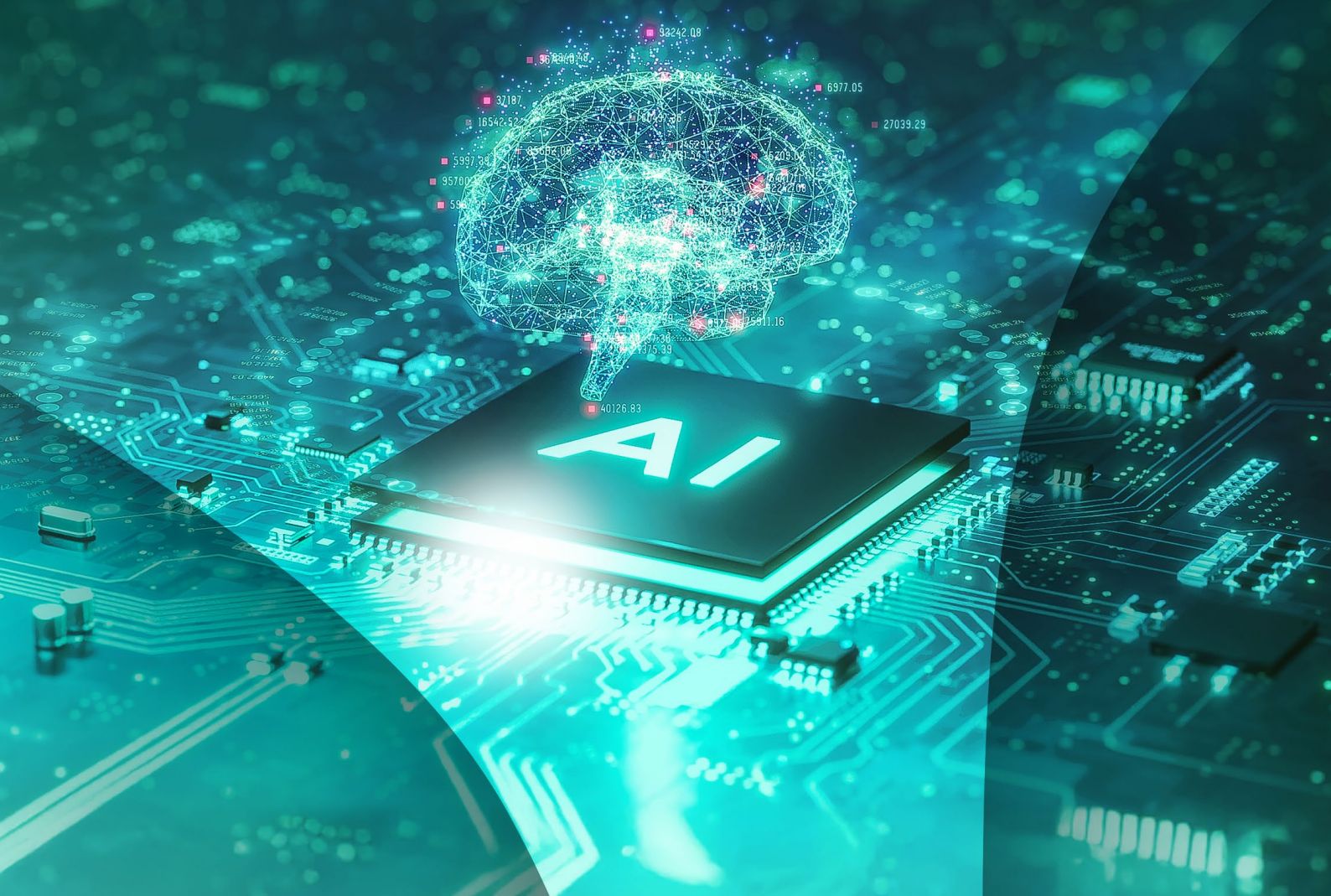
AQUILA GROUP

Aquila Group Insights 2024

ARTIFICIAL INTELLIGENCE AND INFRASTRUCTURE

Part 1: Data centres as the backbone of the digital transformation



CONTENTS

KEY INSIGHTS

- AI is driving the digital transformation and increasing the need for data centres as essential infrastructure.
- Rapid data growth as a result of digitisation, the Internet of Things (IoT), social media and AI is boosting demand for storage and computing capacities.
- Cloud migration and AI expansion are the main drivers of the increasing need for powerful data centres.
- Data centres as an investment opportunity: high returns and a contribution to the energy transition through the use of renewable energies.
- Sustainable innovation: Aquila Group combines state-of-the-art technology with ecological solutions for a sustainable future.

1. What is AI and what are its strengths?

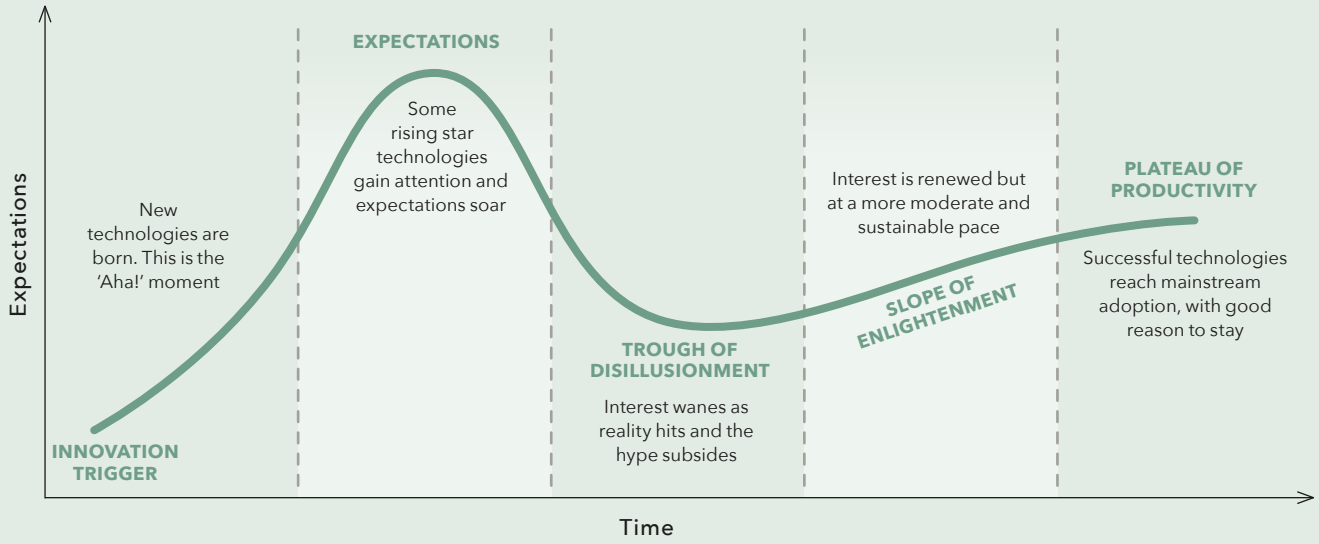
Imagine you had a machine that could not only perform tasks for you, but became ever smarter as it did so. And that's artificial intelligence (AI) in a nutshell: It is programmed to work in a similar way to the human brain, learning from experience, recognising patterns and taking decisions. Essentially, it's a matter of analysing large quantities of data and drawing conclusions or making forecasts on this basis. In a world that is becoming ever more complex, AI can play a key role when it comes to making processes more efficient, taking more precise decisions and developing innovative solutions for challenges in sectors such as healthcare, mobility and finance AI has already revolutionised numerous sectors:

- In healthcare, AI helps to detect tumours in X-ray, CT and MRI images, for instance.
- In the automotive industry, AI forms the basis for autonomous driving.
- In the finance sector, AI-supported systems check large quantities of transaction data for potential fraud in real time.

Despite all this progress, however, there are still questions to be asked. Will AI be the greatest invention of mankind? Will it revolutionise the way we live, work and take decisions? Or is the current hype exaggerated: is AI just another new technology that will result in small improvements here and there?

Figure 1

BLINDED BY THE HYPE?



Source: Blinded by the hype? (kongsbergdigital.com)

Many ground-breaking technologies of the past followed a specific pattern of adoption. To date, AI has followed the conventional pattern illustrated above: awareness → enthusiasm → hype, followed by initial disillusionment when deployed in practice and ultimately strong growth as soon as the actual benefit has been proven.

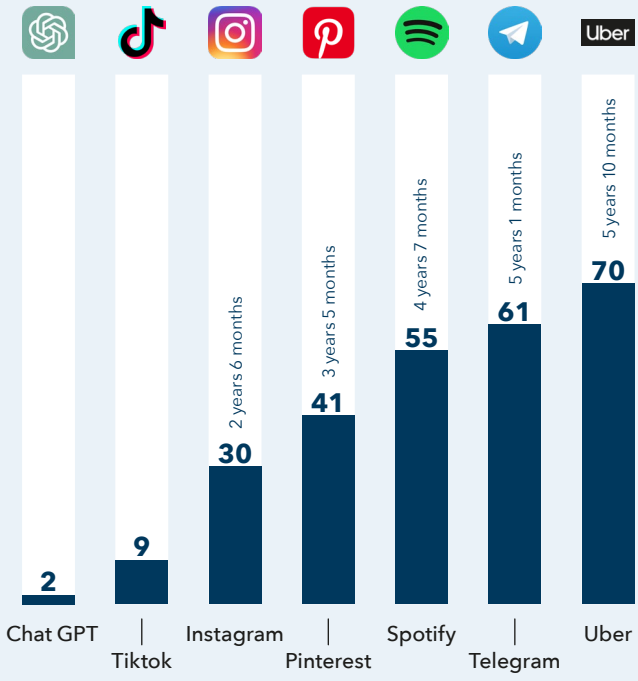
The hype took off soon after the launch of ChatGPT in November 2022: the number of users of the service developed by OpenAI surpassed 100 million within two months (see fig. right) – the fastest increase seen by any internet company. Its rapid proliferation was not restricted to private use, however. Companies around the globe were also quick to recognise the benefits of AI: according to a survey conducted by Forbes Advisor, 97% of all CEO respondents believe that generative AI will drive their business thanks to increased productivity, cost savings and an improved service offering.[1]

Countless other application areas are currently being developed to support further AI-based innovations. But all of these innovations would not be possible without powerful data centres, which are the backbone of the digital revolution and provide the infrastructure on which AI is based. From the processing of vast quantities of data all the way to the provision of computing power – data centres play a key role in developing AI's full potential.

Figure 2

OPENAI'S CHATGPT WAS THE FASTEST APPLICATION TO SURPASS 100MN USERS

Number of months taken to surpass 100 mn users



Source: Goldman Sachs Global Investment Research

[1] How Businesses Are Using Artificial Intelligence In 2024 – Forbes Advisor

2. Need for data centres driven by strong data growth

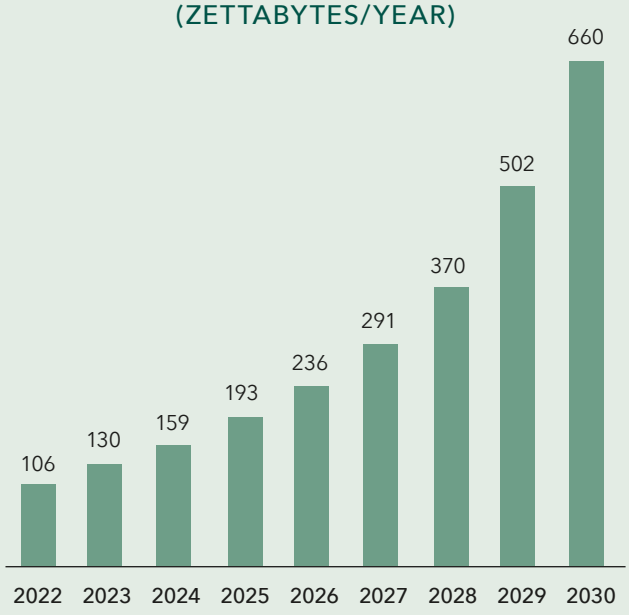
At the end of the 18th century, steam-powered engines in England revolutionised the world of work. The industrial manufacture of goods superseded traditional craftsmanship, leading to a dramatic rise in economic production referred to as industrialisation. Today we find ourselves in an era of digitisation in which AI has assumed the role of the latest and most powerful engine. The technology uses data as the raw materials and data centres as the production halls of our age.

In contrast to other raw materials, the data pool keeps on growing. Over the past two years, the global data volume has increased by over 50% (fig. 3), and innumerable new data points are being created all the time, such as 231 million emails and 66,000 new photos posted in Instagram (fig. 4) every minute. UBS predicts that the global data volume will increase to over 660 zettabytes by 2030 – the equivalent of 322 smartphones each with a memory capacity of 256 GB for every person in the world. This growth in data volume can be attributed to the following factors in particular:

- Digitisation of all areas of life
- Increasing number of smartphones and Internet of Things (IoT) devices
- Growth of social media
- Advances in data collection
- AI systems

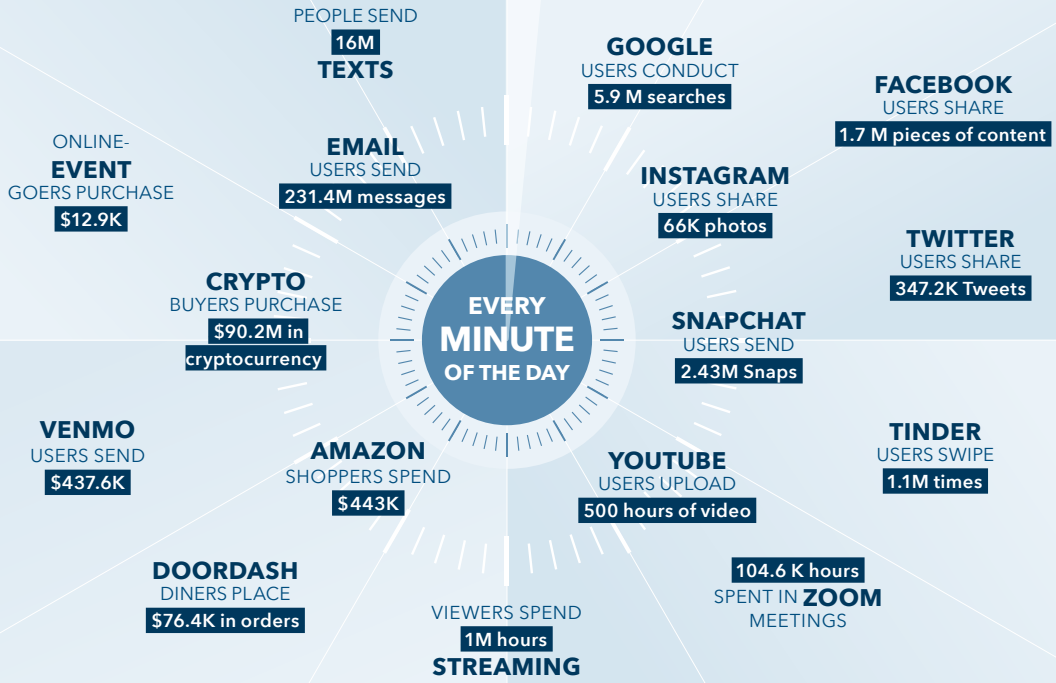
Figure 3

GROWTH OF DATA GENERATION
(ZETTABYTES/YEAR)



Source: International Data Corporation, UBS, Aquila Capital Holding GmbH

Figure 4



Source: https://web-assets.domo.com/miyagi/images/product/product-feature-22-data-never-sleeps-10.png

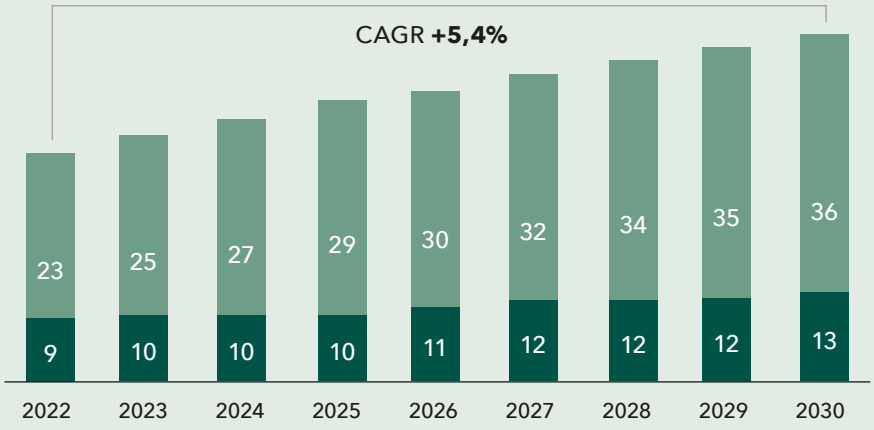
While the first-mentioned factors lead to continuous linear growth, the increasing use of AI systems is causing an exponential increase in data volume. The reason for this exponential growth is that AI systems not only process vast quantities of data, but also continuously generate new data themselves – via training, simulations and real-time interactions.

This growth in data volume goes hand in hand with the need for efficient infrastructure, as the information has to be stored, processed and analysed. Data centres are the backbone of data storage and processing. They provide the computing power and storage capacity needed to cope with the flood of data and operate AI systems efficiently. The demand for data centres is thus increasing exponentially. According to a forecast by McKinsey, the global capacity could triple by 2030 (fig. 6).

Figure 5

GLOBAL SPENDING ON THE CONSTRUCTION OF DATA CENTRES IS FORECAST TO REACH $49 BILLION BY 2030.

Data centre construction spending,[1] $ billion



[1] Includes construction spending by providers. Excludes enterprise spending and any other capital expenditure outside of construction (such as equipment).

Source: Synergy Research Group

Co-location data centres are facilities that offer companies the opportunity to accommodate their servers and IT infrastructure in a common data centre. These centres provide electricity, cooling, physical security and a reliable internet connection, while the companies manage their own hardware. They are the ideal solution for firms seeking flexibility without having to operate their own data centres.

Hyperscaler data centres have been designed especially to meet the requirements of large technology companies such as Google, Amazon and Microsoft. They feature high scalability, automated procedures and state-of-the-art technologies. Hyperscalers often operate entire server farms that are networked worldwide, and offer not only cloud services, but also the infrastructure required to process and store vast quantities of data efficiently.

3. Data centres as an investment case

At the heart of this technological revolution are data centres that not only provide the infrastructure for AI, but also represent an attractive investment opportunity.

Two mega trends are currently driving the demand for data centre capacities and are likely to continue to do so in the years to come: the migration of data storage from local servers to the cloud, and the rise of AI. Against this backdrop, investments in data centres are currently offering exceptionally high return potential coupled with long-term stability.

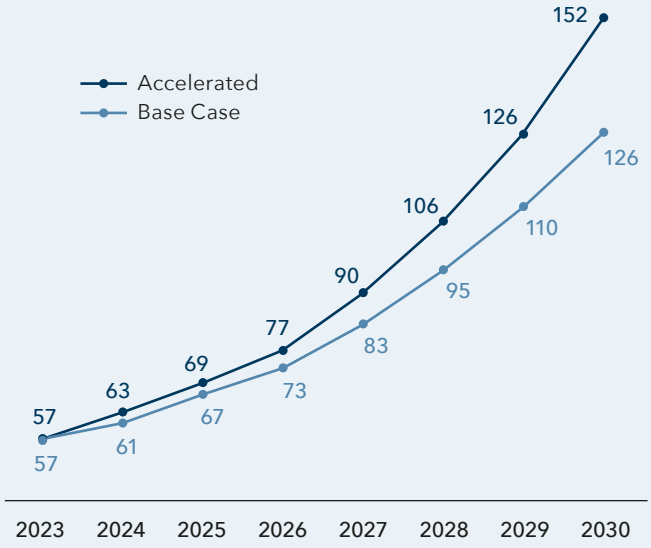
As an investor and developer of data centres, we at Aquila Group are well aware of the complexity of good investments in this field. Thanks to our sound industry know-how, we are able to invest purposefully even in continuously changing market conditions, and thus achieve long-term value appreciation. Factors such as data centre design play an extremely important role in addition to aspects such as location, the regulatory framework and environmental protection.

Extensive and highly specialised equipment is required for cloud and AI programs, for example. Data centre operation also offers opportunities to cut costs and reduce CO_2 emissions, especially when it comes to energy efficiency. It is energy procurement that presents the biggest challenge, however. Data centres consume an enormous amount of energy, which is why their growth is closely associated with the expansion of electricity offerings and networks. Renewable energies such as photovoltaics and wind energy are nowadays the most climate-friendly and cost-effective source of energy, which is why the data centre and AI trend will also speed up the energy transition. The combination of data centres and clean energies makes investments in this sector sustainable, as well as financially attractive.

Investors around the globe are showing great interest in investing in data centres. North America is both the world's biggest and the leading market for data centres, as illustrated in fig. 7. But we are seeing a sharp increase in interest in Europe too. While just 6% of global investments in data centres were made in Europe in 2022, this figure rose to 20% in 2023. In the first five months of 2024, the market share increased further to 29%, equivalent to a volume of USD 7 billion.2 The global investment volume in data centres was around USD 36 billion in 2023. According to a forecast by McKinsey, the annual investment volume can be expected to rise to 49 billion US dollars by 2030 (fig. 5).

Figure 6

ESTIMATED GLOBAL DATA CENTRE DEMAND
(GW*, INCREMENTAL TO 2023)



Source: McKinsey & Company

* The demand for data centres is frequently measured in gigawatts (GW), as this unit records the energy requirement of this type of infrastructure precisely. Data centres require considerable amounts of electricity, not just for operating the servers, but also for cooling as well all for other support systems. This key figure is particularly important, as the energy requirement of data centres is a crucial factor in terms of their scalability, operating costs and environmental sustainability. An efficient use of energy is thus a significant aspect in the planning and construction of modern data centres.

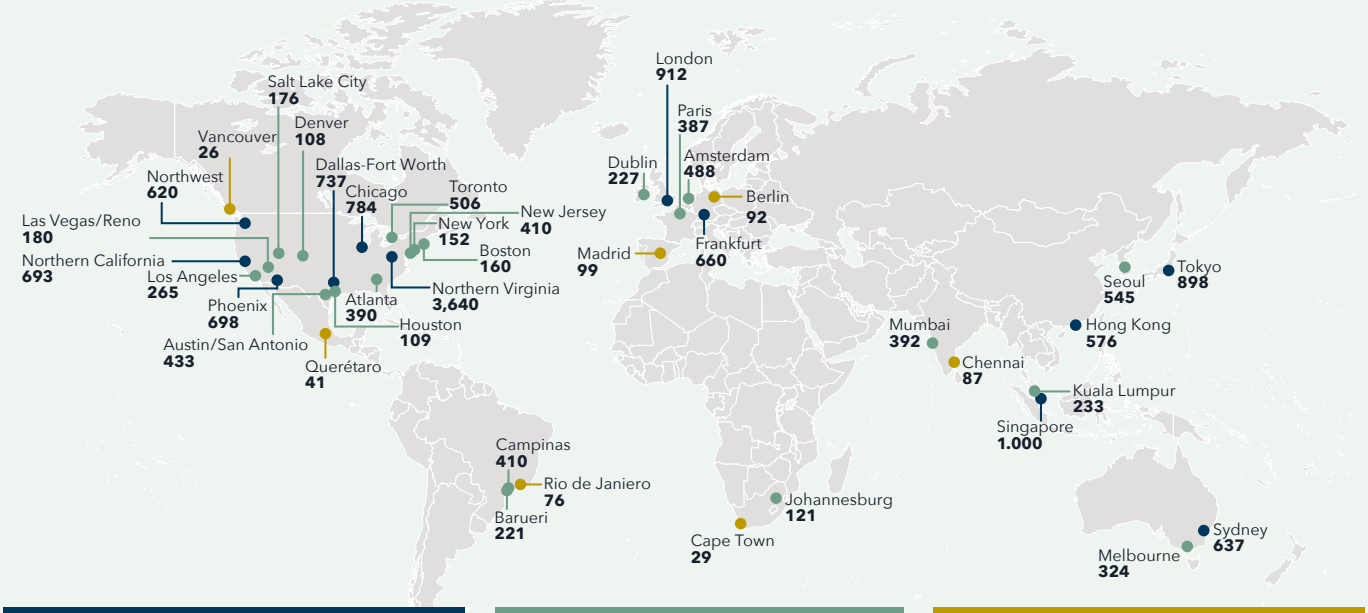
We are convinced that data centres will remain profitable in the long term and are constructing ultra-modern facilities in Europe on the back of this trend. We are also supporting data centres with the development of solar systems, onshore wind farms and battery storage solutions to ensure a CO_2-neutral electricity supply.

[2] https://www.linklaters.com/en/about-us/news-and-deals/news/2024/may/us22bn-invested-in-data-centres-so-far-in-2024#:~:text=In%20the%20first%20five%20months,year%20in%20the%20past%20decade

Figure 7

GLOBAL DATA CENTRE COLOCATION MARKET SIZE BY COUNTRY IN PRIMARY, SECONDARY AND EMERGING MARKETS

(IN MW OF BUILT-OUT CRITICAL IT LOAD CAPACITY)



PRIMARY MARKETS have at least 600MW of supply and many of these markets are now pushing beyond the 1,000MW mark. They will continue to see strong growth as colocation and hyperscalers consolidate their positions in safe metros that have become sub-regional hubs.

SECONDARY MARKETS typically have 100-600MW of supply and have recently become the focus of attention as investors, lenders and developers seek new opportunities in less crowded markets.

EMERGING MARKETS will continue to grow as Edge deployments bring data centres closer to the user and national data sovereignty laws mandate incountry storage.

Source: JLL, Structure Research; Data as of June 2023

4. Conclusion

Artificial intelligence (AI) is spearheading a digital revolution that is transforming numerous sectors and setting new standards in terms of efficiency and innovation. Given the exponential growth in data volume and the rise in demand for cloud services, the importance of data centres will continue to increase in the years to come. Investments in this field offer not just the prospect of high returns, but also the opportunity to contribute to the energy transition by placing the focus on renewable energies. Aquila Group recognised the potential and challenges in this fast developing market at an early stage and is committed to the construction of modern data centres that offer both economic and ecological benefits.

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A quantitative economist, Moritz Paysen began his career as a proprietary trader in foreign currency derivatives at the private and investment bank M.M.Warburg, before moving to the private and investment bank Berenberg, where he worked both as a trader and advisor in the FX & Rates segment. Moritz Paysen has been Head of Corporate Hedging at Aquila Group since January 2023 and is responsible for hedging the company's currency and interest rate risks. He has extensive knowledge of macroeconomics, currencies, interest rates and financial markets.

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