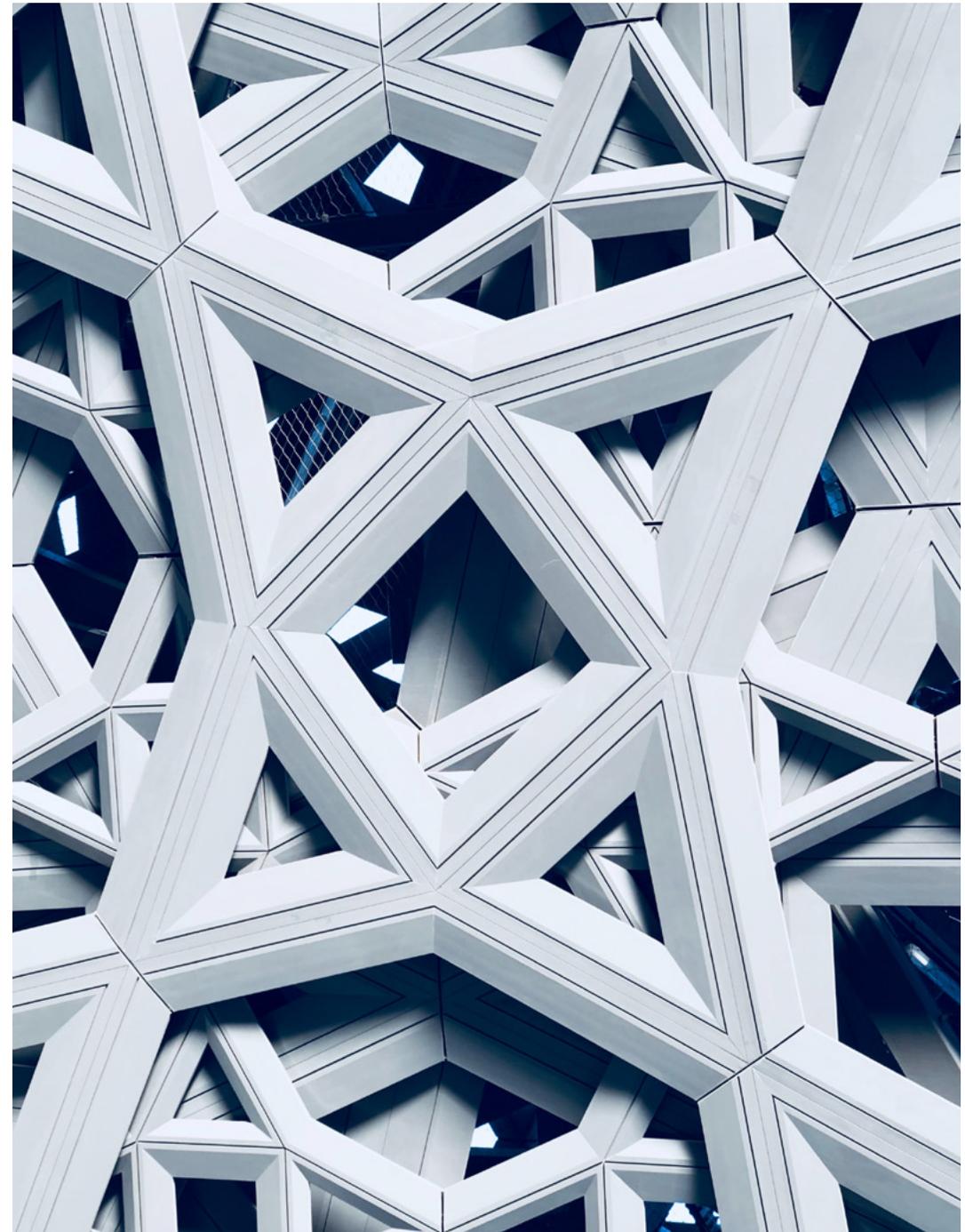
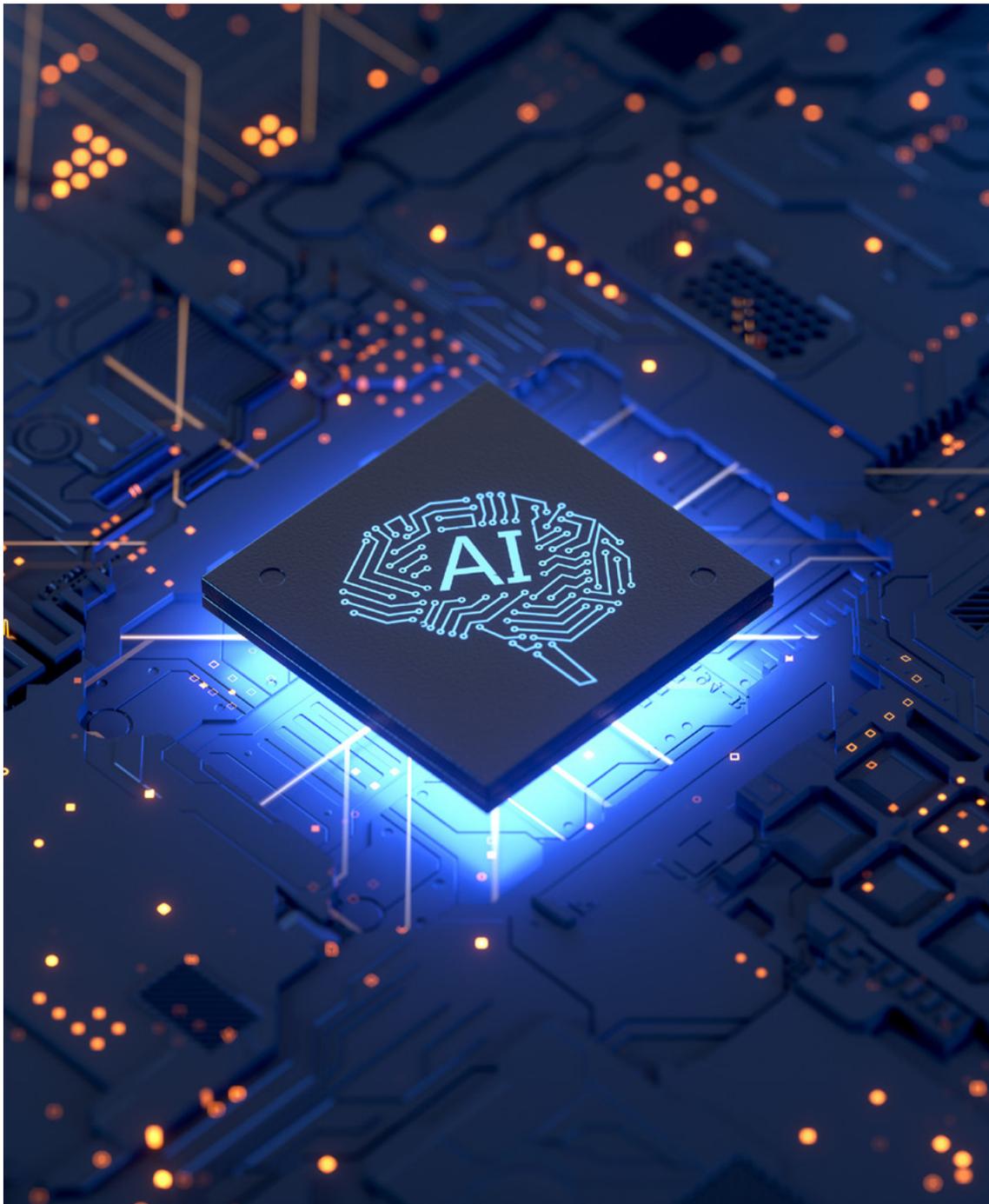


Data Centres: Fuelling the AI future

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Today, generative AI is writing text and cutting code, creating images and composing songs. But in the not-too-distant future, AI will power a whole world of programs – everything from energy management to entertainment, metaverses to mobility.

By the end of 2028, [*more than six billion users*](#) – around 90% of the global smartphone market – will be using generative AI, according to some estimates. That server power will have to come from somewhere.

[*Analysts forecast*](#) a 2028 data centre power consumption of nearly 4,250 megawatts – an increase 212 times over 2023.

What should Europe's property leaders do today to prepare for the world of AI tomorrow?



From Science Fiction to Science Fact

ChatGPT is just one of a growing army of generative artificial intelligence tools that are changing the world.

The chatbot reached [100 million users in just two months](#) – the fastest growth of a consumer app in history. To put this into perspective, TikTok took around nine months to reach the 100 million milestone, while it took Instagram more than two years.

ChatGPT and its more powerful successor GPT-4 are large language models, or LLMs, developed by the Microsoft-backed OpenAI. DALL-E 2, another OpenAI product, generates images. So does Midjourney and a myriad of other programs. Google's language model LaMDA powers its search engine, Bard. Microsoft's Bing chatbot and Baidu's Ernie are also stepping into the spotlight.

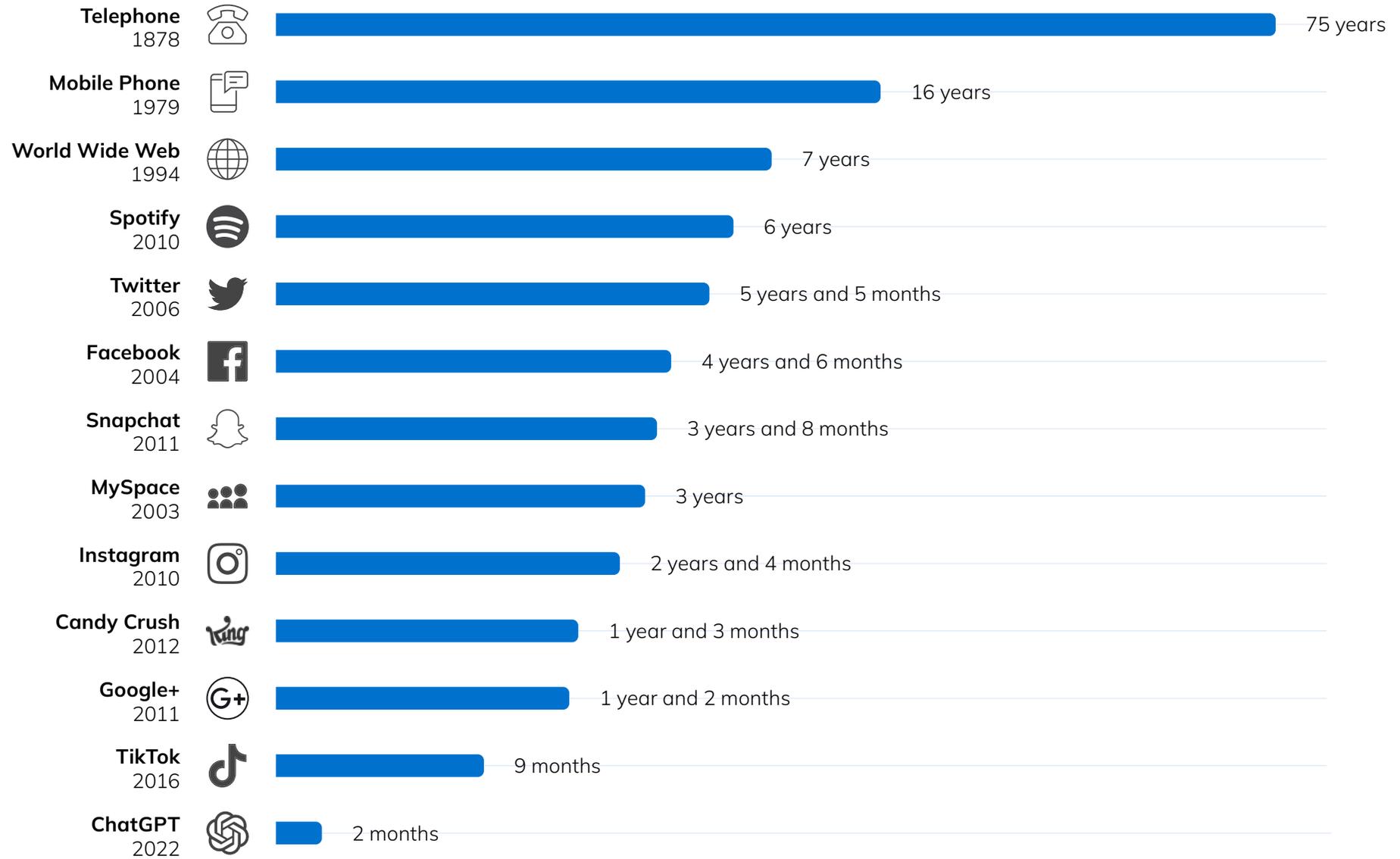
"AI has been around for decades. What's different – and daunting – about generative AI is that it doesn't make decisions based on existing data. It creates new data and that new data is fuelling demand for data centres."



Neal Gemassmer

Vice President & GM of International, Yardi

TIME TO REACH 100 MILLION USERS



Sources: [NASDAQ](#), [Business Insider](#) and [Boston Consulting Group](#).

Cashing the Chips

AI models like ChatGPT use cloud computing that is powered by thousands of chips inside thousands of servers inside enormous data centres.

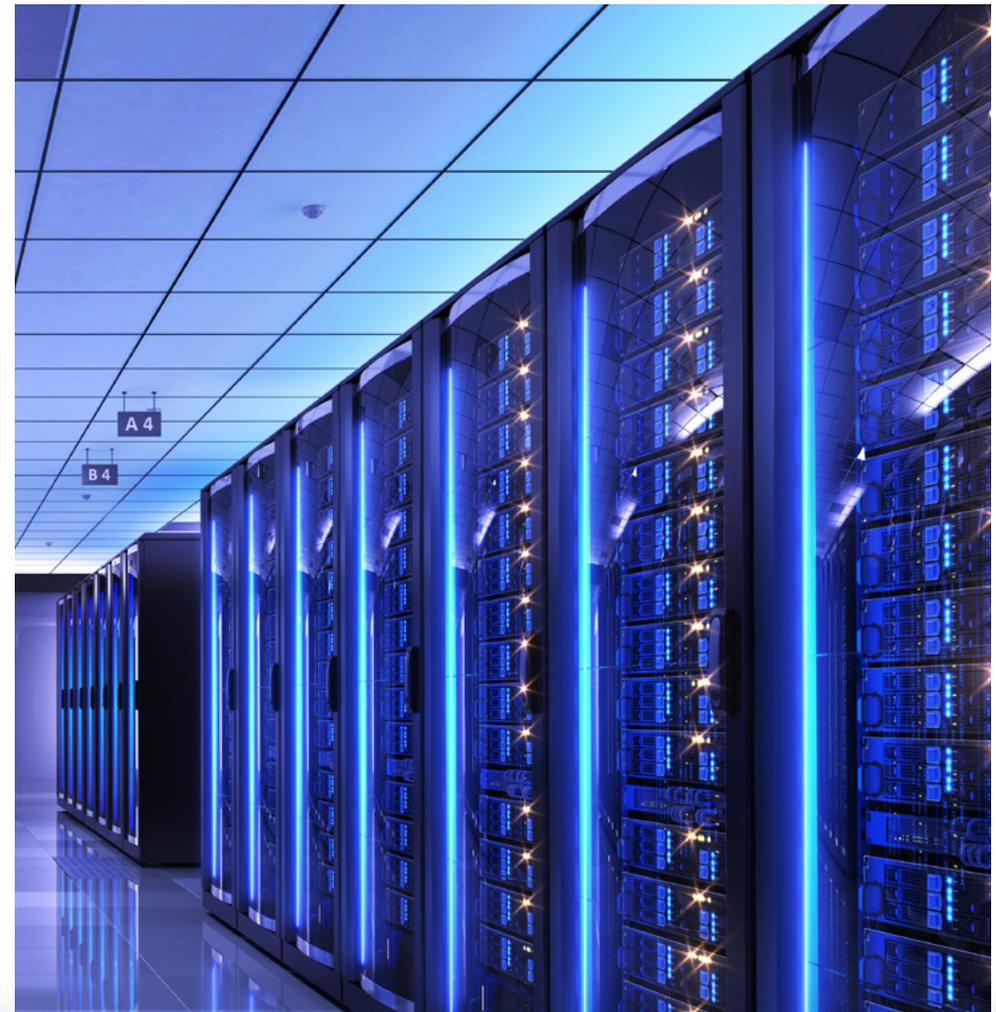
One study by [Tirias Research](#) forecasts that generative AI data centre server infrastructure, when combined with operating costs, will exceed US\$76 billion by 2028.

This is more than twice the annual operating cost of Amazon's cloud services, which holds one third of the world's cloud infrastructure. Tirias Research expects an increase in processing workloads of 50 times what we have today.

This growth will challenge business models and profitability of a host of processes, including search, content creation and automation.

Meta, the parent company of Facebook, operates 22 data centre campuses globally, representing an investment of \$16 billion and more than 3.7 million square metres of space. But as Meta Engineering Director Alan Duong says: "We need to plan for roughly 4X scale."

[Meta is busy optimising its digital infrastructure](#) for AI by fine-tuning its data centre design – and is on record saying it expects to save 31% over its current design.



Up in the cloud

Yardi was named among the [Forbes 2023 Cloud 100](#), taking a spot on the definitive ranking of the top 100 private cloud companies in the world for the eighth year in a row.



The Space Race Heats Up

Generative AI is not alone in the race for space.

There's fierce competition for server power as social media apps and Bitcoin mining drive demand for data centres.

There are [4.9 billion social media users](#) around the world – and they spend an average of two hours and 35 minutes chewing up server capacity every day.

Meanwhile, more than a [million Bitcoin miners](#) use powerful computers – and a lot of electricity – to solve mathematical problems that verify transactions. The processing power required to mine Bitcoin is enormous, but miners are rewarded with Bitcoin for each block of transactions they add to the public ledger, or blockchain.





Future Focus

As the list of companies [building AI engines](#) grows, the question is clear: When will AI be able to build its own tools to solve problems?

[Researchers who conducted early experiments](#) with GPT-4 have found “beyond its mastery of language, GPT-4 can solve novel and difficult tasks that span mathematics, coding, vision, medicine, law, psychology and more, without needing any special prompting.”

“This is a logarithmic explosion that far surpasses the impact that the Internet of Things had on the world – and it’s coming at us at speed and scale.”



Neal Gemassmer

Vice President & GM of International, Yardi

Yardi AI Innovation

Reshaping the Future of AI in Real Estate

Yardi Virtuoso is a multifaceted platform built to shape the future of AI in real estate. It includes chatbots that interpret questions and provides intelligent responses. A Smart AP that assists with data entry and checks for validation. Also, Virtuoso has smart leasing so you can review complex leases and automate lease abstraction. The Virtuoso Assistant can also help you with queries and create and edit objects and reports.

24/7 Communication with RentCafe Chat IQ

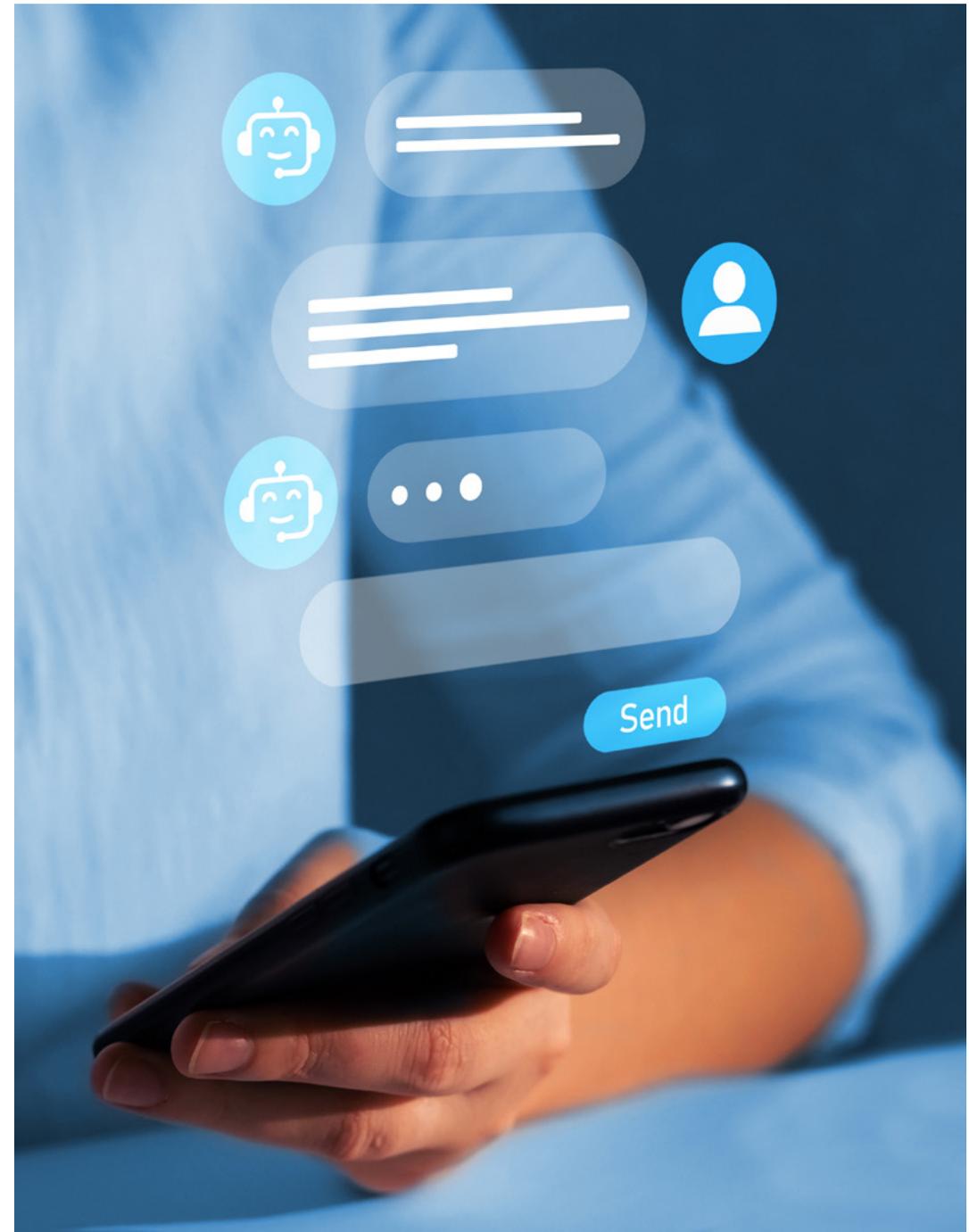
Yardi RentCafe Chat IQ supports multiple communication channels – live chat, texts, emails, phone calls and more – and is trained to understand intent, non-standard grammar and irregular spelling. “Do u have a 2 bdrm 2 rent asap?” Chat IQ can handle that!

Paperless invoices with Yardi PayScan

Yardi's PayScan is a paperless invoice process powered by AI. Invoices are approved faster, saving customers dozens of hours each week. Mistakes are minimised and humans can spend more time doing what they do best – connecting, collaborating and creating.

Maintenance Mobilisation

As Yardi Maintenance processes around six million maintenance requests each year, an AI engine is analysing work orders from initial contact through completion to improve data collection and customer interactions.



A Close Eye on Ethical AI

Generative AI presents both rewards and risks, and Yardi joins the many organisations around the world calling for greater visibility, scrutiny and regulations around AI development to ensure it is used ethically.

From intellectual property infringement to identity theft, social engineering to security threats – there are plenty of reasons why AI has made the real estate world more complex to navigate.

Misinformation generated by AI will encourage consumers to seek out credible and reliable sources – real estate professionals and trusted platforms can play a crucial role in providing verified and transparent information.

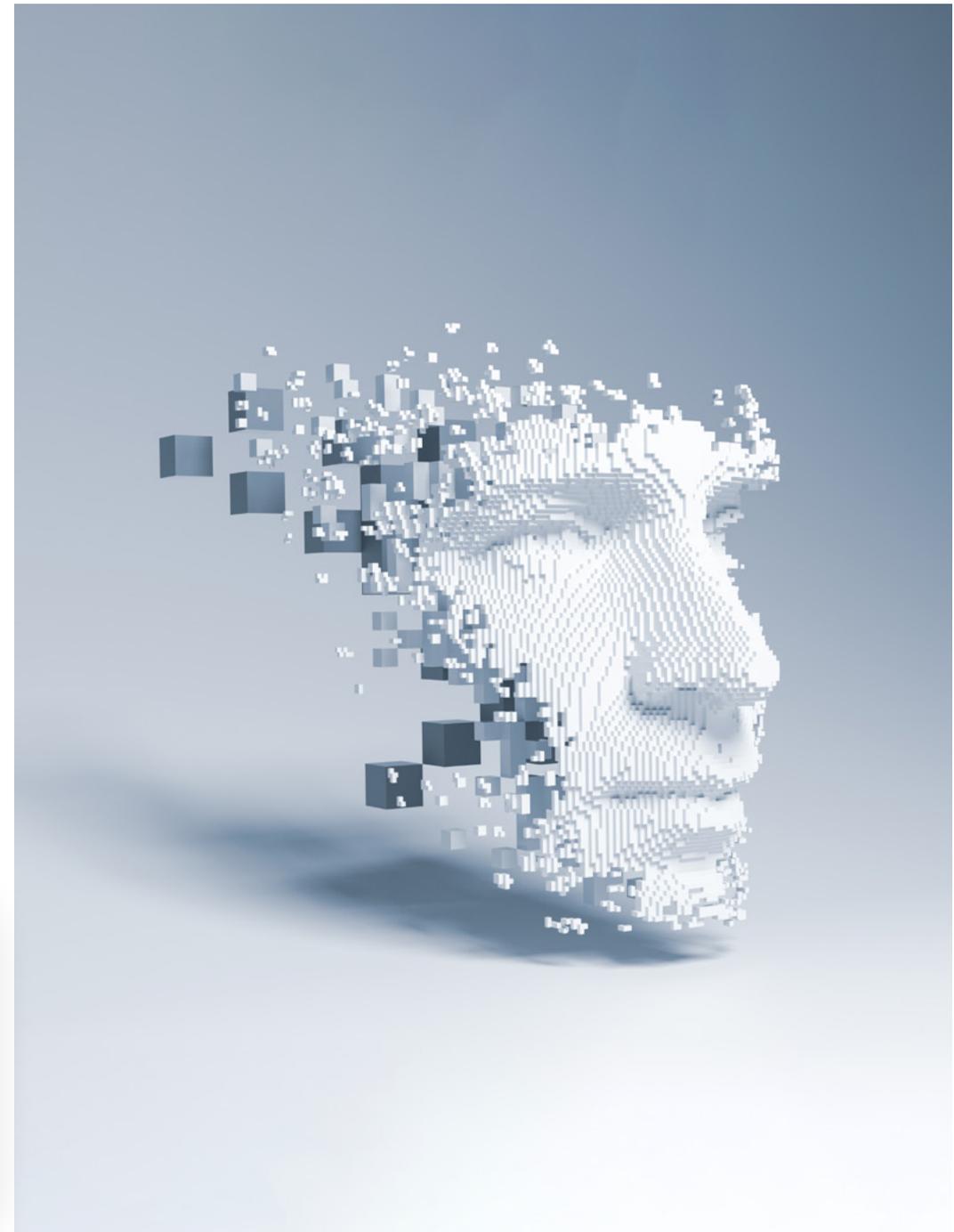
The proliferation of misleading information, known as “deep fakes”, could soon make it difficult, if not impossible, to discern whether we are communicating with human or AI-powered avatars. The implication for real estate may be a return to in-person interactions, particularly when sensitive topics are being communicated.

“While many use cases, risks and impacts are yet to be determined, Yardi will continue to monitor AI progress closely and we welcome conversations about AI with our clients, partners and trade organisations.”



Kevin Yardi

Vice President Global Solutions, Yardi



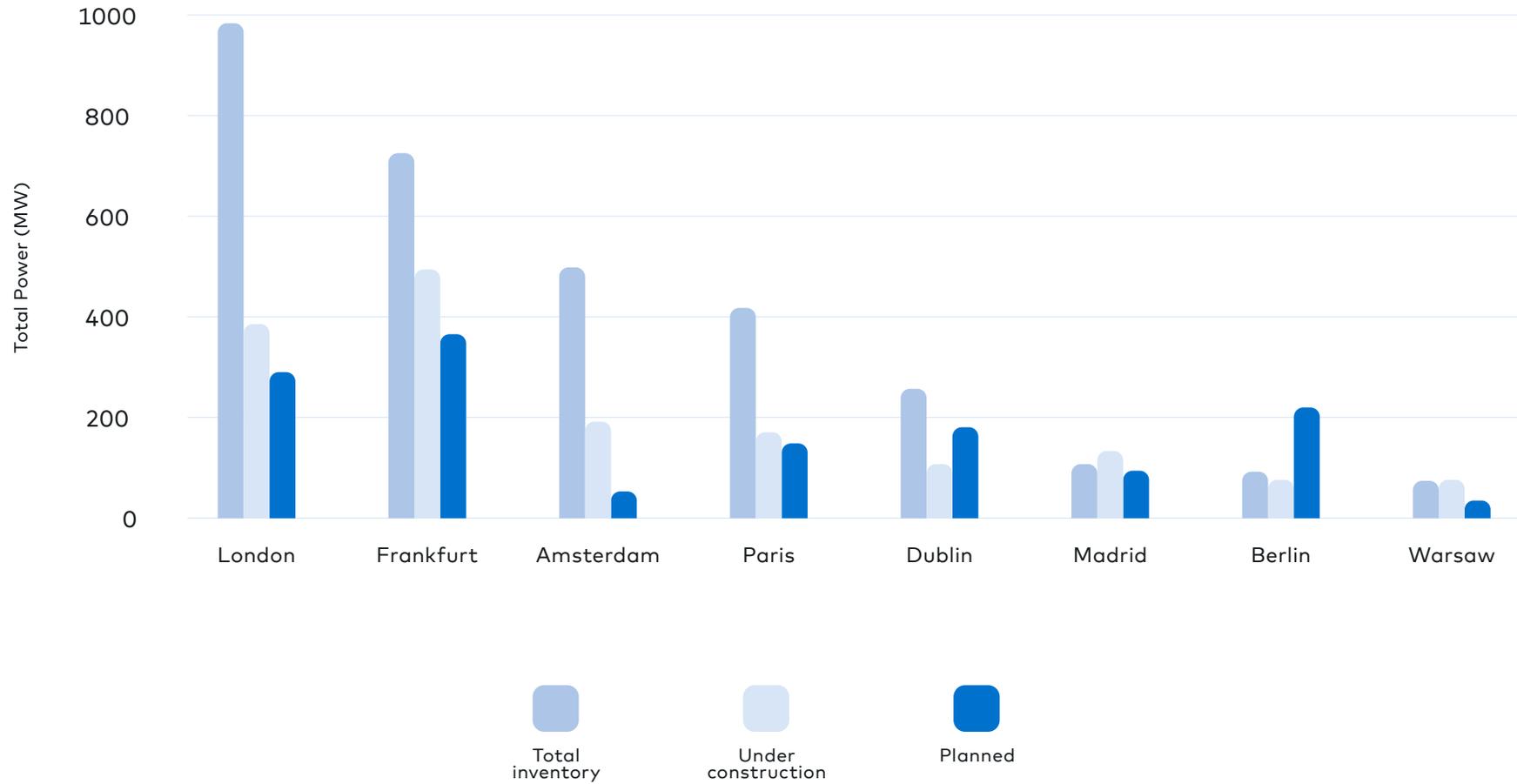
A Boom on Bytes

The volume of data from our devices is growing more rapidly than our ability to process.

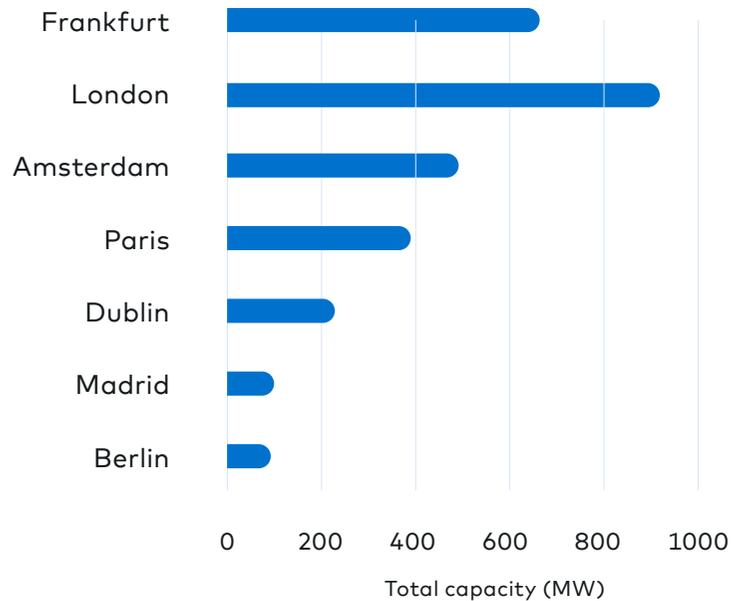
Data centres need connectivity, electricity and land. In many capital city markets, that land is in short supply.

Both hyperscale and colocation providers are looking for high-powered land sites in almost every market to support massive capacity requirements.

EUROPEAN DATA CENTRE POWER SUPPLY



Source: [JLL Data Centre Research](#), Q4 2022



Source: [JLL Data Centre Research](#), Q4 2022

Across EMEA, national security continues to shape data-related policies and regulations. This is also influencing expansion opportunities for data centre operators.

Data protection and sovereignty regulation means that data must be housed in a particular geography, but the data centres themselves don't need to be owned by that nation.

"Firms must adhere to complex and sometimes contradictory regulatory required with those same challenges. Across the region, a growing emphasis on self-reliance will drive demand for local partnerships and local investors."



Neal Gemassmer

Vice President & GM of International, Yardi

Deep Dive Into Data Centres

Hyperscale

The goliaths of the data centre world, hyperscale data centres live up to their name by offering servers on a vast scale to rapidly meet the needs of massive growth.

Hyperscale responds to cloud computing and big data storage and facilities usually offer a minimum of 5,000 servers linked to an ultra-high-speed network.

The world's [four largest hyperscale platforms](#) are Google, Microsoft, Amazon and Meta.

Around [700 hyperscale data centres](#) were operating by the end of 2021 – a doubling in just six years. The [market is expected to grow](#) from US\$35.7 billion in 2022 to \$41.7 billion in 2023, a compound annual growth rate of 16.7%.

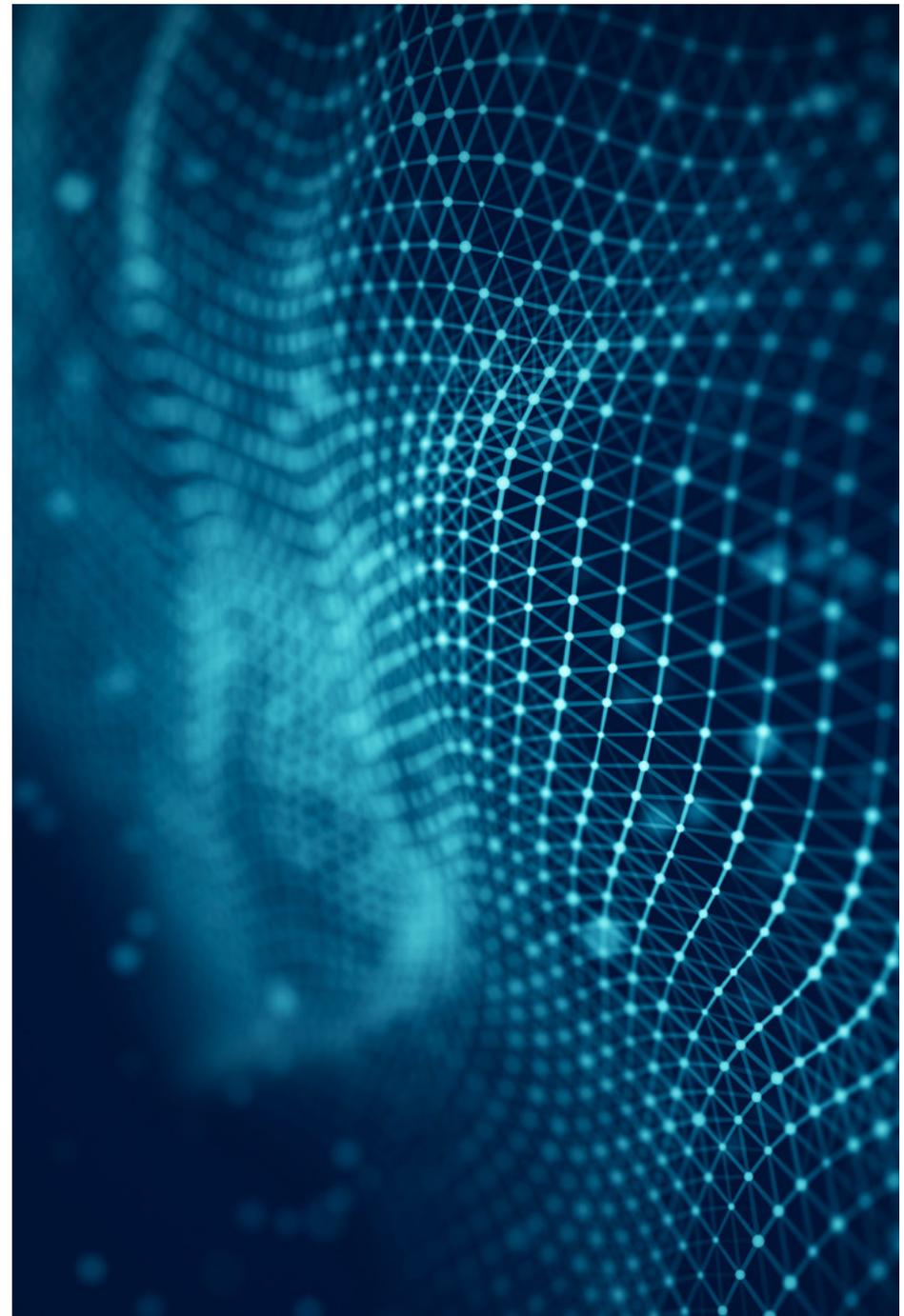
Colocation

Colocation data centres offer customised solutions with minimum cost and complexity.

In this model, one data centre owner sells space, power and cooling to hundreds, and sometimes thousands, of customers from one location. These facilities enable businesses to scale with minimum complexity at a low cost.

Colocation is also on the rise – [growing by a CAGR of 14.9%](#) between now and 2023.

It doesn't matter whether data centres are hyperscale or colocation – the complexity of managing the backend is increasing. As more money flows into the sector, and as operators embrace innovative business models, administration and accountancy will only become more challenging.





Current Affairs

Data centres and data transmission networks are already [responsible for around 1% of the world's energy-related greenhouse gas emissions](#).

The [International Energy Agency](#) says data centre energy use has grown only moderately over the last decade despite the strong growth in demand – but that assessment excludes crypto mining.

China is just one of a growing list of [countries banning Bitcoin mining](#) because of its energy intensity. [New York City](#) has a moratorium on cryptocurrency mining unless companies can show proof that they use 100% renewable energy.

Advances in IT hardware and cooling, and a shift from small enterprise data centres to cloud and hyperscale data centres, has bolstered efficiency.

Many large-scale data centre operators are embracing renewable energy to offset their emissions. Amazon, Microsoft, Meta and Google are the [four largest purchasers of corporate renewable energy power purchase agreements](#).

Operators are now investigating innovations, like immersion cooling techniques, to cut power costs.

But the rapid growth in workloads handled by large data centres has translated into rising energy use – with the IEA noting increases of between 10% and 30% each year.

Finger on the Pulse

Yardi Pulse helps data centre customers to reduce portfolio-wide energy consumption and increase cost control with data-driven decision-making direct from the energy meter. Yardi customers are saving 2-5% by collecting, analysing and fixing energy issues in real-time. And with user-friendly dashboards, analytical insights and alerts, energy savings are easy.





Power Play

Power usage effectiveness (PUE) and rack power density are two metrics used by the data centre industry to track progress toward greater facility efficiency.

[Responding to a 2023 survey](#), data centre owners and operators reported an average annual power usage effectiveness (PUE) ratio of 1.58 at their largest data centre.

More than a third of data centre operators also say their rack power density is rising rapidly. The larger the facility, the faster the rise in typical rack power. About 40% of operators of facilities with capacities above five megawatts say their densities have escalated over the last three years.

How much electricity is required to power a single AI model?

OpenAI, which operates data centres around the world, has not publicly disclosed the exact details of the infrastructure behind its model. But we know that training ChatGPT used [1.287 gigawatt hours](#) – the equivalent to charging roughly 67 million smartphones.

“A decade ago, the average data centre might consume one megawatt or 1,000,000 watts. Today, 250 megawatt facilities are possible and this the equivalent energy use to around 370,000 homes in Australia, a million in China or a massive 2.1 million in India.”



Kevin Yardi

Vice President Global Solutions, Yardi

Solutions at Scale

AI workloads are making a mockery of Moore's Law, growing at a pace of five thousand times every year.

The global generative AI market size was valued at US\$8.2 billion in 2021, but is projected to reach \$126.5 billion by 2031, growing at a compound average growth rate of 32% each year to 2031.

As generative AI workloads and models become more complex, so does the data centre operations challenge...

Think flexibility first

Whether it's hydrogen-powered modular centres built using 3D printing or liquid cooling, data centre design is evolving rapidly in response to generative AI's supersized workloads. Designs that can adapt and evolve with technology will have the longest shelf life.

Superhero sustainability

AI-powered software can help data centres stay on track with net zero targets. By closely monitoring power consumption, cooling efficiency, network traffic, server utilisation and more, operators can fine-tune their systems, optimise performance and reduce their carbon footprints.

Optimise operations

As the size of the data centre market grows, so does the complexity of back-end services. How do you manage leasing, billing, procurement, maintenance and work orders, vendors and more? Streamlining operations is the secret to maximising revenues and improving investor ROI.

Kevin Yardi's call to action is clear. "The generative AI explosion has made data centre operation more challenging than ever before. The solution is a specific strategy and experienced partners ready to roll up their sleeves and help you fuel the AI future."



Fast Forward to the Future

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