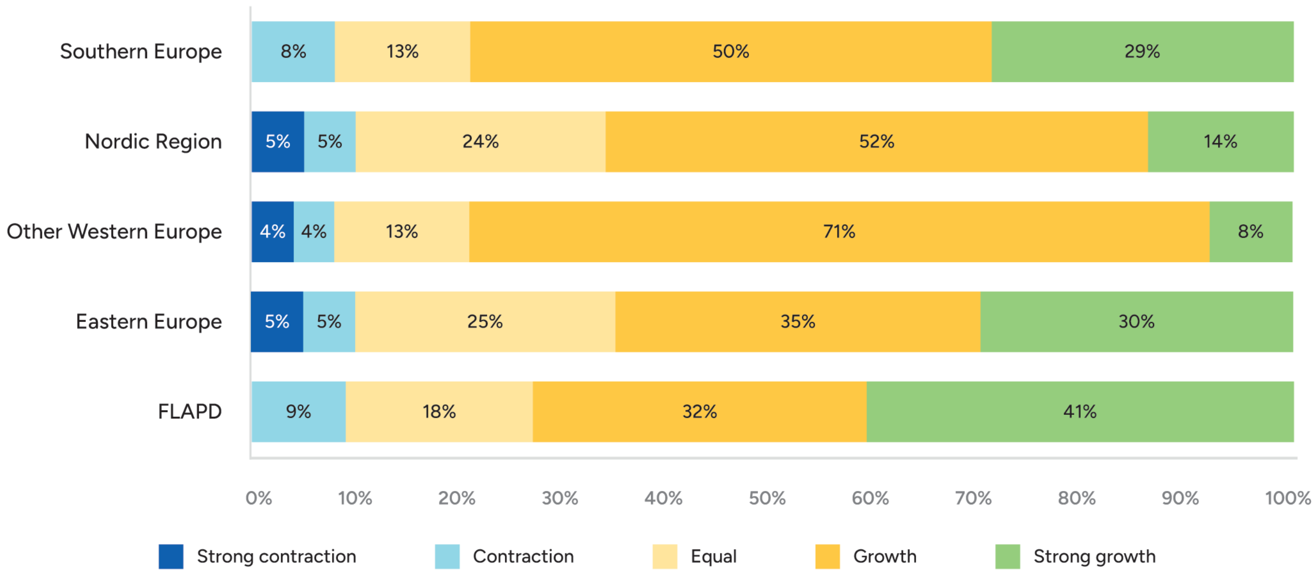
IT Power supply forecast

FLAPD countries host almost three quarters of colocation data centres (72.4%), though the IT power supply forecast expects greater growth in new markets, such as the Nordics and Southern Europe (IT Power supply forecast)

Apart from moving further out, urban data centres also move to alternative well-connected, but less congested data centre hubs, such as Milan, Warsaw, Zurich, Brussels, Oslo, Copenhagen, Stockholm, and others. Within some countries, new "metro regions" are emerging, with Berlin, Rome and Barcelona attracting most of the attention currently.

As a result, data centre operators see growth everywhere in Europe. They continue to be bullish on growth in the FLAPD metros, even though it may be unevenly distributed. They are arguably even more positive about the growth prospects in Southern Europe. The data also shows that the Nordic countries are not yet succeeding in attracting a major share of AI workloads as would be expected based on its traditional strengths. Also, Eastern Europe and the rest of Western Europe (other than FLAPD) are expected to grow strongly, but not necessarily to the same extent in every country.

Figure 6. Question: *In which of the following regions do you expect revenue growth or contraction in the next three years?*



Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

MARKET SIZE AND FORECAST

The size of the colocation market can be measured in various ways. The following paragraphs will first look at the investments being made in the construction and fit out of data centres between 2023 and 2030. These investments result in the strong growth of data centre supply, which is measured as IT power supply in Megawatts. The market is sized using the colocation and hyperscale database built by Pb7 Research to include practically every colocation and hyperscale data centre in Europe with a capacity of 50 kW or more, combined with an estimate for the remainder.

To forecast the IT supply, new data centre plans by country were identified, estimates were made for how likely the plan was to materialise (that being plans from the positive to the speculative) and plotted by years in which the investments are most likely to occur. A conservative approach was taken, as delays to the original planning are to be expected: Projects start later and take longer to complete compared to initial planning. It was also taken into account that the database of investments will be incomplete, and new plans are announced almost every day. An estimate of unknown projects was included, also with a conservative approach. It is important to understand that a single 100MW data centre project can have a major impact on a country forecast. Still, this methodology provides a strong indication of how markets will grow up to 2030.

HIGHLIGHTS

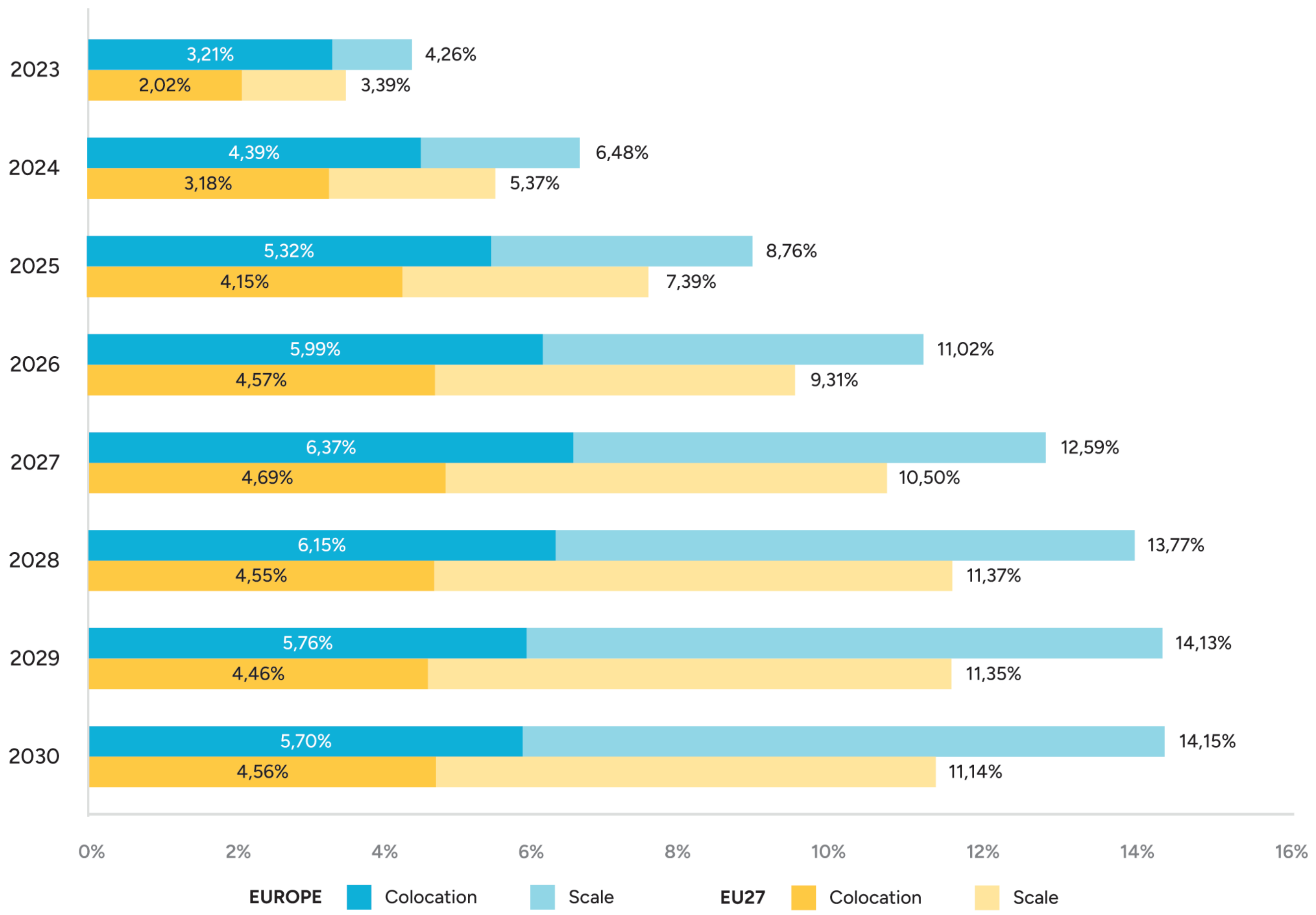
Investments

Investments in the data centre sector grew significantly between 2023 (€5.4 billion) and 2024 (€8.7 billion). Between 2025 and 2030, the multi-year volume of investments is likely to exceed €87 billion.

INVESTMENTS

It is quite a challenge to keep up with all announcements regarding data centre investments in Europe. Every week new investments are announced, often a billion euro or greater in scale. Looking at the base year of this report, it was calculated that almost € 5.4 billion was being invested in the construction of new data centres in Europe. In 2024, this grows by more than 50% to € 8.5 billion. Between 2025 and 2030, the multi-year volume of investments is likely to exceed € 87 billion, bringing the total of construction spend to just over € 100 billion across the total time frame. A conservative model was used to calculate this, assuming that AI will lead to additional growth, but not on an ongoing, exponential basis, that some data centre plans are too speculative, and that regulation and access to power will be growing challenges, resulting in construction delays.
Most of the construction spending is going to a relatively new category that is taking Europe by storm: scale colocation. Essentially, scale colocation offers very large customers, often hyperscale cloud providers, very large, scalable and modular facilities that can easily be adapted for purpose. Increasingly, these facilities are organised in campuses that can scale to tens of Megawatts all the way up to a Gigawatt. The size and scale of these facilities are growing very rapidly to accommodate the increasing demand for cloud and AI workloads.

Figure 7. Question: *Data centre construction and installation Investments (€ Bln), EU and Europe Colocation, 2023 – 2030 forecast*



Source: *Pb7 Research, 2025*

IT POWER SUPPLY

These investments will have a profound impact on the European data centre landscape. Adding the IT power that is expected to come online year by year (on a project-by-project basis), the market is expected to more than double to over 17 Gigawatt in five years. Between 2023 (end of year) and 2030, the available IT power will on average grow 14% per year. That includes 8% for retail and wholesale colocation data centres and a compound annual growth rate of 22% for scale colocation data centres. The EU is growing slightly faster, especially as a result of strong growth in Southern Europe.

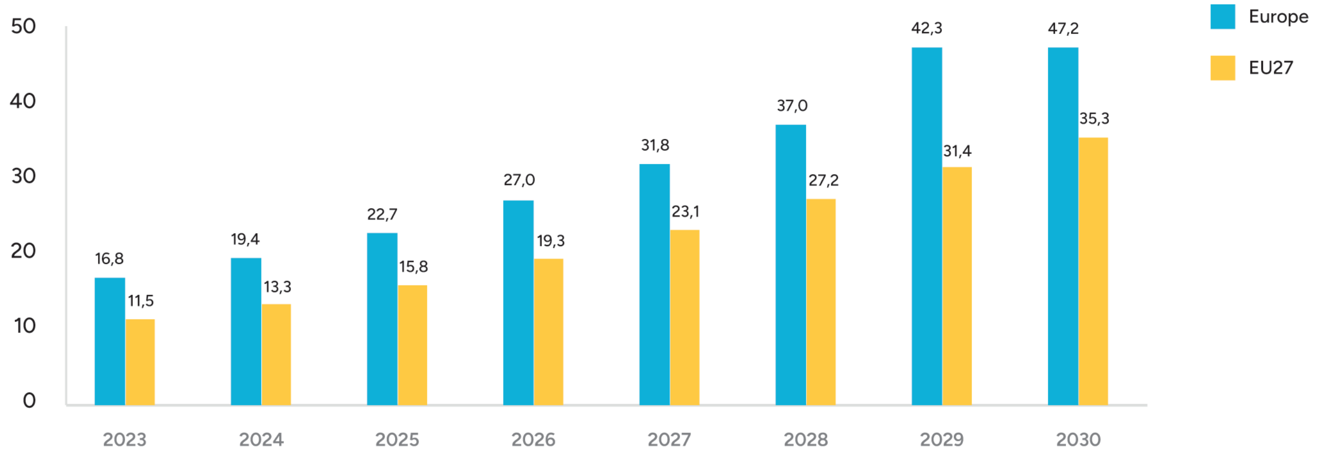
In terms of market revenues, the market will grow even faster. On the one hand, prices continue to go up, as a result of scarcity of materials and resources and inflationary effects on electricity prices, construction materials, wages, and so on. On the other hand, the mix between retail and wholesale colocation and scale colocation revenues will shift towards the latter, resulting in lower revenues per square metre for the colocation provider.

Table 2. Colocation IT Power Supply (MW) forecast in Europe by Type, 2023 - 2030

	2023	2024	2025	2026	2027	2028	2029	2030	CAGR 23-30
EUROPE TOTAL									
Retail & Wholesale	4554	4899	5338	5847	6372	6947	7452	7904	8%
Scale	2288	2782	3454	4357	5469	6661	7988	9232	22%
Total Colocation	**6842**	**7681**	**8792**	**10204**	**11841**	**13609**	**15440**	**17136**	**14%**
EUROPEAN UNION									
Retail & Wholesale	3166	3367	3684	4104	4493	4923	5281	5642	9%
Scale	1483	1866	2429	3194	4136	5133	6249	7229	25%
Total Colocation	**4649**	**5233**	**6133**	**7298**	**8630**	**10056**	**11530**	**12871**	**16%**

Source: *Colocation and hyperscale data centre database, Pb7 Research, 2025*

Figure 8. Colocation revenue (€ Bln) in Europe EU, 2023 – 2030 (CAGR 23-30: Europe:15,9% ; EU 17,4%)



Source: *Colocation and hyperscale data centre database, Pb7 Research, 2025*

REGIONAL DIFFERENCES

Across Europe, there are marked differences in both maturity and growth of the data centre market. The heart of the market is located in the Northwest of Europe, spread across a handful of metropolitan regions. But there are also major developments and opportunities in other regions. The Nordics have been up and coming for some time, while currently investments are soaring in Southern Europe too. In Eastern Europe, growth is not yet ubiquitous, but that may be a matter of time.

FLAPD COUNTRIES

Geographically, the European colocation market is dominated by the FLAPD countries, thanks to the international data and connectivity hubs. While Frankfurt, Paris and London have grown as a result of being centres for financial services, Amsterdam and Dublin differ slightly. Amsterdam became an early internet hub because it was the first location the internet landed in Europe. Since the beginning of the tech era, Dublin has been a cost-effective bridgehead to Europe for US companies, and the hyperscalers followed suit.

Broadly speaking, between 70-90%, of the colocation data centre supply in FLAPD markets is located around its data and connectivity hub. These facilities cater for workloads with an international focus or that require superior connectivity for other reasons. Other data centres have a more domestic focus, offering well-connected, reliable and, increasingly, energy efficient space for IT and networking equipment to Small and Medium Businesses (SMB's), local enterprises, technology companies and organisations in the public sector.

Apart from this, there are new metro regions emerging as high growth data centre hubs, with Berlin and, to some extent, Marseille as primary examples. It is part of a wider trend, where data centres are starting to group around every developed metropolitan region with a multi-million population, which is also visible in other regions.

Overall, we see strong growth in the FLAPD markets. While London is by far the biggest single centre, it faces its own challenges with grid and space constraints. Germany is the fastest growing country, with soaring investments in the Frankfurt region as well as in Berlin. While space and power in Frankfurt itself is scarce, there are plenty of opportunities somewhat further out. Even though Paris and, especially Dublin and Amsterdam, are dealing with significant grid congestion issues, growth is still expected to be close to 10% on an annual basis. Some of those projects seem uncertain, but serious delays have already been taken into account. Dublin and Amsterdam are also under pressure due to grid challenges which take a long time to address.

COLOCATION AND SCALE COLOCATION IT POWER SUPPLY

Table 3. Colocation and Scale Colocation IT Power Supply (MW) forecast in Europe by Region and Country, 2023 - 2030

	2023	2024	2025	2026	2027	2028	2029	2030	CAGR 23-30
FLAP- Countries	**4906**	**5296**	**5918**	**6622**	**7488**	**8366**	**9311**	**10182**	**11%**
France	708	760	813	874	970	1082	1197	1308	9%
Germany	1330	1467	1799	2124	2522	2909	3275	3572	15%
Ireland	451	485	543	569	617	695	795	903	10%
Netherlands	857	925	991	1125	1273	1388	1521	1630	10%
United Kingdom	1560	1660	1771	1930	2107	2292	2523	2770	9%
Nordics	**649**	**833**	**1015**	**1184**	**1410**	**1708**	**1951**	**2186**	**19%**
Denmark	50	53	64	116	158	199	244	289	28%
Finland	101	115	177	228	278	324	341	393	21%
Sweden	130	155	175	200	246	335	413	475	20%
Iceland (EEA)	141	190	226	242	260	313	359	383	15%
Norway	228	322	373	397	469	538	594	646	16%
Baltics	**36**	**36**	**50**	**51**	**59**	**59**	**67**	**68**	**9%**
Estonia	14	14	18	18	21	21	24	24	8%
Latvia	10	10	20	20	25	25	30	30	18%
Lithuania	12	12	13	14	14	14	14	14	2%
CEE	**614**	**668**	**740**	**827**	**940**	**1038**	**1138**	**1219**	**10%**
Austria	62	65	68	78	100	114	123	131	11%
Bulgaria	32	32	32	35	35	36	39	40	3%
Croatia	14	14	17	18	25	27	33	34	14%
Czech Republic	67	77	79	93	94	108	110	112	8%
Hungary	17	17	18	18	18	19	20	20	2%
Poland	147	175	206	229	267	289	340	373	14%
Romania	25	26	27	34	40	50	54	59	13%
Slovakia	14	14	14	15	15	15	15	15	1%
Slovenia	4	4	4	5	5	6	6	6	6%
Switzerland	231	243	274	302	340	375	397	428	9%
Southern Europe	**497**	**692**	**869**	**1286**	**1692**	**2135**	**2638**	**3088**	**30%**
Greece	21	28	31	48	65	89	106	130	30%
Italy	248	274	368	578	683	859	1016	1164	25%
Portugal	35	49	69	73	205	300	451	566	49%
Spain	160	308	367	553	704	851	1028	1190	33%
Other Southern Europe	34	34	34	35	35	36	37	38	2%
Other Northwest	**140**	**155**	**200**	**234**	**251**	**302**	**335**	**394**	**16%**
Belgium	76	91	136	169	186	237	270	327	23%
Luxembourg	64	64	64	66	66	66	66	67	1%
EU TOTAL	**4649**	**5233**	**6113**	**7298**	**8630**	**10056**	**11530**	**12871**	**16%**
ALL	**6842**	**7681**	**8792**	**10204**	**11841**	**13609**	**15440**	**17136**	**14%**

Source: *Colocation and hyperscale data centre database, Pb7 Research, 2025*

NORDIC COUNTRIES

The Nordic countries, including Iceland and Norway as members of the EEA, have benefited from a combination of a cool climate, plenty of space, and a surplus of low-cost renewable energy. And more recently, great international connectivity to attract a growing share of the European colocation data centre market. According to analysis, the market is growing at a compound annual growth rate of 19%. The smallest data centre market, Denmark, is even growing at a rate of 28%. Clearly, they are well positioned to attract training focused AI factories.

BALTIC COUNTRIES

Estonia, Latvia, and Lithuania are a group of small countries that can derive benefit from their cool climates, just as the Nordics. The majority of the data centres there are focused on the domestic market. There may be a bigger opportunity to attract international investments in this IT savvy part of the EU. For now, the most growth is seen in Latvia with a CAGR of 18%.

CENTRAL AND EASTERN EUROPE (CEE)

CEE is a mixed bag in that it comprises a variety of countries in terms of digital maturity. The largest colocation country in the CEE region is Switzerland. Poland has grown into the second largest market. In particular, the Warsaw metro is developing into a powerful data centre hub, with a mix of retail, wholesale, and scale colocation investments. The third and fourth largest CEE countries, are the Czech Republic and Austria. When looking at the growth, it can be seen that Poland continues to outperform with a CAGR of 14%, a similar percentage as seen in Romania and Croatia, where data centre investments are starting to ramp up. In other CEE countries, the market appears not to be ready for significant investments. Still, the overall compound annual growth rate of the region is quite strong at 10%.

SOUTHERN EUROPE

As indicated previously, Southern Europe is attracting a lot of investment. Historically, data centre operators were hesitant to invest in Southern Europe due to a combination of the warm climate (increasing the need for cooling power), limited global connectivity, and permitting challenges. The cooling challenge has been reduced to a combination of innovation and offset by the wide availability of renewable power; sea cable landing points have sprung up at a fast rate and governments often welcome major data centre projects. As a result, the Southern European market is growing at a very high growth rate of 30% per year. Scale colocation (and hyperscale) data centre investments form the basis for the growth in these areas. The growth in the market is driven by Spain, Italy and, more recently, Portugal. But Greece is showing strong growth as well, due to the commitment of new cloud investments in the country.

OTHER NORTHWEST EUROPE

Belgium and Luxembourg also warrant attention. Geographically, they are in the middle of the FLAPD area. Luxembourg very early on, carved out a data centre niche for itself that matched the strong finance sector, but over for the coming years, there is little sign of significant additional investments, leading to modest growth prospects. Belgium, on the other hand, is becoming an alternative for operators that have found room for growth challenging in the FLAPD markets. Apart from that, new cloud investments are driving construction in the colocation market in the Brussels region.

SUMMARY

The European colocation market is rapidly expanding, with diverse growth patterns across regions. The FLAPD countries dominate as central hubs due to their connectivity and established infrastructure, representing over 70% of Europe's IT power supply. However, other regions are emerging as key players. The Nordics benefit from renewable energy, cool climates, and improved connectivity, while Southern Europe is experiencing rapid growth, driven by renewable energy investments, enhanced connectivity, and government incentives, particularly in Spain, Italy, and Portugal. Central and Eastern Europe, led by Poland, show steady growth, although some countries face infrastructure limitations.

The market is increasingly leaning toward scale colocation to meet demand from hyperscalers and AI workloads, with investment well exceeding €100 billion by 2030. Despite this growth, power constraints, regulatory hurdles, and sustainability challenges remain critical issues, shaping the future trajectory of the sector.

HYPERSCALE-OWNED DATA CENTRES

While the key focus in this report is on colocation data centres, the picture would not be complete without addressing data centres operated by hyperscale vendors such as Apple, AWS, Google, Meta, and Microsoft. These vendors, and especially AWS, Google and Microsoft, employ a hybrid data centre model, using a mix of owned and rented colocation facilities. Colocation is a very useful method for such operators to get close to their customers when needed. Self-built data centres on the other hand, provide scale advantages, including energy efficiency. It is not unusual that they first enter new regions via colocation facilities, adding self-built capacity once the scale of customer demand reaches a certain level.

DRIVERS AND INHIBITORS

The same trends that drive the colocation market, digitalisation, cloud, and AI, are currently driving growth in hyperscale data centre construction. Hyperscale cloud providers are moving closer to their customers as soon as market size allows it[21]. They are currently in the process of rolling out in a growing number of national and metropolitan regions across Europe. At the same time, they continue investing in centralised hyperscale campuses.

Importantly, they are also the prime investors in AI equipment. Hyperscale cloud vendors are the biggest buyers of AI systems and are betting on becoming the biggest AI infrastructure providers. They may run up to two thirds of all AI workloads by 2030[22]. More than half of the current investments are focused on the US. These investments are applauded by the US government and seen as critical to stay ahead. The sudden breakthrough of generative AI has posed something of a dilemma for hyperscale operators, leaving them to consider whether to continue to invest in cloud data centres according to plan, or to radically redesign their data centres. For now, the answer seems to be somewhere in the middle: they have stopped construction projects e.g., in Odense Denmark, to rethink. Still, the new designs seem to be relatively flexible, so they can house both dense AI workloads as well as more traditional cloud server workloads. In general, the perception is that the latest wave of hyperscale data centre construction is slowing down somewhat and perhaps nearing its end. The next generation of AI cloud data centres, however, is only just starting to ramp up in Europe, leading to this new wave of growth in the second half of the 2020s.

[21] This is sometimes described as edge computing. Since it is a move away from centralised computing and closer to the end-user, therefore this makes sense. However, to avoid confusion, we prefer to reserve that term for small scale computing close to the device.
[22] https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/ai-power-expanding-data-center-capacity-to-meet-growing-demand

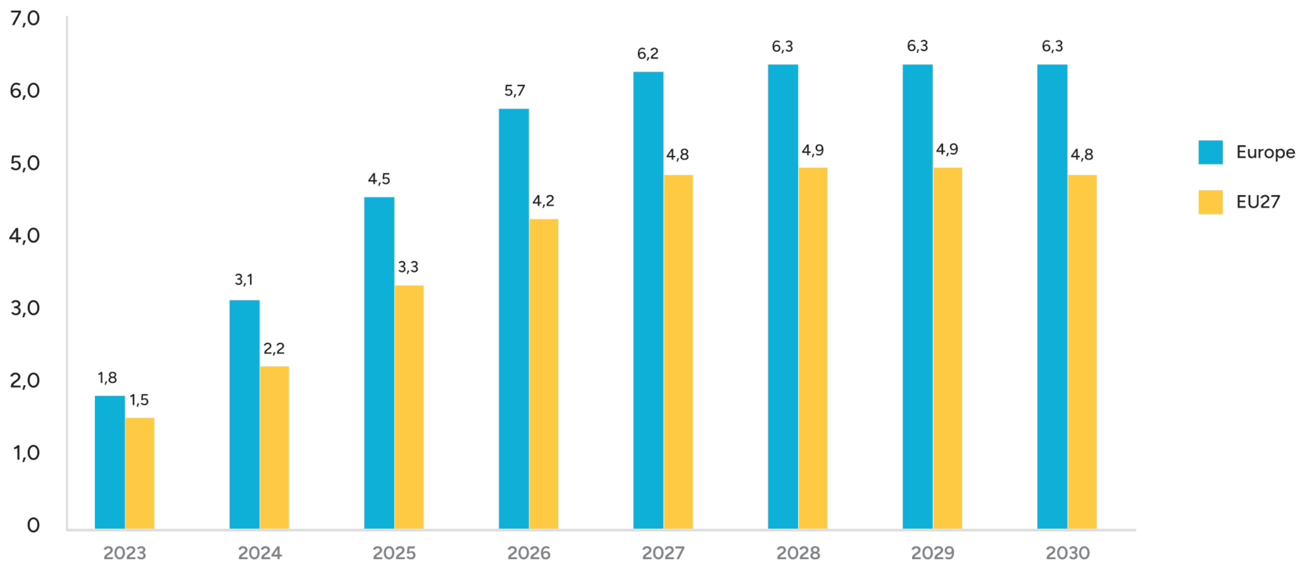
MARKET SIZE AND FORECAST

The size of the hyperscale (owned) market has been measured largely in the same manner as the colocation market, first looking at the investments being made in the construction and fit out of data centres. The investments result in growth of the data centre supply, measured in Megawatts. The market is sized using the same colocation and hyperscale database which also includes hyperscale data centres across Europe. The difference between this and the colocation section is that the market is not being measured in terms of colocation (or other type of) revenues.

INVESTMENTS

In terms of finance, there are many major announcements for new long-term investments, with messaging focussed on AI. Also, behind the scenes, there is a wide range of permits for expansions being requested for existing and new campus locations. The next wave of investment is anticipated to bring a lot of new construction activities. When looking at the base year 2023, it was calculated that about €1.8 billion was being invested in the construction of new hyperscale data centres. In 2024 this grows to well over €3 billion. Between 2025 and 2030, the multi-year volume of investments is about €35 billion, bringing the total of the construction spend to more than €40 billion between 2023 and 2030. Again, using a conservative model to calculate this, assuming that AI will lead to additional growth but not on an ongoing exponential basis, as most behind the scenes data centre plans are still too speculative or will have a limited impact in the forecast period, and with construction delays taken into account too.

Figure 9. Data centre construction and installation Investments (€ Bln), Hyperscale owned data centres, 2023 – 2030 forecast



Source: *Colocation and hyperscale data centre database, Pb7 Research, 2025*

IT POWER SUPPLY

These investments will result in a significant growth of the IT power supply in the hyperscale market. Between 2023 (end of year) and 2030, the available IT power will on average, grow at 10% per year to about 5 Gigawatts. Additionally, hyperscale data centres are not evenly spread across Europe, although there are marked differences compared to the colocation market.

HYPERSCALE OWNED IT POWER SUPPLY

Ireland (43%) and the Nordic countries (32%) account for the lion's share of the IT power supply in hyperscale data centres. When we also include the Netherlands (17%) and Belgium (5%), there's only 2% of the market capacity available elsewhere. By 2030, there will be a clear shift: 31% of all hyperscale capacity will be elsewhere. There are plans for Germany, Austria, Poland and Greece, but the biggest investments are expected to occur in the United Kingdom, Spain and Italy.

SUMMARY

Hyperscale data centres are experiencing robust growth across Europe. These facilities utilise a hybrid model, leveraging both self-built and colocation data centres to optimise scalability, efficiency, and proximity to customers. Investment in hyperscale infrastructure is accelerating, particularly due to advancements in AI and increasing demand for cloud services.

By 2030, the total investment in hyperscale data centres in Europe is projected to exceed €40 billion, with an average annual IT power supply growth of 11%, reaching 5.6 GW. It is worth noting reports that Microsoft is cancelling some 200MW of data centre leasing agreements, though it is not yet clear if that is representative of broader market intent[23]. While Ireland and the Nordics currently dominate hyperscale capacity, regions such as Southern Europe (notably Spain and Italy) and the UK are emerging as significant growth areas. Despite the rapid expansion, challenges such as construction delays and the need for flexible designs to accommodate dense AI workloads are shaping the sector's trajectory.

[23] https://www.datacenterdynamics.com/en/news/microsoft-cancels-200mw-of-ai-data-center-leases-report/

Table 4. Hyperscale owned IT Power Supply (MW) forecast in the EU by Region and Country, 2023 - 2030

	2023	2024	2025	2026	2027	2028	2029	2030	CAGR 23-30
FLAP- Countries	**1642**	**1676**	**1757**	**1888**	**2133**	**2432**	**2762**	**3081**	**9%**
France	0	0	0	0	50	120	200	280	na
Germany	10	20	20	20	42	42	64	85	36%
Ireland	1142	1166	1189	1213	1274	1363	1486	1616	5%
Netherlands	460	460	460	495	525	582	612	664	5%
United Kingdom	30	30	88	160	242	325	400	435	47%
Nordics	**840**	**859**	**961**	**1018**	**1131**	**1201**	**1358**	**1414**	**8%**
Denmark	340	359	387	387	387	387	406	406	3%
Finland	175	175	195	225	263	309	355	375	12%
Sweden	325	325	379	406	481	505	597	633	10%
Iceland (EEA)	0	0	0	0	0	0	0	0	na
Norway	0	0	10	40	102	154	196	238	na
Baltics	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**na**
CEE	**15**	**25**	**35**	**55**	**80**	**100**	**110**	**115**	**34%**
Austria	0	10	20	40	40	60	70	75	na
Bulgaria	0	0	0	0	0	0	0	0	na
Croatia	0	0	0	0	0	0	0	0	na
Czech Republic	0	0	0	0	0	0	0	0	na
Hungary	0	0	0	0	0	0	0	0	na
Poland	15	15	15	15	40	40	40	40	15%
Romania	0	0	0	0	0	0	0	0	na
Slovakia	0	0	0	0	0	0	0	0	na
Slovenia	0	0	0	0	0	0	0	0	na
Switzerland	0	0	0	0	0	0	0	0	na
Southern Europe	**20**	**54**	**115**	**212**	**341**	**441**	**515**	**592**	**63%**
Greece	0	0	0	0	0	10	10	19	na%
Italy	20	20	34	101	160	202	216	223	42%
Portugal	0	0	0	0	0	0	0	0	na
Spain	0	34	81	111	181	229	289	349	na
Other Southern Europe	0	0	0	0	0	0	0	0	na
Other Northwest	**143**	**143**	**158**	**158**	**198**	**198**	**233**	**233**	**7%**
Belgium	143	143	158	158	198	198	233	233	7%
Luxembourg	0	0	0	0	0	0	0	0	na
EU TOTAL	**2630**	**2727**	**2939**	**3172**	**3641**	**4047**	**4577**	**4999**	**10%**
ALL	**2660**	**2757**	**3037**	**3372**	**3985**	**4526**	**5672**	**5672**	**11%**

Source: *Colocation and hyperscale data centre database, Pb7 Research, 2025*

SOCIOECONOMIC IMPACT OF DATA CENTRES IN EUROPE

Data centres have a significant socioeconomic impact on the European market. As stated previously, the most important contribution of data centres is providing the solid digital infrastructure that is required to build the digital economy. Digitalisation makes enterprises more efficient and competitive; it empowers employee productivity; finds new solutions to old and new problems; it allows the government and the public to build new value-added services and develop entire new business models. These downstream effects are key to modernising the European economy enabling it to stand on its own feet.

Taking a narrower perspective, focusing only on data centres themselves and the impact on the value chain upstream, we can quantify the impact using a so-called economic impact analysis. Data centres bring billions of euros of foreign and domestic investments, create thousands of jobs directly and throughout the value chain; and potentially bring in new taxes that support local communities. In this section, these effects will be examined, also looking at some of the challenges, especially in terms of technical skills and training.

HIGHLIGHTS

Socio-economic

- Colocation data centres will contribute €83.8 billion to GDP by 2030 (GDP contribution)
- Colocation data centres employ more than 15,000 full-time employees (FTE)
- One major cause of labour shortages according to the operators surveyed is the lack of data centre-oriented studies (50%)

ECONOMIC IMPACT

There have been numerous studies that have calculated the economic impact of data centres, using various methodologies. This study employs a method that best reflects the contribution to the entire economy.

Impact is measured in three areas:

- **Direct effects:** This includes the value of the goods and services produced by the company, or direct GDP contribution: The sales revenue minus the cost of goods and services purchased from other companies (intermediate consumption) - employment within the data centre.
- **Indirect effects:** This includes the GDP contribution of the company's supply chain. It involves the production of goods and services by other companies that are necessary for the build and operation of data centres, such as materials, utilities, and business services - employment within the value chain.
- **Induced effects:** Consumer expenditures of the employees of both data centres and suppliers, such as groceries, housing, or hospitality - associated employment in the local economies.

There is some question as to how to measure construction in terms of effects. In some studies, construction is included as part of the **direct effect**. Methodologically speaking it can be argued that it is more accurate to place construction within the supply chain, where it can be counted as an **indirect effect**. This is the approach taken in this study.

Finally, it is noted that new data centres also lead to additional tax revenues at the direct, indirect, and induced levels, but not all are quantified in this study as it varies across European countries, regions, and municipalities.

METHODOLOGY

To build the economic impact model, data from the data centre database, secondary data from desk research and data from the survey were combined to first determine the direct effects (GDP contribution and employment by data centres). Revenue and employment data, partially from the colocation data centre survey and partially as identified by operators, are extrapolated and double checked with metrics that Pb7 Research found in studies in various countries.

To calculate the indirect (GDP contribution in the supply chain) and induced effects (consumer spending by direct/indirect workers), the proven method of applying national input/output statistics to build an economic impact model was used[24]. The IT services sector was used as a basis, but included adjustments based on studies on specific data centre spending patterns (for example, above average spending on construction in the current high growth market) to improve the accuracy of the model.

[24] https://www.datacenterdynamics.com/en/news/microsoft-cancels-200mw-of-ai-data-center-leases-report/

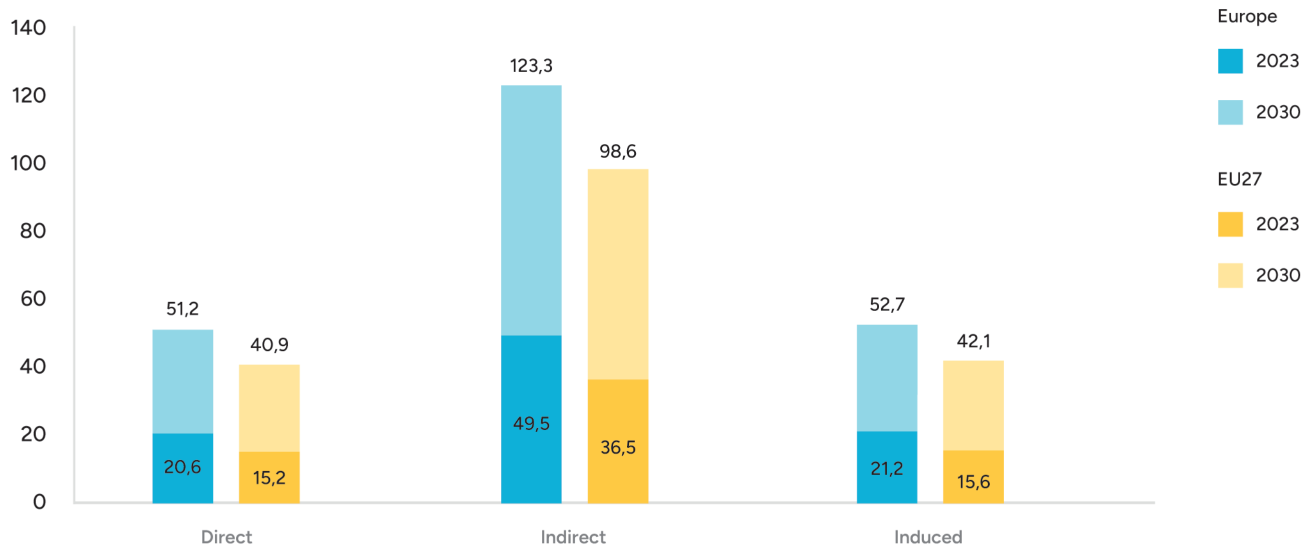
EMPLOYMENT

This study splits the market into colocation data centres (including scale colocation) and hyperscale-owned data centres. Enterprise data centres (including those of IT service providers) have been excluded. Colocation and hyperscale data centres typically have big scale advantages and can be run more efficiently compared to enterprise data centres. Another difference is that colocation data centres have people working in the back-office and front-office, while enterprise data centres (and hyperscalers) do not sell data centre services and typically rely on corporate resources for the back-office.

Colocation was found to have over 20,000 full-time employees (FTE) active (not including subcontractors). The calculation of jobs in the colocation industry was quite straight forward. The extrapolation from the database matched the metrics found in other countries. A narrow perspective on data centre employment was used to make sure only employment that is used to build and run the data centre are involved. That means including (physical) security and hospitality staff, facilities engineers (cooling, power, etc.), IT technicians (such as data centre cabling and connectivity, data centre hardware maintenance, facility monitoring), site managers and related project management. While some studies also may include other IT staff using these facilities and/or managing the IT systems located in the racks, this study does not. These jobs are qualified as "user", not as "data centre employee". As a result of our approach, the total number of employees is lower than some other studies have claimed.

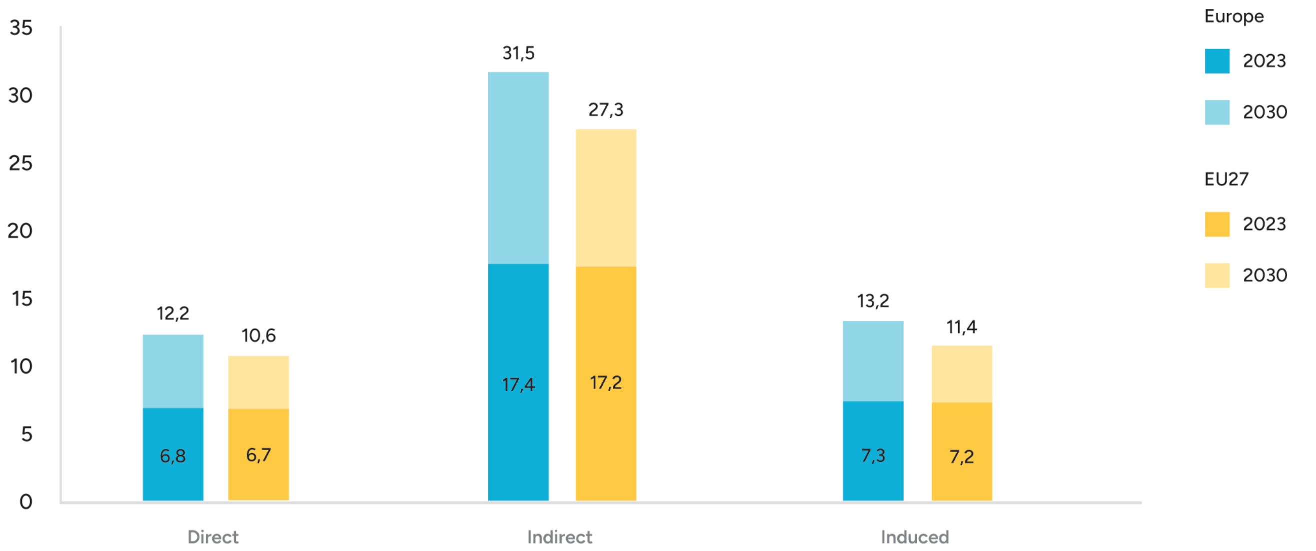
Apart from the colocation sector, also the hyperscale-owned data centre market is employing a significant number of employees. In 2023, 6,800 FTEs were directly employed by hyperscale data centres. This is expected to almost double to well over 12,000 FTEs in 2030.

Figure 10. Economic impact of colocation data centres in the EU (employment effects, 2024) and Europe, employment effects (2024-2030)



Source: *Pb7 Research*

Figure 11. Economic impact of hyperscale owned data centres in EU (employment effects, 2024) and Europe (employment effects, 2024-2030)



Source: *Pb7 Research*

INDIRECT AND INDUCED EMPLOYMENT EFFECTS

Suppliers to the data centre industry consist of a combination of architects, consultants (mechanical, electrical and plumbing), construction and installation companies, suppliers of electrical equipment, security companies, utilities, and various business service providers. Due to the level of expenditure on data centres, these suppliers will invest in capacity to supply the requested products and services, a significant part of which will be within the EU. This includes renting and furnishing offices for temporary employees and their workspaces, purchasing raw materials, products, and materials, or renting temporary accommodations for hundreds or even thousands of construction and installation workers. As a result, colocation data centres are responsible for about 49,500 jobs (FTE) and hyperscale data centres for another 17,400. Since there are a lot of investments in growth, specifically in the construction of new facilities in the former market, the proportion of indirect jobs is quite high compared to many other economic sectors.

Since skilled technical staff are scarce, there is also a large group of hired staff, also counted as indirect employees. The average data centre directly employs 50 to 100 personnel but will also hire a small number of contractor staff. Typically, the bigger the data centre operator, the bigger the proportion of contractors. Getting a big new data centre up and running with only local staff, can be a seemingly impossible challenge. When new data centres enter operational mode, they generally rely quite heavily on contractors. As time goes on, data centres will want to replace them as much as possible with permanent, preferably local, employees.

All direct and indirect employees spend a significant part of their salaries in the European economy, often very locally, on services such as groceries, housing, and leisure. This translates into another 21,200 jobs (FTE) that are supported by colocation data centres and 13,200 by hyperscale data centres.

LABOUR MARKET CHALLENGES

Access to skills is one of the key business challenges for the data centre industry. The technical skills that are required to run data centres are in wide demand, across a lot of other sectors that are undergoing transformation themselves, including the energy sector. Since the data centre industry is relatively young, there is a lack of data centre-oriented studies in Europe. In the FLAPD markets more studies are emerging, but in most other countries there are few if any curricula dedicated to the sector. There is also little awareness among students of the career opportunities in data centres. Overall, data centres find it challenging to find technical staff and must resort to providing on-the-job training.

From the survey results, many data centres will increasingly have to deal with competition over skills from competitors, resulting in higher salary demands from experienced technical workers (Figure 12, 38%), although that challenge seems to be felt most acutely in FLAPD currently. This is likely to change with the strong growth of the sector.

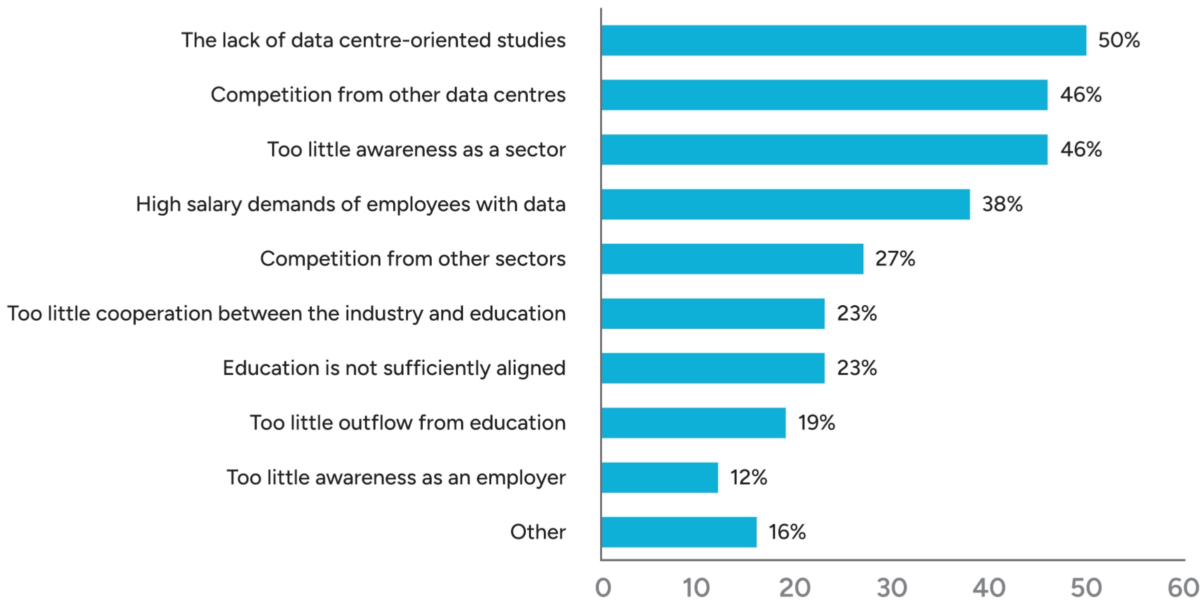
Some operators have developed innovative schemes to encourage cross and upskilling. Amazon, for example, has a programme whereby employees can get up to 95% of tuition and materials costs, up to £8,000 in the UK, on the Career Choice programme[25].

HIGHLIGHTS

Skills and Talent

- Considering suppliers, colocation and hyperscale data centres are responsible for about 36,500 jobs (FTE)
- The average data centre employs 50 to 100 employees, excluding subcontractors
- Only 8% of female technical staff

Figure 12. Question: *What do you experience as the main obstacles in finding new employees? [multiple response]*



Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

[25] https://www.aboutamazon.co.uk/news/working-at-amazon/amazon-career-choice-programme

For now, there are too few technical vocational education and training (VET) graduates to fill vacancies within data centres and competing sectors. On one hand, this means there needs to be an effort to increase the influx into education. This implies that interest in technical studies in VET broadly needs to be stimulated. With the significant underrepresentation of women in these studies, there is significant untapped potential. It has proven difficult to change existing prejudices around women and technology in such a way that they choose technology on a large scale. This requires consistency and collaboration between education and across various sectors.

On the other hand, the limited outflow means that data centres need to focus on lateral entry from sectors such as energy, defence, or the oil and gas sector. It can also come from groups with greater or lesser proximity to the labour market. The data centre industry could look more at military veterans with a technical background and technically trained status holders. It can also be made more attractive for women to work in a data centre, for example, through better options to work flexibly. Also targeted training programmes for disadvantaged youths, especially if they are early school leavers, may offer opportunities to tap into new resource pools.

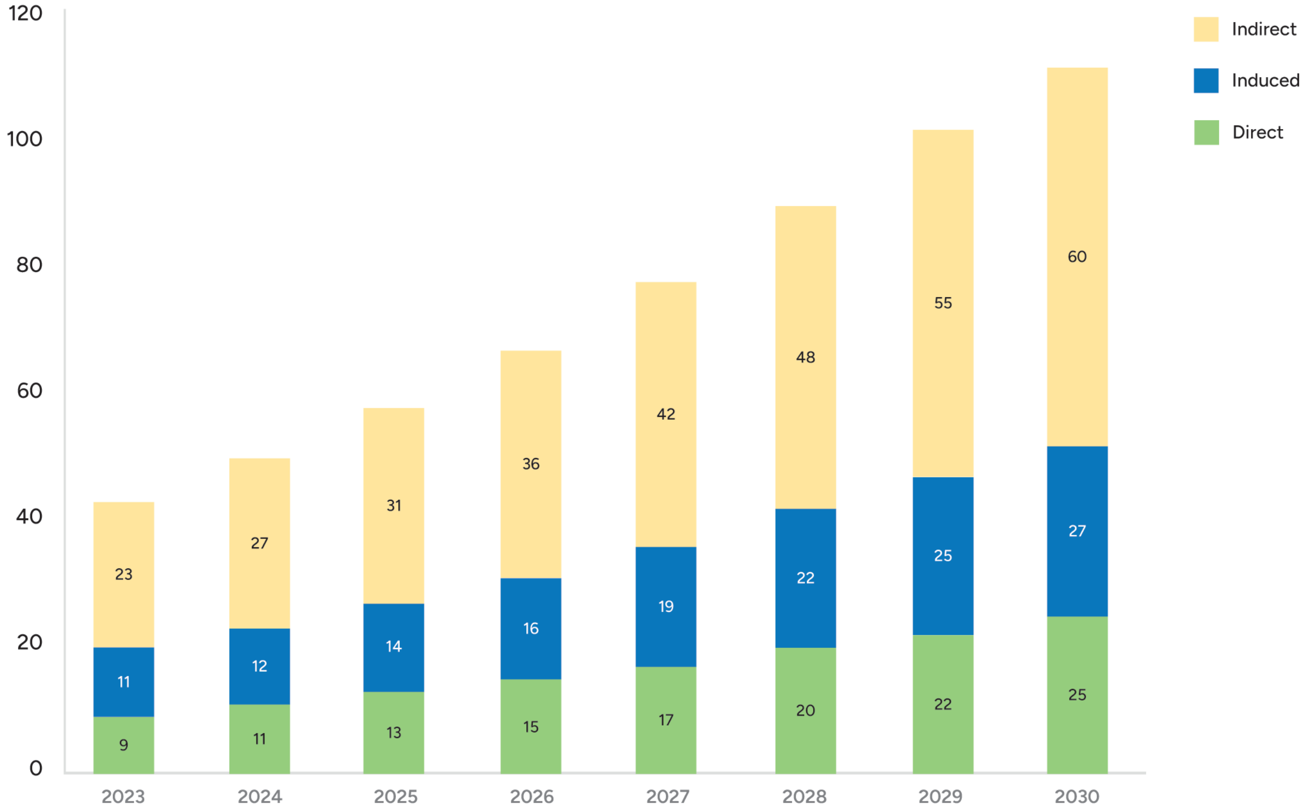
The initiatives to increase lateral entry, and a the number of women in technology, can be part of the diversity policy of the data centre industry. The advantage of a coherent diversity policy is that it looks not only at the practical short-term benefits of finding lateral entrants but also considers how diversity can be used to achieve company goals structurally. Then, it is not only about finding enough employees but also about being open to the benefits of diverse teams.

Research shows that diverse companies perform better because they utilise different perspectives and thereby come up with new solutions. There are some front-runners in the data centre industry who effectively embrace this, but it is not yet evident as a widespread practice throughout. There is still much to be done. For example, only 8% of all technical staff in data centres are female. In other roles, it was found that 25% of the staff are female, which although an improvement is still far from optimal[26].

[26] https://uptimeinstitute.com/resources/research-and-reports/uptime-institute-global-data-center-survey-results-2023

GDP CONTRIBUTION

Figure 13A. Economic impact (EUR Bln) of colocation data centres in **Europe**, GDP contribution **(CAGR 2023-30: 14.6%)**

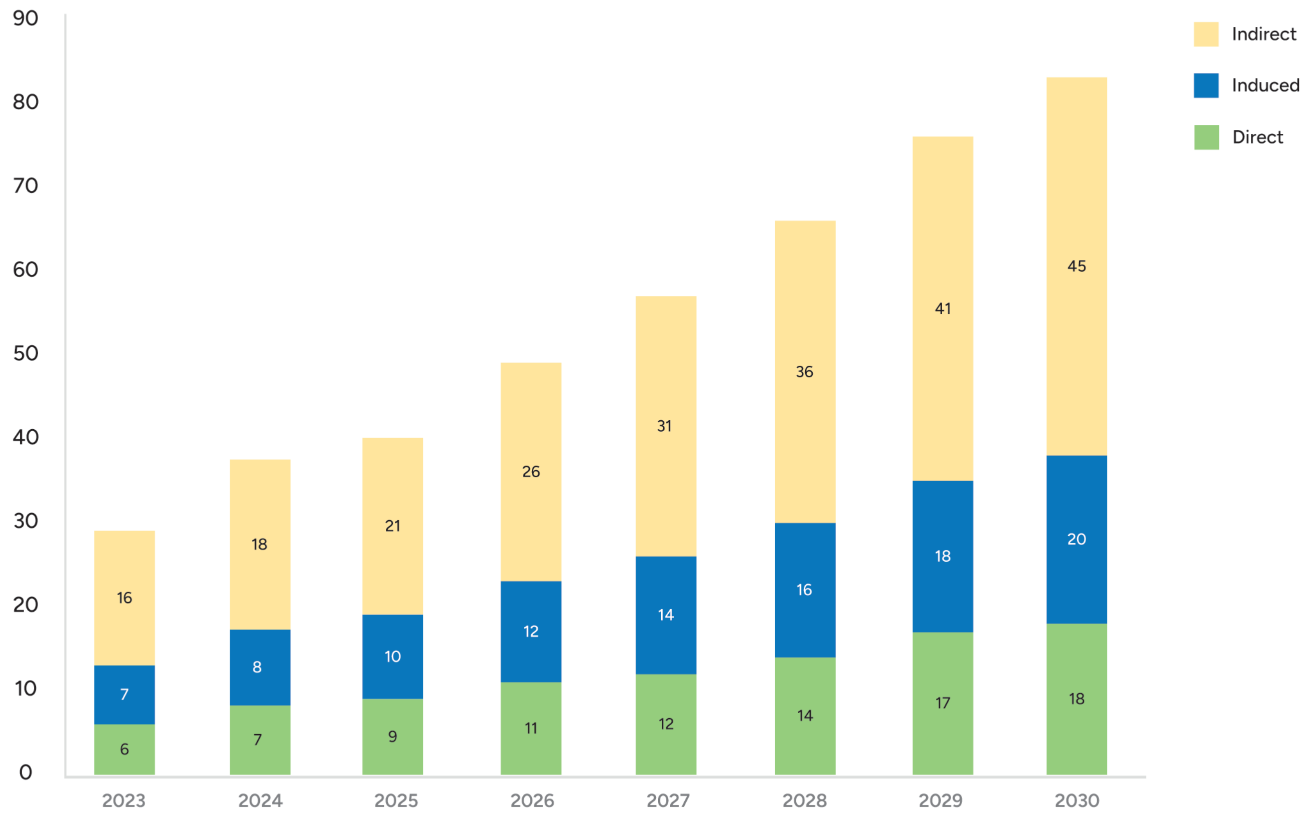


Source: *Pb7 Research, 2025*

To look at the value that is created by data centres, for now, only colocation data centres will be taken into account. For hyperscale-owned data centres, the economic value is too interwoven with other revenues. That said, it would definitely be interesting to quantify the GDP effects in the supply chain.

Looking at the GDP contribution of colocation and scale data centres, using the colocation revenue forecast built earlier as a basis for growth, there is a direct contribution of €6.6 billion in 2023. Pb7 Research estimates that hyperscale data centres indirect investments almost match that of colocation data centres. Suppliers to these data centres contributed even more to the GDP: €16.1 billion. And, calculated on top of that was an induced effect of another €7.3 billion. In total, the GDP contribution of colocation data centres was €30.0 billion. Taking into account the growth seen in the market, the total contribution will be €83.8 billion by 2030, based on an average annual growth rate of 15.8%.

Figure 13B. Economic impact (EUR Bln) of colocation data centres in **EU**, GDP contribution **(CAGR 2023-30: 16.1%)**



Source: *Pb7 Research, 2025*

COMMUNITY CONTRIBUTIONS

To understand the total economic impact of data centres, the tax that is spent on different levels must be considered. Tax income provides benefits for society as a whole but can also contribute significantly to local economies. Although not every small community is looking forward to a big data centre in its proverbial backyard, commercial and other local taxes can contribute to goals such as infrastructure improvements, ecology, or education.

Furthermore, community projects must be considered. The industry, led by hyperscale cloud providers and big colocation providers, typically understands the need to integrate and become part of the local communities where they reside. Apart from offering local employment, there are contributions to all types of community projects. One of the most obvious is investment in STEM skills, bringing them to schools and attracting future talent. Some data centres allow staff to spend work time on charity and community projects. Others have funds for community projects that are available for diversity initiatives. Typically, there is a strong focus on sustainability and green projects.

Examples of community contributions:

Equinix Foundation: The Equinix Foundation funds initiatives that advance digital inclusion. The foundation invests in programmes that boost access to technology and digital skills, collaborating with local educational institutions and supporting community-driven nonprofits and social enterprises dedicated to closing the digital divide.

Digital Realty's education initiatives and biodiversity projects: Digital Realty collaborates with local educational institutions to promote STEM education and create career opportunities within the data centre industry. Also, the company invests in environmental restoration projects to enhance biodiversity in the regions where they operate.

Beehives in Ireland: Host in Ireland, along with 40 partners from the data centre and wider ICT industry, launched its 'DCs for Bees Pollinator Plan.' This shared action plan aims to address the decline in pollinators by implementing biodiversity initiatives across Irish data centres.

Microsoft's Datacenter Community Pledge: Microsoft has committed to designing and operating its data centres to support societal climate goals, aiming to become carbon negative, water positive, and zero waste by 2030. This includes partnerships with local governments, businesses, schools, and nonprofits to create jobs, provide digital skills training, and enhance local sustainability efforts.

Kao SEED Fund: Kao Data has nominated 20 community initiatives near its Stockport, UK, base to receive funding through its Kao SEED Fund. These initiatives range from educational support to local sustainability projects, reflecting the company's commitment to supporting the local communities surrounding its data centre facilities.

Added to this, data centres are investing in infrastructure that can be leveraged by other industries and society as a whole. This obviously includes (submarine) data cables, investments in nature and bio-diversity, but PPAs must also be included that help increase the availability of energy; the construction of power substations; new industrial water installations; heat for heat community networks; and so forth.

SUMMARY

Data centres have a substantial socioeconomic impact on the European economy. By providing critical digital infrastructure, data centres empower businesses, governments, and communities to innovate, improve efficiency, and develop new solutions.

Their contributions are multifaceted, encompassing direct GDP growth, significant employment creation across direct, indirect, and induced levels, and substantial tax revenues that support local and national initiatives.

Despite their efficiency and scalability, the sector faces challenges, particularly in recruiting skilled technical staff, which requires investment in education, training, and diversity initiatives. With a direct GDP contribution of €30 billion in 2023 and a forecasted annual growth rate of 15.8%, the colocation sector's economic importance will continue to grow, reaching an estimated €83.8 billion by 2030. Data centres also foster community development, sustainability projects, and vital infrastructure investments, solidifying their role as a cornerstone of Europe's digital economy.

SUSTAINABILITY

As with any economic sector, data centres not only make social and economic contributions, but also have an environmental footprint. The good news is that data centres are virtually[27] completely electrified and are leaders when it comes to buying renewable energy. Furthermore, the European data centre industry, has drafted and signed the voluntary Climate Neutral Data Centre Pact (CNDCP)[28], focused on achieving climate neutrality by 2030.

The Climate Neutral Data Centre Pact (CNDCP) is a voluntary initiative launched in 2021 by leading European data centre operators and cloud providers to align with the European Union's Green Deal and its goal of achieving climate neutrality by 2050. The CNDCP represents a commitment by the data centre industry to reach climate neutrality by 2030. It focuses on several key areas, including improving energy efficiency, transitioning to 100% renewable energy, reducing water consumption, promoting a circular economy by reusing and recycling equipment, circular energy and heat re-use.

Participants are required to commit to meeting the goals and ambition of the Pact (CNDCP) on energy and water usage and emissions, going beyond binding legislative requirements. The initiative involves over 100 data centre operators and trade associations across Europe, including major players like Amazon Web Services (AWS), Google, Microsoft, Equinix, Digital Realty and many others.

The extent of electrification and the pioneering CNDCP put the data centre industry ahead of most others in terms of sustainability. Nonetheless, data centres are significant power users, sometimes significant water users too, and are growing rapidly — with that comes a responsibility. Apart from the CNDCP, many country and local governments throughout Europe are monitoring the sector closely. To get a better grip on the climate impact and sustainability of the sector, the EU added a specific reporting obligation for data centres with installed nominal IT power capacity of 500 kW or more to the Energy Efficiency Directive.

The Energy Efficiency Directive (EED) plays a crucial role in monitoring the energy performance and sustainability of the EU data centre market. It provides a legislative framework aimed at improving energy efficiency across sectors, including data centres, to support the EU's broader climate and energy goals.

Under the EED[29], data centres are required to report detailed energy performance data to national authorities as of 2024, including metrics such as energy consumption, efficiency levels, and the share of renewable energy used. These reports enable authorities to monitor the sector's energy footprint and identify opportunities for improvement. The directive also establishes benchmarks and best practices for energy performance, ensuring that data centres adopt measures such as efficient cooling systems and energy recovery technologies.

[27] Typically, the only non-electrical component is diesel powered back-up, that needs to run for testing regularly.
[28] https://www.climateneutraldatacentre.net/
[29] The reporting requirements are set under a Delegated Regulation: https://eur-lex.europa.eu/eli/reg_del/2024/1364/oj/eng

Transparency is another key aspect of the EED, as data centres must disclose energy usage and efficiency metrics, allowing regulators, policymakers, and the public to assess their performance. The directive mandates regular energy audits for large enterprises, including data centres, providing insights into how they can further optimise energy use. Additionally, the EED encourages the adoption of renewable energy in data centre operations, ensuring alignment with the EU's climate neutrality objectives.

National authorities enforce compliance with the EED by evaluating the data submitted by operators. Non-compliance can result in penalties, further driving the sector's commitment to sustainable practices. Through these mechanisms, the EED ensures the data centre market contributes to energy efficiency while being held accountable for its environmental impact.

This section focuses on how European data centres are handling the efficient and sustainable usage of resources and where opportunities can be found to do more. Firstly, power usage will be examined, followed by power efficiency, water, EED efficiency measures, heat re-use and finally, the expected usage of innovative measures.

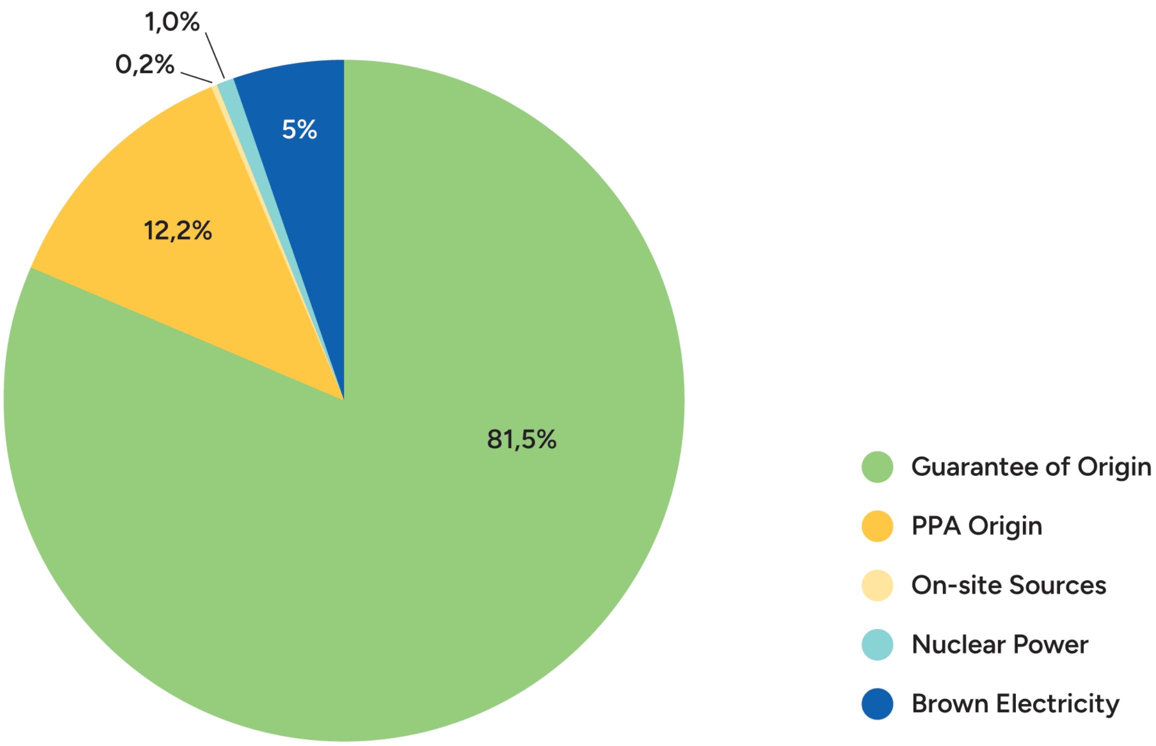
The EED also paves the way for the EU to introduce additional measures, such as a rating schemes for data centres or minimum performance standards. At the time of writing, these measures are undergoing a preparatory study by the Commission.

POWER

Colocation and hyperscale data centres in Europe are rapidly transitioning to the use of green power. Given that the industry is inherently electrified, it has a distinct advantage over other energy-intensive sectors that are only beginning to fully electrify. Currently, 94% of electricity consumed by surveyed colocation data centres comes from green energy contracts, with all large and very large data centres typically already achieving 100%. In some of the smaller data centres, there is still a mix of grey and green energy use. This places the colocation data centre sector ahead of many others, including enterprise data centres. Despite this progress, data centres can take further steps to green their electricity usage and reduce their climate impact.

The first step toward reducing fossil fuel reliance is transitioning to green power. Many energy contracts include a portion of renewable energy, but most of it (87%) often comes from green certificates with a Guarantee of Origin, such as those linked to Norwegian hydropower. While this practice enables a move to renewable energy on paper, it does not always incentivise energy providers to increase renewable production. Nevertheless, this initial step toward green electricity has a medium-to-high impact.

Figure 14. Question A: *How is the energy consumption of your data centre(s) approximately divided into the following variants? [Weighed by IT Power]*
Question B: *How is the renewable electricity consumption of your data centre(s) approximately divided into the following variants?*



Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

LOCAL RENEWABLE ENERGY AND PPAS

The next step for Europe, is ensuring that electricity comes from local renewable sources. Energy providers that supply power from European renewable energy, such as solar, wind, or hydropower, must generate what they sell, ensuring a direct investment in local renewable infrastructure. Buying local renewable energy is a critical step in achieving green power maturity, as it has a high impact on the greening of energy production.

Power Purchase Agreements (PPAs) are a key tool for securing access to renewable energy. PPAs are long-term agreements between large energy consumers, such as data centres, and renewable energy producers, such as wind or solar farms, or hydro power plants. These agreements often provide discounted pricing and help finance renewable energy projects that might otherwise require subsidies or face delays. In Europe, PPAs account for 12% of the energy usage in the colocation and hyperscale sector, driven largely by a small group of major users, and it is growing rapidly.

While small and medium-sized data centres often do not have the scale to enter into PPAs, many larger colocation facilities aim for 100% PPA coverage, with some hyperscale leaders striving to secure renewables for 100% of their operations, including 24/7 energy coverage.

HIGHLIGHTS

Renewable energy

- 94% of renewable energy used
- 12% is from PPAs

On-site renewable energy production

- More than 28% invested in on-site renewable energy
- More than 41% plan to do so

ON-SITE ENERGY PRODUCTION

On-site energy production is another step toward sustainability. Data centres can utilise their roofs, walls, and land for renewable electricity generation, primarily through solar panels, with some facilities also exploring wind energy. While on-site generation typically meets only a small fraction of a data centre's energy needs (0.3% on average), it remains a valuable opportunity. Currently, more than 28% of colocation data centres in Europe have invested in on-site renewable energy production, with another 41% planning to do so.

Figure 15. Question A: *Which of the following sustainable initiatives do you already have in operation? [multiple response]*
Question B: *Which of the following sustainable initiatives are on your agenda in the next 2 years? [multiple response]*

Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

GREEN SUPPLY CHAIN

For data centres, energy is not only consumed in running and cooling computer equipment but also in the production and transportation of materials, machines, and the delivery of various services. Data centres can influence their supply chains by advocating for carbon-neutral production of goods and services. They can also adopt sustainable practices, such as using reusable materials for construction, employing 3D printing to reduce waste, or repurposing existing buildings (brownfield sites) instead of building new facilities from the ground up (greenfield sites). While greening the entire supply chain can be challenging, significant progress is achievable. Several green building standards, such as BREEAM[30] or LEED[31], provide frameworks that data centres can adopt to support their efforts.

The impact of a green supply chain is moderate. Although supply chain energy use is smaller compared to operational energy use, it remains a considerable factor. Additionally, efforts to green supply chains often drive innovations that can benefit other industries. Across Europe, a growing number of data centres are adopting green supply chain practices.

DEMAND MANAGEMENT AND WORKLOAD SHIFTING

Purchasing renewable power is not the same as fully utilising it. Renewable energy production in Europe is increasingly dependent on variable sources such as sunlight or wind. While hydropower, thermal energy, and biomass offer more stability, fluctuations still occur. Ideally, energy consumption would align with the availability of renewable resources.

Colocation data centres may have limited ability to control demand directly, as they are largely driven by tenants who operate their IT equipment. However, they can raise awareness among customers and encourage changes. Hyperscale data centres, especially those operated by large cloud companies, have greater flexibility. They can schedule workloads during periods of high renewable energy availability or even shift workloads to locations with surplus green energy. Colocation data centres are also looking into the potential to operate in the same way. However, none of the surveyed data centres are actively shifting workloads currently; 13% believe it will become a realistic option in 2 years, and another 23% believe it will be an option by 2030.

While workload shifting has a high theoretical potential, its practical impact is currently moderate due to challenges in aligning computing demand with green energy supply. More progress may be expected from battery energy storage systems (BESS). While currently only 3% of the operators are using BESS, another 28% are exploring its potential. Data centres are exploring battery storage as a means to reduce dependence on external power during times of limited green energy availability. Collaborative efforts with power companies to manage grid congestion are also promising.

[30] https://breeam.com/
[31] https://www.usgbc.org/leed

NON-FOSSIL BACKUP POWER

Achieving green leadership in the Green Energy Maturity Model requires the elimination of fossil-based backup power, such as traditional diesel generators. While these generators primarily serve as backups, they require regular testing, contributing to emissions. Fortunately, alternative solutions are emerging. Battery energy storage systems (BESS), beyond the short-term capacity of traditional UPS batteries, are being developed for use both for demand management and back-up. Green hydrogen-powered generators are also entering the market, though their current high costs are expected to decrease in the coming years.

In the interim, many data centres are turning to biodiesel alternatives such as hydrotreated vegetable oil (HVO) to reduce their carbon footprint while maintaining existing infrastructure. Although the impact of non-fossil backup power is relatively small compared to other initiatives, it is a vital step toward achieving fossil independence. For example, NorthC Datacenters in the Netherlands introduced the first hydrogen-powered back-up fuel cells for data centres in 2023 and they are rolling it out across other locations as well. This innovation has sparked significant interest throughout Europe, with more data centres (19%) expected to adopt similar solutions.

OTHER INITIATIVES

The list of initiatives is not exhaustive. If a data centre wants to be a green leader, it should also look at initiatives to utilise energy more efficiently. There are great initiatives on energy proportional computing that improve utilisation, there is an even greater potential for efficiency by moving to liquid cooling solutions. And with data centre heat re-use, a sustainable source for heat networks becomes available. Energy efficiency and heat re-use will be further examined later in the section.

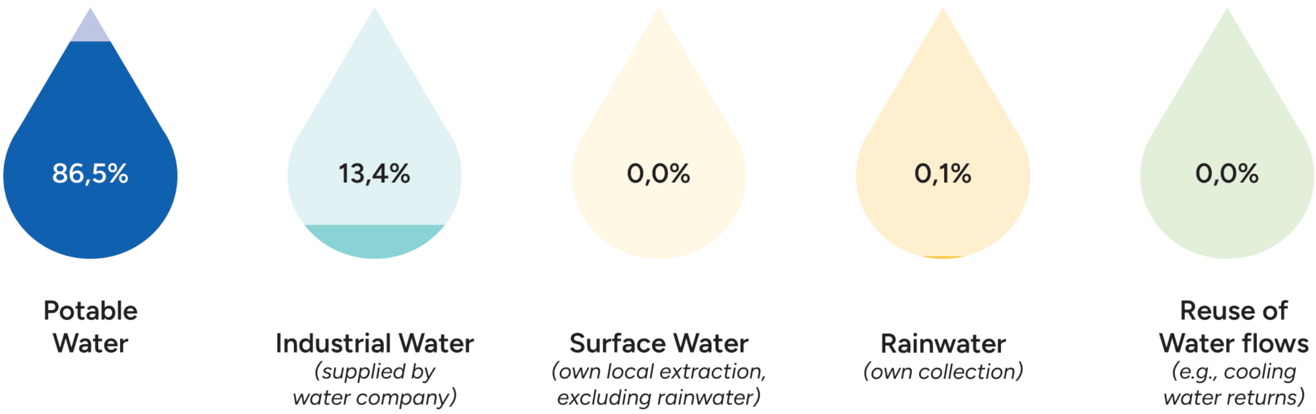
WATER

In addition to the focus on energy and heat re-use, there is growing attention on data centre water usage. Although the data centre industry as a whole is a relatively small consumer of water, high concentrations of facilities, particularly large hyperscale campuses, can have a significant local impact. Reducing water consumption often involves a trade-off with energy efficiency. Water is typically used for cooling purposes, either in evaporation towers or through closed-loop water cooling systems. Efforts to lower Water Usage Effectiveness (WUE) can sometimes negatively affect Power Usage Effectiveness (PUE). As a result, data centres must strive to find the right balance between water and energy efficiency.

Rather than solely focusing on reducing water usage, many data centres are exploring alternative sources to potable water. This includes collecting and storing rainwater, using surface water where it is plentiful, or tapping into industrial water supplies. Currently, about 28% of colocation data centres are investing in the collection of rainwater, with another 47% looking into it in the next two years (Figure 15). Still, it is not yet responsible for a large portion of the overage water usage.

At present, surface water (including rainwater) accounts for less than 1% of water usage in the colocation market. The majority of water used by data centres comes from drinking water sources, although industrial water also represents a significant share (13%). Further diversification helps data centres reduce their dependence on drinking water, especially during heat spells in the summer.

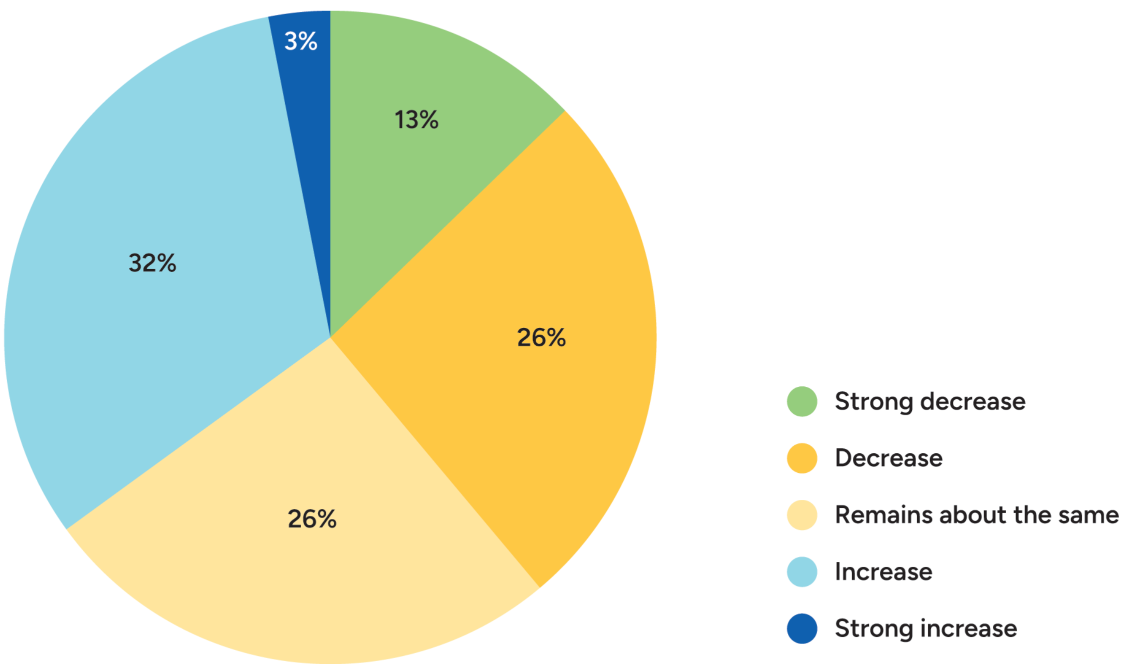
Figure 16. Question: *How is the water consumption of your data centre(s) approximately divided into the following variants?*



Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

It might seem logical to expect a dramatic increase in water usage by data centres, given the high anticipated annual growth rates in the colocation and hyperscale market. However, water usage in the sector has been under growing scrutiny in recent years. In response, data centres have implemented energy-efficient solutions that minimise water consumption, such as the re-use of filtered water in closed-loop systems. As a result, only one in three colocation data centres expects an increase in water usage. In fact, there are more data centre operators (39%) that anticipate a decrease or even a significant reduction.

Figure 17. Question: *Do you expect an increasing or decreasing use of water (all types) for cooling in the coming years?*



Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

EFFICIENCY MEASURES

In the latest version of the EU Energy Efficiency Directive (EED), countries are urged to have data centres with IT power capabilities of 500 kW or more, colocation, hyperscale and enterprise alike, start reporting on their use of resources. The list includes three specific energy performance indicators that can (and eventually will) also be used in data centre regulation: Power Usage Effectiveness (PUE), Water Usage Effectiveness (WUE), and the Energy Re-use factor (ERF). PUE is a widely used metric and has been for some time. The other metrics are not so widely familiar or employed. It is worth noting that the EU is not asking for the design figures, but for the actual performance.

Power Usage Effectiveness, or PUE, is a metric that looks at how much power is used on top of what the computer equipment is using. For example, if a data centre uses 1 MWh for running IT equipment and 0.5 MWh for other purposes, the PUE is 1.5. The first generations of data centres were quite inefficient, and often needed more energy to just house computers that the equipment would use itself (so a PUE of 2.0 or more). The usual culprit was inefficient cooling, but there can also be power-loss due to UPS-inefficiencies or even lighting. Critics of the PUE metric say, correctly, that the PUE is not the best measurement of energy efficiency. The primary objection is that it doesn't measure the relationship between the performance (output) and the power usage. However, since colocation operators do not control the customers' IT equipment, it provides a good metric for their energy efficiency as long as the actual performance is measured.

Water Usage Effectiveness, or WUE, is another simple metric for getting an indication about water usage. It is expressed in litres (of water) per kWh. It is useful to look at this as an indicator in order to prevent waste, but also it is important to look at the broader situation. For one, water is often used to cool more effectively and therefore can have a positive effect on the PUE. Vice versa, reducing water usage may cause an increase in the PUE. In addition, data centres do not necessarily have to use potable water.

Energy Re-use Factor, or ERF, measures the proportion (%) of energy (kWh, or Joules) that is being re-used, typically for heating offices or heat networks. Sometimes the ERF is subtracted from the PUE to create a new energy efficiency indicator, Energy Re-use Effectiveness (ERE). The ability to influence this indicator depends on the availability and willingness of potential heat re-users in the vicinity of the data centre.

Almost all the interviewed colocation data centres are measuring their PUE. As a result, they were able to share that the average operational PUE for colocation data centres is 1.39 (weighted by IT Power volume) in 2023. To avoid confusion, this is not the design PUE of a data centre that is sometimes reported and usually lower. The design PUE is the lowest PUE that a data centre can achieve based on its design under ideal circumstances.

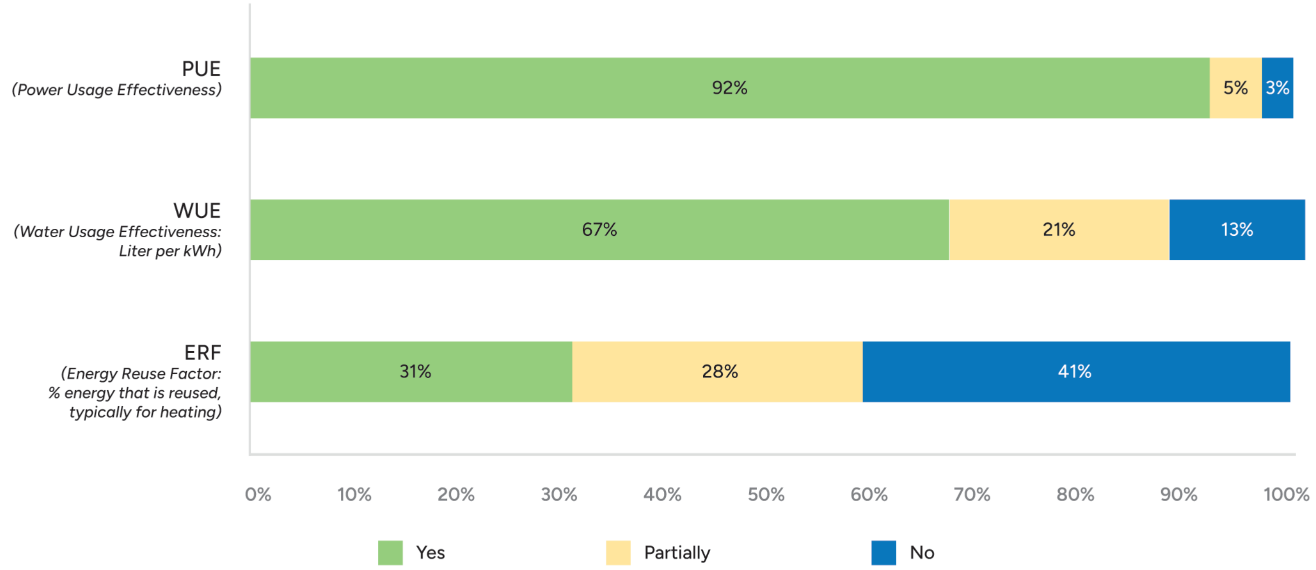
While the EU has not yet set targets, the Climate Neutral Data Centre Pact (CNDCP) has set specific Power Usage Effectiveness (PUE) goals to improve energy efficiency in data centres and align with the EU's climate neutrality objectives. For new data centres, those located in cooler climates are required to achieve a PUE of 1.3 or lower when operating at full capacity by 1 January, 2025. In warmer climates, new data centres must achieve a PUE of 1.4 or lower by the same deadline.

Only two thirds have a complete view on the water usage per kWh. Since some of the operators interviewed have a large number of active facilities, they sometimes only have a partial view. It has also been observed that some of the smaller operators are not able to measure it. The operators that were able to report a WUE, provided us with an average of 0.31 litre per kWh for 2023, well below the CNDCP's targets for water-stressed areas.

The Climate Neutral Data Centre Pact has set a target for new (as of January 2025) data centres in cool climates to aim at a maximum WUE of 0.4 l/kWh for potable water in water-stressed areas. Looking further ahead, European data centre operators have committed to reducing water use to a maximum of 0.4 l per kWh of computer power by 2040 in any location[32].

And only one in three are measuring the percentage of energy that is being re-used, using the Energy Re-use Factor (ERF). To be fair, since most data centres do not re-use heat at all currently, there is nothing to measure. It is becoming more and more common to re-use some of the heat for heating offices, however, the European market is very much in the early stages. The ERF scores in the survey were not conclusive as unfortunately, not all respondents seem to understand the correct way to measure it.

Figure 18. Question: *Which of the following indicators are actively measured, based on actual data?*



Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

[32] The WUE limit may be modified based on the formula: 0.4 l/kWH x Climate x Stress x Water Type = WUE limit. More information on the calculation and commitments can be found on the Climate Neutral Data Centre Pact website (https://www.climateneutraldatacentre.net/).

HEAT RE-USE

A growing number of data centres are exploring opportunities to re-use heat generated by computing operations. Over the past couple of years, most initiatives have been small-scale and focus on nearby applications, such as heating office spaces within the same building. The next step involves connecting to nearby facilities, such as neighbouring offices, local swimming pools, or other community infrastructure.

HIGHLIGHTS

Sustainable initiatives in operation

- Energy or environmental management systems now in place (75%)
- Residual heat coupling now in place (50% of surveyed operators)
- Recycling of IT equipment now in place (47%)
- Biofuels (44%)
- Direct liquid cooling available for 53%
- Collection and use of rainwater now in place (28%) in two years (47%)
- Grid stabilisation/energy trading now in place (22%) in two years (59%)

Water

- Potable water 86.5% but only one in three colocation data centres expects an increment in water usage – with 39% expecting a decrease

Metrics

- WUE average 0.31 litre per kWh

Heat re-use

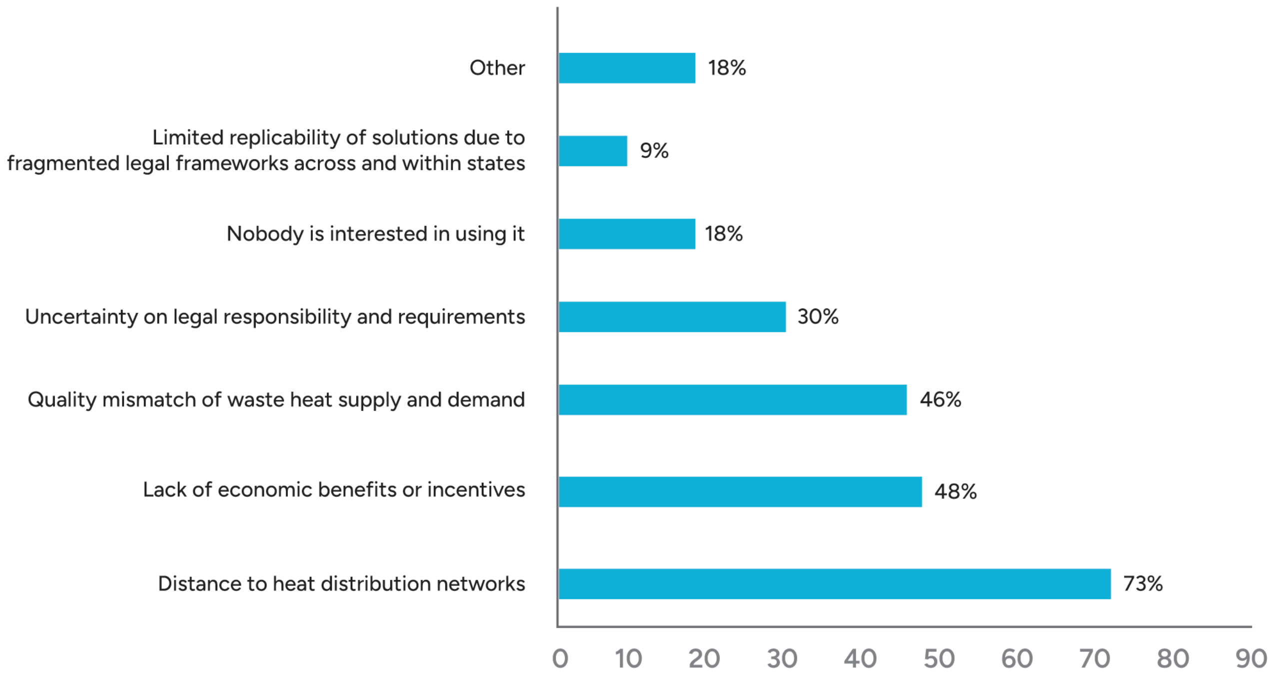
- Distance to distribution networks is the major obstacles to heat re-use projects (73%)

It is anticipated that in the future, new data centres may be subject to laws based upon the EED, and eventually existing data centres, will be required to offer connections for residual heat re-use and comply with minimum Energy Re-use Factor (ERF) standards. Germany is the first EU country to implement such requirements. By 2026, new data centres with an energy capacity of 1 MW or more must re-use at least 10% of their heat, increasing to 20% by 2028, or establish contracts to supply heat to district heating networks. Currently, 31% of colocation and hyperscale data centres in Europe report having the capability to provide heat coupling, with 38% investing in such initiatives. Among enterprise data centres, these numbers are significantly lower.

The growing requirement for heat re-use is likely to influence spatial planning and permitting for data centres. Facilities will need to be located closer to areas with a demand for heating, such as towns and villages, to enable effective and cost-efficient connections to district heating networks. Data centres built far from potential customers may face challenges in integrating with these networks. Most respondents (73%) indicate that the distance to heat distribution networks is the major obstacle for heat re-use. There are also other challenges. For many data centres heat re-use does not provide a clear business case to cover the investment by data centre operators for residual heat collection and interface infrastructure - before outside parties can connect to networks to use the output. Another key obstacle is that the quality (temperature) of the residual heat is relatively low compared to industrial residual heat and requires a lot of additional power to upgrade using heat pumps.

Despite these challenges, data centres present a significant opportunity to contribute to greener heating grids. As power usage and density increase, the amount of heat available for re-use will also grow. Moreover, the adoption of liquid cooling technologies will enhance the quality of the heat, making it more suitable for integration into heating networks.

Figure 19. What are the main barriers to the export of heat?



Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

MEASURING DATA CENTRE FOOTPRINT WITH EED METRICS

The EED reporting obligations require data centres to report on a number of key metrics in terms of resource use. By replicating a selection of these questions in the European colocation survey, combined with the data centre database, a solid estimate of the EU's overall usage and efficiency can be determined.

To bridge the gap between available IT power, as reported in the data centre database, and installed IT power demand, as (informal) input from grid operators on peak and average capacity usage of colocation and hyperscale data centres has been leveraged compared to contracted power. Apart from that, actual usage data where available was used[33] and extrapolated – where necessary – to 2023 to cross-check.

Based on the analysis, the overall power consumption of all data centres, colocation, hyperscale and enterprise, is estimated at 55.3 TWh for 2023[35] [36], or 2% of all electricity usage in the European Union. As a group, colocation data centres are responsible for 44% of that, or 24.4 TWh. More precisely, 17.6 TWh is used by colocation customers, while 6.8 TWh is used by the colocation operator for cooling, lighting and other facilatory uses.

As stated previously from the survey, most of that energy, 94%, is from RES. Close to 20 TWh of the consumed power comes from contracts with Guarantees of Origin, 3 TWh from PPA consumption and about 70 GWh from on-site produced power, such as photovoltaic power.

The PUE results also highlight the inefficiencies of the enterprise data centre sector and smaller operators, compared to colocation and hyperscalers. This demonstrates the need for further data collection and inclusion of smaller enterprise data centres within the reporting scheme of the EED and future policy measures to address inefficiencies and energy savings from the data centre sector.

[33] Country data for Denmark, the Netherlands and Ireland. The data centre volume in these countries compare to 46% of the EU total for colocation and hyperscale combined in Megawatts in 2023.
[34] Please note that is significantly lower compared to the most recent IEA estimates for about 100 TWh in 2022. Cross checks with non-public data from grid companies show this is in line with their actual data. It is also more in line with recent McKinsey estimates for Europe: https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/the-role-of-power-in-unlocking-the-european-ai-revolution
[35] Please note that is significantly lower compared to the most recent IEA estimates for about 100 TWh in 2022.
[36] McKinsey estimates the EU plus UK total at 62 TWh for 2023: Unlocking the European AI revolution | McKinsey

Table 5. EED totals for Colocation Data Centres

Indicator	EED Annex	Metric	Colocation	Hyperscale (Co-hosting)	Enterprise	Total
IT Power Demand Installed (nominal)	XVD1	MW	2360	1052	1595	5007
Total Energy Consumption	XVD4.1	TWh	24,4	9,5	21,2	55,2
Total Energy Consumption IT Equipment	XVD4.2	TWh	17,6	8,3	11,5	37,4
Total Water Input	XVD5	m3 (mln)	7,6			
Total Potable Water Input	XVD5	m3 (mln)	6,6			
Waste Heat Reused [1]	XVD6.1	TWh	na			
Total Renewable Energy Consumption	XVD8	TWh	23			
Total Renewable Energy Consumption GoO (Guarantee of Origin)	XVD8a	TWh	19,9			
Total Renewable Energy Consumption PPA (Power Purchase Agreement)	XVD8b	TWh	3			
Total Renewable Energy Consumption OS (On Site)	XVD8c	TWh	0,07			
PUE (Power Usage Effectiveness) [2] [34]		XVD1	1,39	1,15	1,85	1,48
WUE (Water Usage Effectiveness)		l / kWh	0,31			
REFE (Renewable Energy Factor for Electricity)		XVD1	0,94			
ERF (Energy reuse factor)		XVD1	na			

[1] The survey did not provide enough data on heat re-use
[2] The PUEs for hyperscale and enterprise are estimates

Source: *European colocation survey, Pb7 Research, 2024 (N=63)*

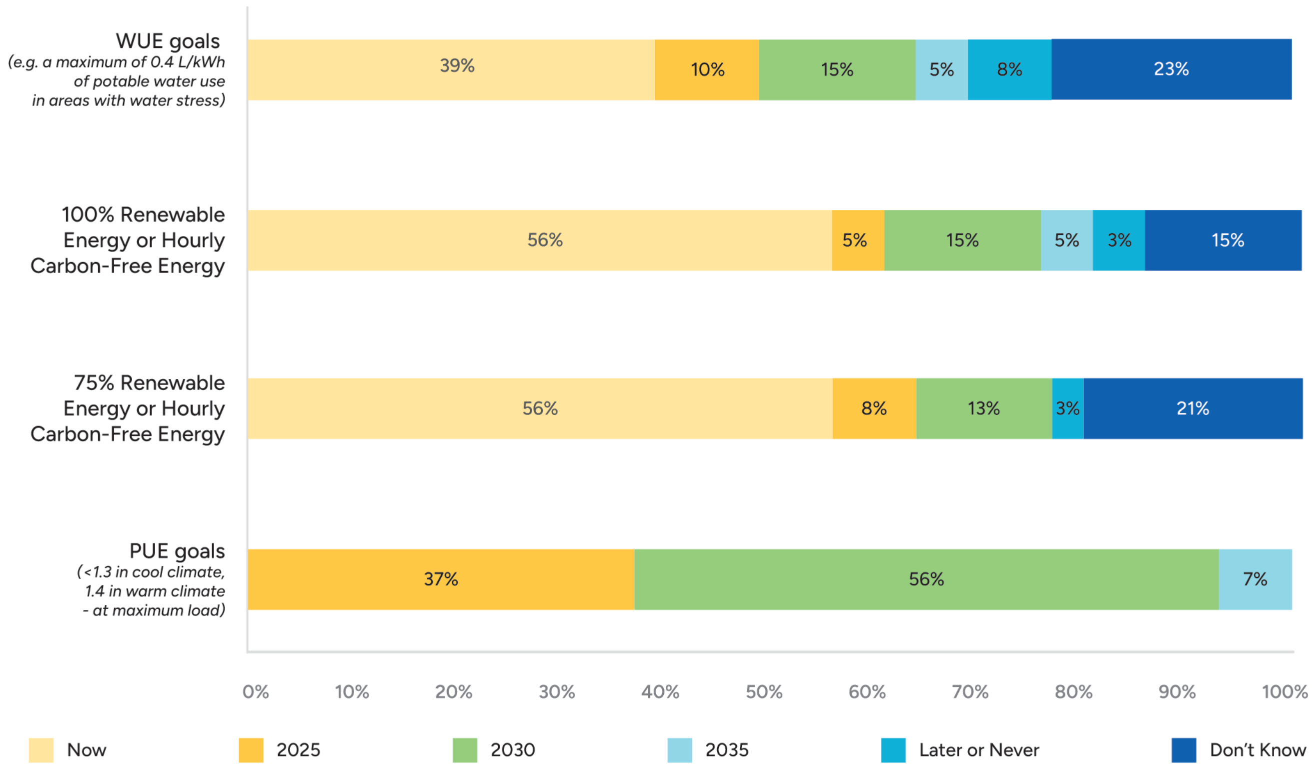
EVALUATING THE CLIMATE NEUTRAL DATA CENTRE PACT

We have previously mentioned the CNDCP, whereby the data centre industry has made a pact to self-regulate. In the colocation sector, data centre operators indicated that many are on track to achieving some of the most important goals, such as PUE targets of 1.30 or lower for new facilities in cool climates and below 1.40 in warm climates. Only 7% of the respondents believe it will not be able to make the deadline.

In terms of renewable energy, data centres seem to struggle a bit more. It is worth bearing in mind that 94% of all used power is already renewable, which means talking mostly about the long tail of small data centres. And by 2030, 76% of all operators are on track to achieve 100% of renewable power. Finally, there is a lot of progress on the various WUE goals that are part of the Pact. By 2030, two in three data centres will be in compliance. It is worth highlighting that some of the WUE goals, such as a maximum WUE of 0.40, are set for 2040.

In summary, most operators are on track to achieve the sustainability goals as stated in the CNDCP. Achieving these goals can be a lot of work and require some ingenuity, certainly when it involves older facilities that were not built to today's standards. Fortunately, there is much innovation taking place that can help data centres achieve their sustainability goals and gaining access to emission free power in general.

Figure 20. When do you expect to achieve the following goals, as formulated in the Climate Neutral Data Centre Pact?



***Source:** European colocation survey, Pb7 Research, 2024 (N=63)*

INNOVATION TIMELINE

The many changes that data centres are making in energy, cooling, and efficiency have already been discussed. To understand the trajectory of these advancements, respondents were asked when they believe certain innovations related to energy efficiency will become realistic options for their organisations. Some of these innovations are already being implemented or are within reach, while others remain further on the horizon.

The most immediately realistic innovations are related to liquid cooling. Among these Direct Liquid Cooling (DLC) is gaining much traction, with 53% of respondents already using it and another 30% expecting to adopt it within the next two years. This technology is especially well-suited for high-density AI workloads and appears to be the preferred liquid cooling method for the near future. However, 'other liquid cooling' (Figure 21) solutions, such as rear door heat exchangers, are currently quite accessible. These solutions are relatively simple to integrate into existing air-cooled data centres and are particularly effective for cooling high-density racks carrying performance-intensive workloads like AI.

Immersion cooling, however, presents more significant challenges. It requires substantial modifications to existing data centre infrastructure and new technical expertise. While its attractiveness is growing, the general consensus is that it will take at least five years before it becomes widely adopted.

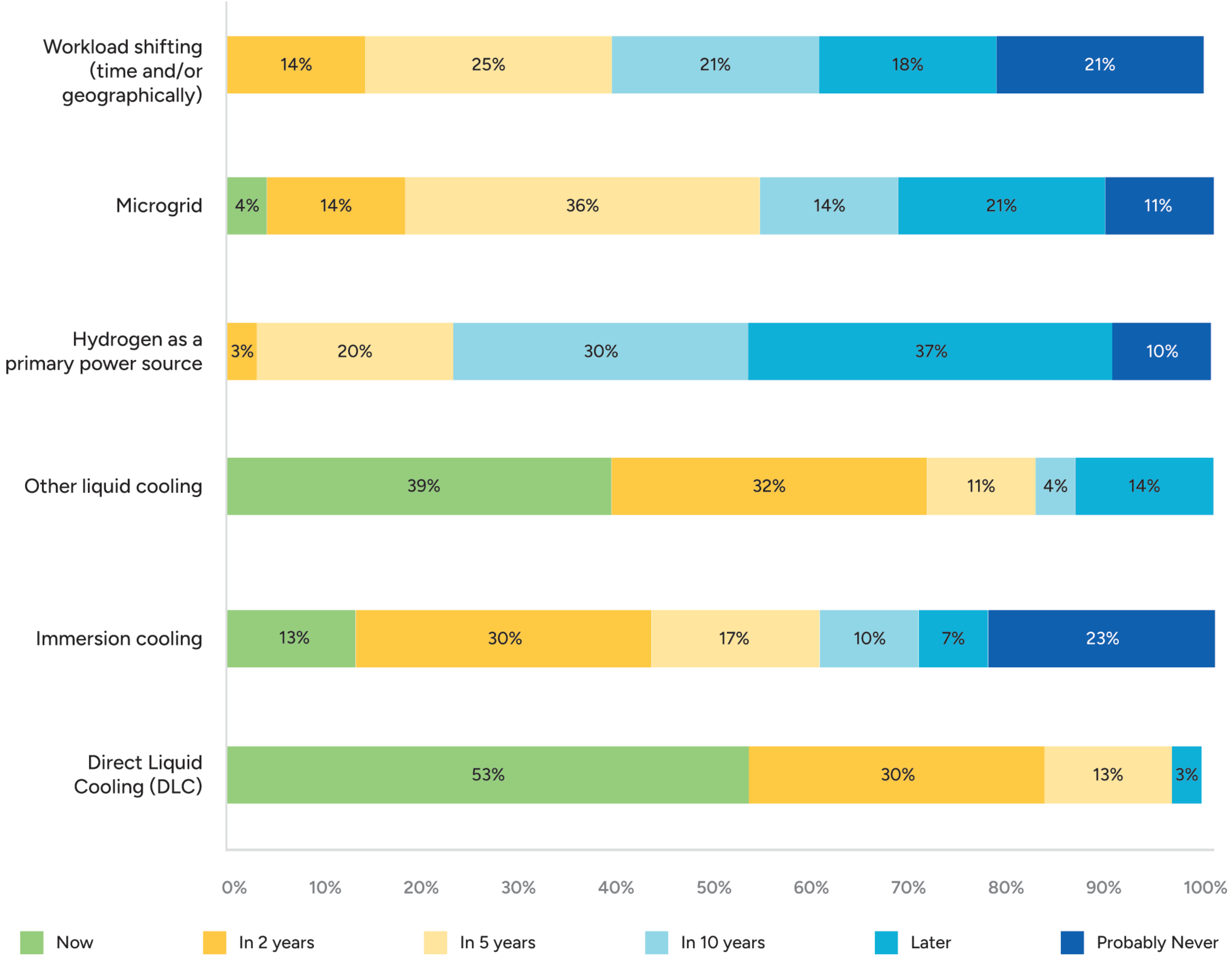
The use of hydrogen as a primary power source is also still in its early stages. Currently, it is neither common nor affordable, although ongoing experiments and pilot projects have shown some promise. Hydrogen may yet become a viable option in areas with severe grid congestion or as a clean alternative to gas-powered plants (providing it is produced sustainably). While it is not seen as a short-term solution, just over half of respondents believe it could become an option within the next 10 years.

Microgrids, which are localised groups of electricity sources and loads that can operate independently from the utility grid, are expected to become a realistic option for data centres in five to 10 years. These systems typically include renewable energy sources (such as solar panels and wind turbines), energy storage (such as batteries), and control mechanisms to manage energy production and distribution. However, many data centres are either unfamiliar with this potential or believe it is not feasible for their operations.

Workload shifting is another innovation gaining attention, expected to become viable within the next five to 10 years. This involves moving computing workloads across time or geographic locations to better align with green energy availability or to address grid congestion challenges. While hyperscalers are already exploring and expanding this capability, colocation data centres face greater challenges since workloads are typically controlled by their customers. Nevertheless, many data centre operators believe workload shifting will become a realistic option in the near future.

Finally, the most speculative innovation was examined, though it seems to become less speculative by the day: small modular nuclear reactors (SMRs). A year ago, hyperscalers in the US started making headlines as they were actively investigating nuclear energy as a low-emission, grid-independent power source, we now see new contracts surfacing with both hyperscalers and large colocation operators on a regular basis. The support for nuclear is clearly growing in many parts of Europe. However, this support is not uniform across the region. Combining SMRs on site, or near data centre clusters, could address a lot of the energy transport challenges that many countries are currently facing and therefore deserves further study. Already, some operators have taken an active interest and even started to invest. In 10 years from now, three in four data centres believe SMRs would be a viable option.

Figure 21. When, do you think, will the following innovations become a realistic option for your organisation? – Colocation & hyperscale



Source: *: European colocation survey, Pb7 Research, 2024 (N=63)*

SUMMARY

The European data centre industry is making significant progress toward sustainability, driven by regulatory frameworks like the Climate Neutral Data Centre Pact and the Energy Efficiency Directive, as well as advancements in renewable energy adoption, energy efficiency, and heat re-use.

Innovations such as liquid cooling, workload shifting, hydrogen power, and small modular reactors are on the horizon, offering promising solutions to further reduce environmental impact. While challenges remain, including retrofitting existing facilities and balancing energy and water efficiency, the industry's active efforts position it as a frontrunner in achieving its sustainability goals.

By continuing to invest in cutting-edge technologies and aligning with regulatory goals, the industry continues to work on building a sustainable footprint.

KEY FINDINGS AND CONCLUSIONS

The European data centre market is undergoing robust growth, driven by increasing demand for cloud services, AI-driven applications, and edge computing technologies. This expansion underscores the strategic importance of data centres in supporting Europe's digital transformation and economic resilience. The following key findings and conclusions offer a comprehensive understanding of the current landscape, trends, and future prospects of the European data centre industry.

GROWING IMPACT OF DATA CENTRES

Data centres are a crucial element to Europe's digital infrastructure, supporting everything from cloud services to AI-driven applications. Their growth is contributing significantly to Europe's GDP, employment, and overall economic development. For instance, in 2023, the direct GDP contribution of colocation data centres was €30 billion, with an expected annual growth rate of 15.8% leading to a contribution of €83.8 billion by 2030. The industry also fosters indirect and induced employment in the supply chain and local economies, enhancing its socioeconomic footprint across the continent.

SUSTAINABILITY

Sustainability is a primary focus for the European data centre industry. While data centres are significant consumers of electricity and, in some cases, water, they are leading the way in adopting renewable energy sources and innovative efficiency solutions. Currently, the majority of large-scale data centres report using 100% renewable energy, supported by green energy contracts. The sector is also advancing cutting-edge technologies such as liquid cooling and heat re-use to improve efficiency and reduce its environmental footprint. These efforts align with self-regulatory initiatives like the Climate Neutral Data Centre Pact and the Energy Efficiency Directive.

KEY MARKET DRIVERS

Several market trends are fuelling the growth of the European data centre industry:

- **Digitalisation:**
Increasing digitalisation across sectors is driving higher demand for data storage and processing capabilities.

- **Cloud and Edge Computing:**
The shift toward hybrid IT environments and the rise of edge computing to address low-latency requirements and data sovereignty concerns.

- **Artificial Intelligence:**
The rapid development of AI technologies, particularly generative AI, is driving substantial investments in high-density, high-performance data centres.

KEY CHALLENGES

Despite the positive growth trajectory, the European data centre industry faces several challenges that could impact its expansion:

- **Power Constraints:** Access to reliable and sustainable power remains a critical issue, compounded by grid congestion in high-growth regions.

- **Regulatory Compliance and Permitting:** Adhering to European and national regulations, particularly those addressing energy efficiency and environmental impact present complex hurdles for operators. Additionally, data centre developments tend to struggle with lengthy and complex permit processes.

- **Technical Skills Shortage:** A shortage of skilled technical personnel poses significant challenges for the design, construction, and operation of data centres, with intense competition for talent across a range of industries.

- **Sustainability Pressures:** While the industry has made significant strides, there is ongoing pressure to further reduce its environmental footprint, including better water management and more comprehensive heat re-use solutions.

CONCLUSION

The European data centre market is at a pivotal moment, with significant growth opportunities driven by digitalisation, cloud adoption, and AI advancements. The industry's focus on sustainability and the shift from enterprise to colocation data centres are shaping its future trajectory.

Addressing key challenges such as power constraints, regulatory compliance, technical skills shortages, and sustainability pressures will be critical to maintaining this growth. Continued investment in green technologies, streamlined regulatory frameworks, and workforce development will ensure Europe's competitiveness in the global digital economy.

EUDCA MEMBERS

STACK INFRASTRUCTURE

submer

DANISH DATA CENTER INDUSTRY

DUTCH DATA CENTER ASSOCIATION

FDCA

FRANCE datacenter

GERMAN DATACENTER ASSOCIATION

SPAINDC ASOCIACIÓN ESPAÑOLA DE DATA CENTERS

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APPENDIX I:
DATA CENTRE TAXONOMY

The data centre market has evolved significantly, leading to the emergence of specific data centre products that can be segmented accordingly. Data centres come in various forms and sizes, with the key focus of this study being on colocation (multi-tenant) data centres. Additionally, hyperscale and enterprise data centres (single tenant) are examined, as they employ similar professionals, compete with colocation facilities for the housing and hosting of IT equipment, data, and applications, and must adhere to many of the same regulations. While there are different definitions for various types of data centres in the market, the following classifications are used:

Single tenant data centres

Enterprise data centre

- Data centres and server rooms (50kW+ IT power)
- Managed Service Provider data centres (IT services/hosting, but no customer access)
- Crypto mining facilities (no colocation)

Hyperscale data centre

- Designed and operated by hyperscalers such as Alibaba, Apple, AWS, Bytedance, Google, Meta, and Microsoft; typically, >20 MW

Micro data centres (<50 kW) are considered out of scope.

Multi-tenant or colocation data centres

Retail colocation

(Customer contracts <1 MW): Data centres that rent out rack unit space, racks, cages or even complete rooms or halls, but typically to customers with a contracted workload of a maximum of 1 MW.

Wholesale colocation

(Customer contracts >1 MW): Data centres that rent out bigger spaces, typically rooms or halls, sometimes cages, with contracted workloads of 1 MW or above.

- AI Data Centres are a specific class of Wholesale colocation with power density exceeding 20kW per cabinet.

Scale colocation

Very large facilities that are built-to-scale and/or powered shells by colocation data centre operators; typically, 20 MW

APPENDIX II:
MARKET STATISTICS (TABLES)

Table 5. Colocation and Scale Colocation IT Power Supply (MW) forecast in Europe by Region and Country, 2023 - 2030

	2023	2024	2025	2026	2027	2028	2029	2030	CAGR 23-30
FLAP- Countries	**4906**	**5296**	**5918**	**6622**	**7488**	**8366**	**9311**	**10182**	**11%**
France	708	760	813	874	970	1082	1197	1308	9%
Germany	1330	1467	1799	2124	2522	2909	3275	3572	15%
Ireland	451	485	543	569	617	695	795	903	10%
Netherlands	857	925	991	1125	1273	1388	1521	1630	10%
United Kingdom	1560	1660	1771	1930	2107	2292	2523	2770	9%
Nordics	**649**	**833**	**1015**	**1184**	**1410**	**1708**	**1951**	**2186**	**19%**
Denmark	50	53	64	116	158	199	244	289	28%
Finland	101	115	177	228	278	324	341	393	21%
Sweden	130	155	175	200	246	335	413	475	20%
Iceland (EEA)	141	190	226	242	260	313	359	383	15%
Norway	228	322	373	397	469	538	594	646	16%
Baltics	**36**	**36**	**50**	**51**	**59**	**59**	**67**	**68**	**9%**
Estonia	14	14	18	18	21	21	24	24	8%
Latvia	10	10	20	20	25	25	30	30	18%
Lithuania	12	12	13	14	14	14	14	14	2%
CEE	**614**	**668**	**740**	**827**	**940**	**1038**	**1138**	**1219**	**10%**
Austria	62	65	68	78	100	114	123	131	11%
Bulgaria	32	32	32	35	35	36	39	40	3%
Croatia	14	14	17	18	25	27	33	34	14%
Czech Republic	67	77	79	93	94	108	110	112	8%
Hungary	17	17	18	18	18	19	20	20	2%
Poland	147	175	206	229	267	289	340	373	14%
Romania	25	26	27	34	40	50	54	59	13%
Slovakia	14	14	14	15	15	15	15	15	1%
Slovenia	4	4	4	5	5	6	6	6	6%
Switzerland	231	243	274	302	340	375	397	428	9%
Southern Europe	**497**	**692**	**869**	**1286**	**1692**	**2135**	**2638**	**3088**	**30%**
Greece	21	28	31	48	65	89	106	130	30%
Italy	248	274	368	578	683	859	1016	1164	25%
Portugal	35	49	69	73	205	300	451	566	49%
Spain	160	308	367	553	704	851	1028	1190	33%
Other Southern Europe	34	34	34	35	35	36	37	38	2%
Other Northwest	**140**	**155**	**200**	**234**	**251**	**302**	**335**	**394**	**16%**
Belgium	76	91	136	169	186	237	270	327	23%
Luxembourg	64	64	64	66	66	66	66	67	1%
EU TOTAL	**4649**	**5233**	**6113**	**7298**	**8630**	**10056**	**11530**	**12871**	**16%**
ALL	**6842**	**7681**	**8792**	**10204**	**11841**	**13609**	**15440**	**17136**	**14%**

Source: *Colocation and hyperscale data centre database, Pb7 Research, 2025*

Table 6. Hyperscale owned IT Power Supply (MW) forecast in the EU by Region and Country, 2023 - 2030

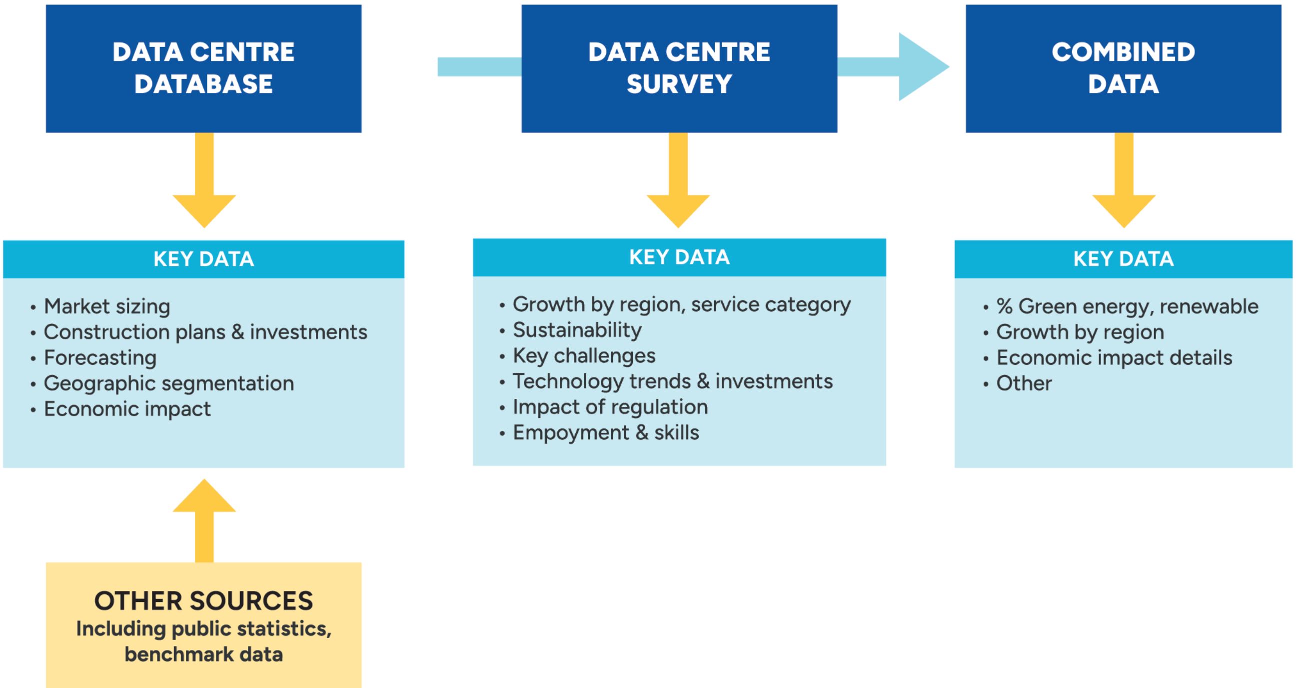
	2023	2024	2025	2026	2027	2028	2029	2030	CAGR 23-30
FLAP- Countries	**1642**	**1676**	**1757**	**1888**	**2133**	**2432**	**2762**	**3081**	**9%**
France	0	0	0	0	50	120	200	280	na
Germany	10	20	20	20	42	42	64	85	36%
Ireland	1142	1166	1189	1213	1274	1363	1486	1616	5%
Netherlands	460	460	460	495	525	582	612	664	5%
United Kingdom	30	30	88	160	242	325	400	435	47%
Nordics	**840**	**859**	**961**	**1018**	**1131**	**1201**	**1358**	**1414**	**8%**
Denmark	340	359	387	387	387	387	406	406	3%
Finland	175	175	195	225	263	309	355	375	12%
Sweden	325	325	379	406	481	505	597	633	10%
Iceland (EEA)	0	0	0	0	0	0	0	0	na
Norway	0	0	10	40	102	154	196	238	na
Baltics	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**na**
CEE	**15**	**25**	**35**	**55**	**80**	**100**	**110**	**115**	**34%**
Austria	0	10	20	40	40	60	70	75	na
Bulgaria	0	0	0	0	0	0	0	0	na
Croatia	0	0	0	0	0	0	0	0	na
Czech Republic	0	0	0	0	0	0	0	0	na
Hungary	0	0	0	0	0	0	0	0	na
Poland	15	15	15	15	40	40	40	40	15%
Romania	0	0	0	0	0	0	0	0	na
Slovakia	0	0	0	0	0	0	0	0	na
Slovenia	0	0	0	0	0	0	0	0	na
Switzerland	0	0	0	0	0	0	0	0	na
Southern Europe	**20**	**54**	**115**	**212**	**341**	**441**	**515**	**592**	**63%**
Greece	0	0	0	0	0	10	10	19	na%
Italy	20	20	34	101	160	202	216	223	42%
Portugal	0	0	0	0	0	0	0	0	na
Spain	0	34	81	111	181	229	289	349	na
Other Southern Europe	0	0	0	0	0	0	0	0	na
Other Northwest	**143**	**143**	**158**	**158**	**198**	**198**	**233**	**233**	**7%**
Belgium	143	143	158	158	198	198	233	233	7%
Luxembourg	0	0	0	0	0	0	0	0	na
EU TOTAL	**2630**	**2727**	**2939**	**3172**	**3641**	**4047**	**4577**	**4999**	**10%**
ALL	**2660**	**2757**	**3037**	**3372**	**3985**	**4526**	**5672**	**5672**	**11%**

Source: *Colocation and hyperscale data centre database, Pb7 Research, 2025*

APPENDIX III:
RESEARCH METHODOLOGY

For this study, a selection of research methodologies and analyses have been used. The research is based on desk research and an anonymous survey. Various sources and methods have been used to estimate market sizes, create forecasts, and quantify economic impacts as realistically as possible.

Figure 22. Research approach



SURVEYS

The survey was conducted in November and December of 2024. 63 colocation data centre decision makers completed the questionnaire, most, but not all, members of the EUDCA and associated National Trade Associations (NTAs). Although it is not a very large number, the respondents' companies are responsible for 59% of the total European colocation market in terms of IT Power supply (MW).

COLOCATION & HYPERSCALE DATABASE

The basis for the quantification of the market is a strong colocation and hyperscale data centre database, using desk research. There are several lists available in the market, but none are close to being complete or consistent and tend to hold a lot of outdated information. The Europe data centre database is built and maintained by Pb7 Research through a combination of existing sources, online search and checks to verify data. If data is not available, estimates are made based on other sources (e.g., the number of racks or building layout). The aim is to include all existing (and planned, if made public) data centres that offer colocation with IT power of 50 kW or more. The database includes operator name, location (address), size of the data floor (m^2), building (m^2), and IT power capacity (MW). It was taken into account that it was not possible to identify a group of small facilities, and an estimate was created for facilities in the long tail. In total, this comprised about 2% of the market size.

ECONOMIC IMPACT

To build an economic impact model, additional data was collected to first determine the direct effects (GDP contribution and employment by data centres). Revenue and employment data identified by operators has been extrapolated and combined with the new survey data, for hyperscale and colocation data centres.

To calculate the indirect (GDP contribution in the supply chain) and induced effects (consumer spending by direct/indirect workers), the proven method of applying national input/output statistics[33] to build an economic impact model was used. The model includes some adjustments to the official input/output statistics based on previous bespoke studies about data centre spending patterns (e.g., above average spending on construction during periods of rapid expansion) to improve the accuracy of the model.

BUILD FORECASTS

To build market forecasts, a combined top-down and bottom-up approach was used. The latter identified planned expansions and construction plans, and distributed the expected deliveries over time based on realistic estimates. Estimates were included on those projects that are not yet visible but are likely to emerge in the medium to long term. From the top-down, the approach compared outcomes with available (international) market forecasts, identified the gaps, and adjusted the data where necessary.

Many of the project announcements come with investment figures, leading to extrapolated figures for projects where no relevant data was published. Investment plans were distributed across the expected construction periods, taking into account potential delays, to forecast the investments on an annual basis.

To size and forecast the colocation market, a model was built that split the market into retail, wholesale, and scale colocation data centres. Revenues per segment per Megawatt were applied from bespoke research projects and cross checked with revenue figures from (globally) listed data centre operators, estimating the differences in revenue per Megawatt by country. For the forecast, it was assumed that pricing will moderately increase across the forecast period.

[33] https://stats.oecd.org/Index.aspx?DataSetCode=IOTS_2021

ABOUT THE EUDCA

The **European Data Centre Association** (EUDCA) represents the interests of the European data centre community. Established in 2011, the EUDCA is the voice of the industry, and a platform where our diverse members from European and international data centre operators and equipment suppliers to National Trade Associations (NTAs), come together to discuss the role of data centres in supporting the twin green and digital transition of Europe. Our policies and initiatives are consistently centred around data centre operators, both in defining the data centre of the future and in regulating markets.

The EUDCA has been at the forefront of the energy transition efforts of the data centre industry. As co-founder of the Climate Neutral Data Centre Pact, the EUDCA is deeply committed to taking the industry on the road to climate neutrality by 2030.

Through our diverse membership and extensive representation across European data centres, the EUDCA is proud to lead and represent the interests of the industry. Communicating our views on the challenges and opportunities of the industry with a unified voice.

ABOUT PB7 RESEARCH

Pb7 Research is an independent IT research firm with a long track record in the data centre sector. It provides independent research and advice, aimed at the successful deployment of new technology in European markets. Pb7 supports technology marketers and strategists by identifying and analysing market and competitive opportunities and challenges, technology buyers in making well informed decisions and we help policy makers with key statistics and market insights. Pb7 Research is a specialist in data centre infrastructure and services, cloud, edge and IoT, and other emerging technologies.

Peter Vermeulen - Principal Analyst, Pb7 Research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