Soben

Data Centre Trends 2025:

Power, AI, and Progress

We're a people business

Foreword

By Scott Smyth
Founder and Group CEO
January, 2025

Expect the unexpected

A wave of change caused by the surge in deployment of regenerative AI is upon us, with a race to build massive new facilities for training AI in the face of labour shortages, limited skilled contractor resource and, in some locations, power constraints. Now we are bracing ourselves for an even bigger wave, and what that will bring, as algorithms are trained and deployed, and more businesses embrace AI.

Adaptability and flexibility are the watchwords for 2025. The speed of technological development is already outpacing that of construction, which means that we will continue to see changes to scope – and some plans could be ripped up altogether.

There are still a lot of question marks over exactly how the world is going to take hold of AI and use it day to day. And that will have a big impact on what we ask of our data centres and exactly where we need them to be located.

The race is on to find new locations, new sources of power and sympathetic regulatory regimes for those regions and governments looking to fulfil their digital growth ambitions.

Read on for our top ten predictions for 2025, in Soben's third annual trends report.

Soben

We're a people business

Data Centre Trends 2025

Click on the right to explore each trend.

1 | AI: pause for thought

- **Big is getting bigger**
- **Impact of AI inference still unpredictable**
- **Robotics ups the ante**

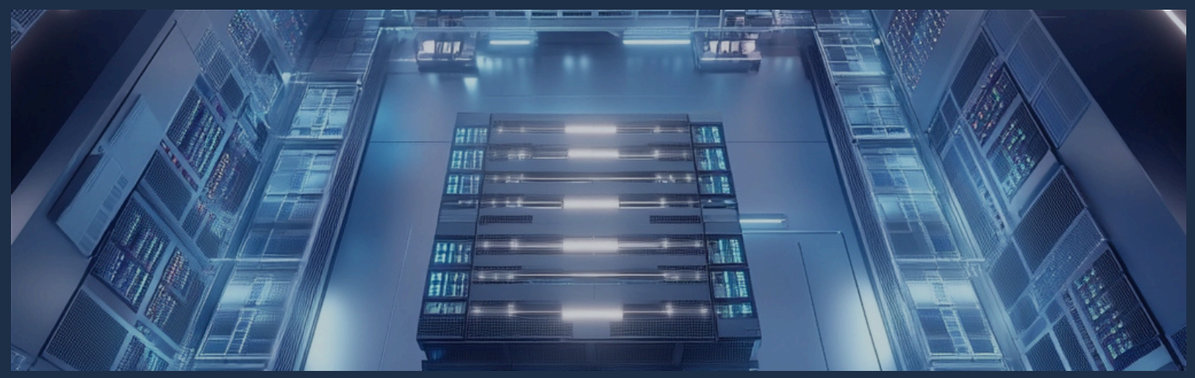
The burgeoning use of generative AI has seen a wave of planned data centre projects which is stronger than anyone predicted. Looking forward, demand for AI data centres could rise at a rate of 30% per year between 2023 and 2030, according to McKinsey [1]. This would mean that it accounted for 70% of all data centre capacity, or 154 GW out of 219 GW in a midrange scenario.

For now, these projects are largely focused on providing capacity for machine learning, training up the algorithms that will be used to deliver AI tools and applications. *"These can be located virtually anywhere, where there are large plots of land with associated power, preferably renewable,"* says **Pieter Schaap**, Group Development Director at Soben.

Scaling up: hyperscale and beyond

The increased processing power required by AI data centres means campuses which were considered large 10 years ago would today be thought of as a minnow. A hyperscale data centre was initially 20MW or more; five years ago, that had risen to perhaps 60 MW. Today, we are seeing plans for 1 GW campuses, such as that planned by ECL, east of Houston, Texas – mooted to be powered by hydrogen [2]. *"These AI facilities are huge, exponentially bigger than cloud computing campuses,"* says **Joe Cusick**, Soben's Group COO.

So, will big keep getting bigger? Not everywhere.



Expanding horizons: inference and emerging technologies

Perhaps three years from now, we can expect the next wave of AI-driven demand to hit. There will be an increased demand for data centre space close to urban and industrial centres, smaller scale inference facilities that need low latency so that data moves fast between the data centre and the machinery or equipment being operated; think autonomous vehicles such as Waymo taxis or Einride freight vehicles.

The use of AI in healthcare, finance, and defence - already advanced compared to other sectors - will ramp up. Applications range from medical diagnoses, drug development and AI-assisted robotic surgery in healthcare to loan appraisals, agent modelling which simulates individual behaviour, and fraud detection. The energy sector is catching up fast, with uses that include more precise demand forecasting and optimised storage and distribution of energy.

Almost every organisation could benefit from the deployment of AI, and many more will over the next five years. The EU wants to see 75% of firms using AI by 2030. And its deployment could offer huge efficiencies in the public sector, an ambition underlined by the UK government's recently announced plans to turn the UK into an 'AI Superpower'.

With generative AI set to become business as usual for private and public sector organisations, and embedded in almost every app we use via our phones, there will be a need for inference data centres with low latency connections to where the apps are located. These could be located close to existing cloud regions.

And then there is the vision of robots as part of the everyday.

The news that Nvidia has set its sights on robotics, promising to showcase technology for humanoid robots in the first half of 2025, accelerates the arrival of that vision. Tesla too is pushing that narrative – the realisation of its humanoid robot Tesla Optimus will follow on from the launch of its Cybercab by 2027 and later its 20-person capacity Robovan, says Elon Musk.

Also on the horizon is quantum computing which, while promising huge leaps in processing speed and capacity, will require significant changes to data centre infrastructure. Currently quantum computers require super-low temperatures to operate which would demand more energy for cooling.

The ambition for quantum computing to move from lab to data centre became a little more attainable in December last year [2024] when Google unveiled its new quantum chip, Willow, which it believes takes us closer to large-scale deployment.

With the AI environment - and the infrastructure that supports it - changing so rapidly, agility and flexibility are vital for those of us delivering construction projects.

Peter Alexander

2 | More on-site power generation

Power constraints are delaying projects

Plans for novel on-site power generation

US turns to natural gas plants

Power remains the constraining factor in many markets. In some locations, there is not enough power available to feed future developments, in others the lead time to power new data centres can be longer than the development cycle for a data centre; up to three years has been reported in North Virginia, for example.

"One of my clients had a big campus scheduled to kick off in the next year or so. They recently said that they were taking it off the radar for at least a year due to power constraints," says **Sophie Smith**, Director, Americas, Soben.

Exploring solutions to power challenges

As well as delaying start dates, developers have been looking at temporary measures for powering data centres while they wait for the necessary electrical infrastructure to be built.

"On one project, we were considering sourcing power skids that we can power off local 13,000-volt power and transform up to 25,000 volts that we could use as construction power and then to commission our builds while we waited for the substation to be built," reports **Mark Smith,** Group Account Executive at Soben.

Power constraints are exacerbated by the increased power demand from AI data centres, which could ramp up to ten times that of a standard rack. Aside from seeking out new locations, which boast plentiful supplies of renewable power, data centre operators are looking at various options for generating power on site.

Microgrids offer an effective way to tap into local renewable energy sources and to provide energy security. Localised power systems that operate independently of the main grid, microgrids are ideal for powering critical infrastructure in remote locations such as Scotland - set to be Europe's newest data centre hotspot.

Low carbon power generation technologies, such as nuclear (see below) or hydrogen, are longer-term options. Digital Reef is planning a 600MW campus in Havering in East London which it says will include a hydrogen power cell to generate energy – although how it will source the green hydrogen needed to make this a clean source of energy is unclear.

In the shorter term, fossil fuels may be coming to the rescue. Some data centre operators are turning to natural gas as a source of on-site power generation using combined cycle gas plants (CCGT). Natural gas suppliers in the US are reporting an increased demand for natural pipelines to data centre sites [3].

This could be seen as a bridging solution while lower carbon solutions are under development [4]. Or it could reflect how operators expect the change in administration of the US Government to impact on incentives and funding for green energy and attitudes to fossil fuel.

Robert Kim

"Power is going to continue to be an issue. Elon Musk predicted we would run out in a year or two. It has already happened in some markets. It is going to be a huge challenge."

3 | The pull of renewables

Green energy demand for training AI

European operators pushing to net zero emissions by 2030

Trump could disrupt renewables progress in the US

Digital transformation and energy transition away from fossil fuels go hand in hand. Data centre providers are clustering in areas that can provide plentiful sources of renewable energy. And governments that are keen to grow their digital economies are investing in green power to attract the data centres they need to service their strategies.

The move to renewable energy has been underway for over a decade. Google, for example, says that it signed over 115 agreements between 2010 and 2023 adding up to over 14 GW of clean energy. And it has set itself a target to run all its data centres on 'carbon-free energy' by 2030 [5].

Renewable energy: the key to future growth

Huge data centres for training AI algorithms do need plentiful power but don't need the low latency connectivity to urban centres or the same security of power supply. This means that new locations with plentiful supplies of renewable energy – think hydropower in Scandinavia or wind power in Scotland – are gaining popularity.

In the wake of the European Green Deal, a set of laws aimed to make Europe climate neutral by 2050, data centre operators there have signed up to the Climate Neutral Data Centre Pact. Launched in 2021, this promises to make signatories' data centres climate neutral by 2030, with over 100 companies signed up, around 75% of Europe's data centre market [6].

In the Middle East, green energy is fuelling Qatar's battle with Oman to become the region's data centre hub, a position historically held by Bahrain. Qatar's Vision 2030 to become a leading digital economy is underpinned by an energy strategy that aims to increase its proportion of renewable power generation from 5% today to 18%, mainly through investing in solar energy. Dubai, which boasts the world's largest solar-powered data centre [7] aims to generate 100% of its power from green sources by 2050.

Meanwhile in the US, laws including the 2022 Inflation Reduction Act, created to encourage decarbonisation through subsidies, have created a good environment for investment in renewable energy. Of course, these laws were enacted under the Biden administration; commentators suggest that the pace of renewables growth in the US could slow somewhat due to the change in administration.

Pieter Schaap

"Countries across the Middle East are competing to establish themselves as leaders in the regional data centre industry, driven by bold investments in renewable energy and digital infrastructure. With sustainability now a priority, the region's commitment to green energy is creating new opportunities for developers."

4 | New hotspots emerge

Tier 2 and 3 markets hotting up

Nordics booming

Remote locations gain popularity

There are several interconnected factors driving the move to new locations. Decreasing availability of power in established data centre markets, combined with companies' decarbonisation goals, means that countries and regions with renewable energy sources come high on the hit list for data centre providers.

Additionally, the changing nature of some data centres - such as the huge facilities needed to train up AI algorithms - means that any location with good land supply, access to power and proximity to major fibre lines are an attractive option.

Nordics and Europe's rising stars

In Europe, the Nordic countries of Norway, Finland, Denmark, Sweden, and Iceland, with their ample supplies of hydropower and cool climates, are attracting massive investment. Both new developers, such as Polar, and existing operators like Green Mountain and atNorth are creating high-density facilities alongside their traditional ones.

Hyperscalers are targeting the Nordics too. Google started construction of its first Norwegian data centre in February 2024 in Skien [8] and recently acquired 1,400 hectares of land, over four locations in Finland, from state-owned enterprise Metsähallitus across Muhos and Kajaani [9].

There is activity in other tier 2 and 3 European markets too including Spain, Italy, Belgium, Poland, Austria, and Scotland. In Spain, Madrid could be considered Tier 1, with investments in subsea cable connectivity and a commitment to increasing its renewable energy production increasing the country's allure for data centre operators [10].

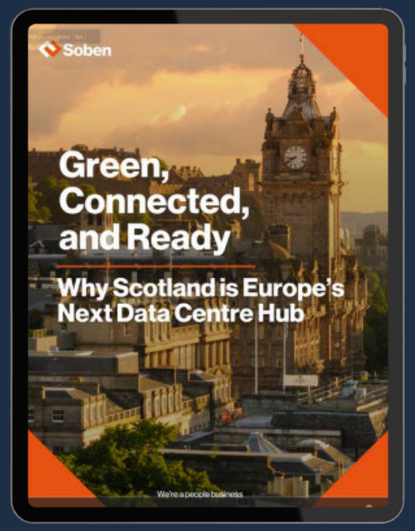
Soben

Meanwhile, Zaragoza in Aragon in Northeastern Spain, with its supply of solar, wind and hydropower, is emerging as a new hotspot. Some forecasts suggest that Aragon's installed capacity will reach over 1600 MW by 2030, making it a leading European market [11].

Investment by the European Union to boost innovation in AI development is likely to lead to greater concentrations of data at the seven locations it has pinpointed. In December 2025, the European High Performance Computing Joint Undertaking (EuroHPC) selected consortia at the following locations to receive €1.5bn of funding to create 'AI Factories' to host research and technology hubs: Barcelona, Spain; Bologna, Italy; Kajaani, Finland; Bissen, Luxembourg; Linköping, Sweden; Stuttgart, Germany; Athens, Greece [12].

The newest market poised to emerge in Europe is Scotland. Already generating more power from renewable sources than it uses, Scotland is developing multiple new offshore wind farms, with parcels of land located close to them.

Connections and proximity to subsea data cables, and its cooler climate are other attractions that mean there is already 3 GW of development under consideration there.



Read more about Scotland's data centre potential in Soben's recent report: Green, Connected and Ready - Why Scotland is Europe's Next Data Centre Hub.

Remote locations in the US

While activity in the US's traditional data centre markets continues, power constraints are driving developers to new locations such as Indiana, Minnesota and Nebraska, where there is lots of land and few people. Further East, the data centre market in Phoenix, Arizona, is booming, with multiple developers following the major hyperscalers there. Renewable energy is a big draw [13].

Data centres in Phoenix are driving the acceleration of solar power in the state. Danish energy company Ørsted has recently commissioned a 300MW solar farm and 300MW battery energy system to supply Meta's 2.5 million sq ft campus which is under development [14]. Atlanta, Georgia is experiencing a similar explosion in development, with a flurry of new project announcements at the end of 2024.

South Carolina is also set for growth with both Google [15] and Meta building there. In Reno, Nevada data centre development is gaining pace with Vantage, PowerHouse, Google, Apple, EdgeCore, Novva, and Tract all developing there, attracted by proximity to fibre routes, lower power and land costs and a favourable regulatory environment.

5 | Driving nuclear small modular reactors (SMRs)

Big players sign deals

Existing or former nuclear zones favoured

New power brings new options

A year ago, we knew that nuclear power was coming to the data centre sector. Now we see the big hyperscalers accelerating the advancement of small modular reactors (SMRs) by making substantial commitments and investments. Next year, we can expect plans to become more concrete as data centre developers push forward with earmarked sites.

Deployment of SMRs will allow data centre developers and operators to consider new options for power management. Backup generators could become obsolete, with connections to the grid becoming the emergency option. Data centres could be co-located with other industrial facilities to share SMRs, with workloads scheduled and shifted so that they are complimentary to one another, reducing peak demands needed.

Favoured locations are likely to be in areas with a history of nuclear power generation, or in those where new nuclear plants are planned or under construction. This helps to mitigate some of the planning and permitting risks, since local bodies and communities already understand issues relating to nuclear power.

"Small nuclear power already exists. It runs submarines and aircraft carriers, so why not data centres?" asks Soben's Group COO, **Joe Cusick.**

Major industry commitments

In October 2024 Amazon announced three new SMR deals. With Energy Northwest in Washington, it signed an agreement giving it the right to purchase up to 320 MW from the first four of a possible 12 SMRs. The SMRs will come from X-energy, in which Amazon will invest $500m. And in Virginia, Amazon signed an agreement with Dominion Energy which the power company said could lead to 300MW of power in the region [16].

These deals followed on from Amazon's purchase of the 960 MW Cumulus Data Assets campus from Talen Energy. The campus is powered by the nearby Susquehanna power station, the US's sixth biggest nuclear plant, and will see new Amazon developments powered under a fixed-price power deal.[17]

Major industry commitments

In December 2024, Meta published a request for proposals (RfP) aimed to accelerate the development of nuclear power plants. It is looking for companies who will permit, design, engineer, finance, construct, and operate power plants to supply 1.4 GW of electricity across the US [18].

Microsoft signed a 20-year, 835MW power purchase agreement (PPA) with Constellation, which owns the Three Mile Island nuclear plant, in October 2024. Constellation hopes to restart the plant, which was closed in 2019 because it was too expensive to run [19]. The same month, Google signed a PPA with SMR developer Kairos Power which it hopes will see the first reactor in operation by 2030, followed by further deployments and resulting in a total of 500MW of power.

Meanwhile, nuclear company Oklo signed pre-agreements with co-location company Equinix for 500MW, and with Wyoming Hyperscale for 100 MW *[20]*. Kemmerer, Wyoming, is the site of a new nuclear power station for TerraPower, which is headed up by Bill Gates, where construction work began in October 2024 [21].

The UK is committed to the development of SMRs, with its Government pushing to have the first SMRs in operation by early the early 2030s [22]. One policy suggestion is to establish 'AI growth zones' which would be located in areas such as existing or former nuclear plants, ports and former steel plants. These zones would benefit from a fast-track planning process for both data centres and SMRs [23].

Sophie Smith

"We don't know how quickly and by how much it will ramp up, but the adoption of nuclear energy has definitely begun."

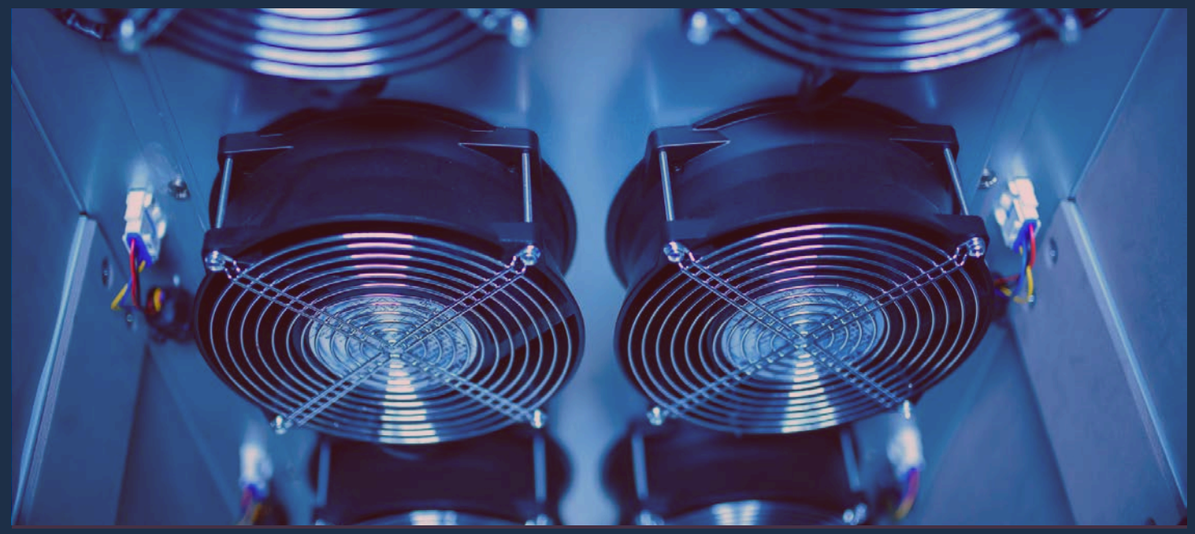
6 | All change in cooling

Higher densities demand innovation

Liquid cooling gains traction

Waste heat reuse rises

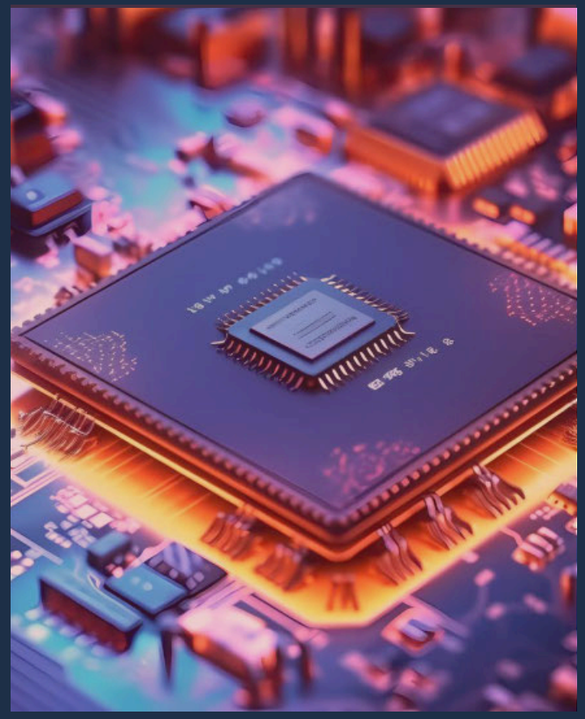
There are big changes on the horizon due to developments in data centre cooling. The higher processing power required for AI activities, combined with the need to achieve higher densities in areas where land is constrained means that data centre operators need new combinations of cooling technologies. New cooling solutions, which offer a lower power usage effectiveness (PUE) are also under development.



According to Vertiv, one-in-five data centres is already adopting liquid cooling systems [24]. However, air cooling is still required for equipment such as switches. Vendors must develop hybrid solutions – combining air and liquid cooling – which can be deployed fast and at scale.

Amazon recently outlined changes aimed at increasing its computing power by 12% per site. This involves changes to cooling systems, power distribution and hardware configurations [25]. Amazon also announced its intention to retrofit existing data centres to introduce liquid cooling which would allow it to run generative AI applications and to lower its carbon footprint.

Meanwhile, late last year [2024] electrical equipment manufacturer Schneider Electric announced that it was partnering with chip maker Nvidia to create next-generation liquid-cooled server racks. Initial designs offer options for liquid-to-liquid Coolant Distribution Units (CDUs) and direct-to-chip liquid cooling, according to Schneider Electric.



Emerging developments

There are possible developments which could advance direct-to-chip cooling too. Currently these systems see single-phase cooling which uses a liquid coolant passing through a cold plate to absorb heat from the chips. An alternative is a two-phase direct-to-chip system which uses the phase change of the coolant to absorb more heat, leading to lower cooling costs. Potential downsides to two-phase systems are the potential environmental hazards of the liquids used and the higher capital costs [26].

Further out on the horizon is the use of microfluidics. This involves the creation of tiny fluid channels within the chips themselves so that the liquid coolant passes very close to the processors. Microsoft has said that it is working to develop this technology [27].

There are other novel cooling technologies at the early stages of development too. Swiss deep tech start-up Apheros has patented a system to develop metal foams which it says could dramatically increase heat dissipation and reduce power costs for cooling [28].

Aside from improving cooling systems, another way to up the energy efficiency of data centres is to make use of the waste heat. Uses around the world include warming homes through district heating systems, heating commercial greenhouses, or warming the water for swimming pools. The return temperatures from liquid cooling systems – especially those used for high-density applications – are more suited for the use of waste heat.

In Germany, new legislation was introduced at the end of 2023, which will require data centres that go into operation after 1 July 2026 to meet waste heat use targets. The proportion of energy reuse will ramp up from 10% in 2026 to 20% from 2028 [29].

And then there is the possibility that waste energy from data centres could fuel carbon capture plants. Carbon capture technology requires significant amounts of energy which would be provided by the waste heat. Major operators including Meta and Alphabet are investigating the use of waste heat to power carbon capture from the air, in a process called direct air capture (DAC) [30].

Mark Smith

"Changes in the cooling scope are significant. It requires changing the layout of the building completely."

7 | Shifting rules of engagement

PMC approach reduces risks of GC failure

Experienced GCs called shots in the US

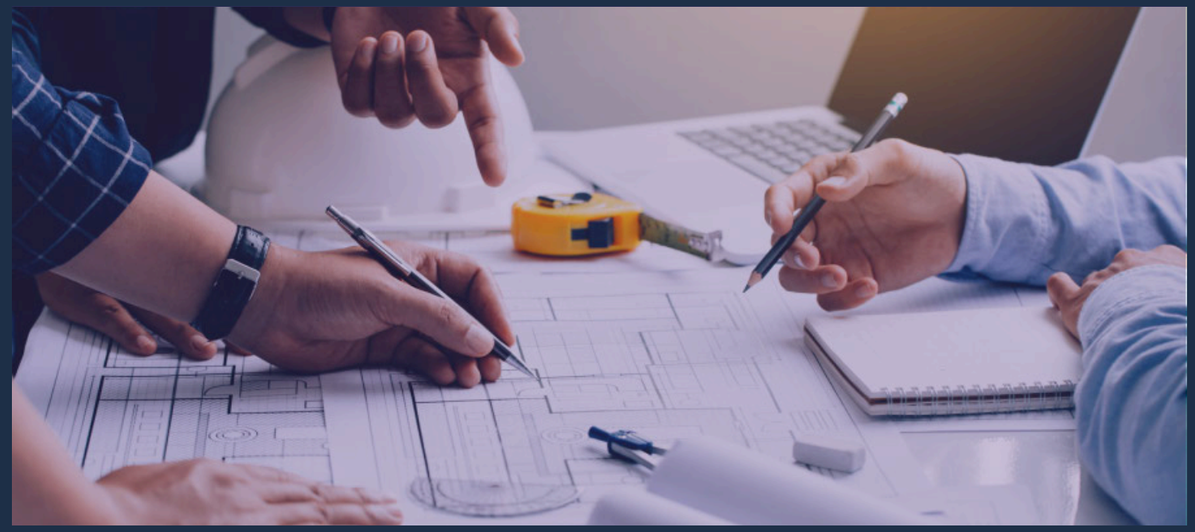
Pendulum will swing back to cut costs

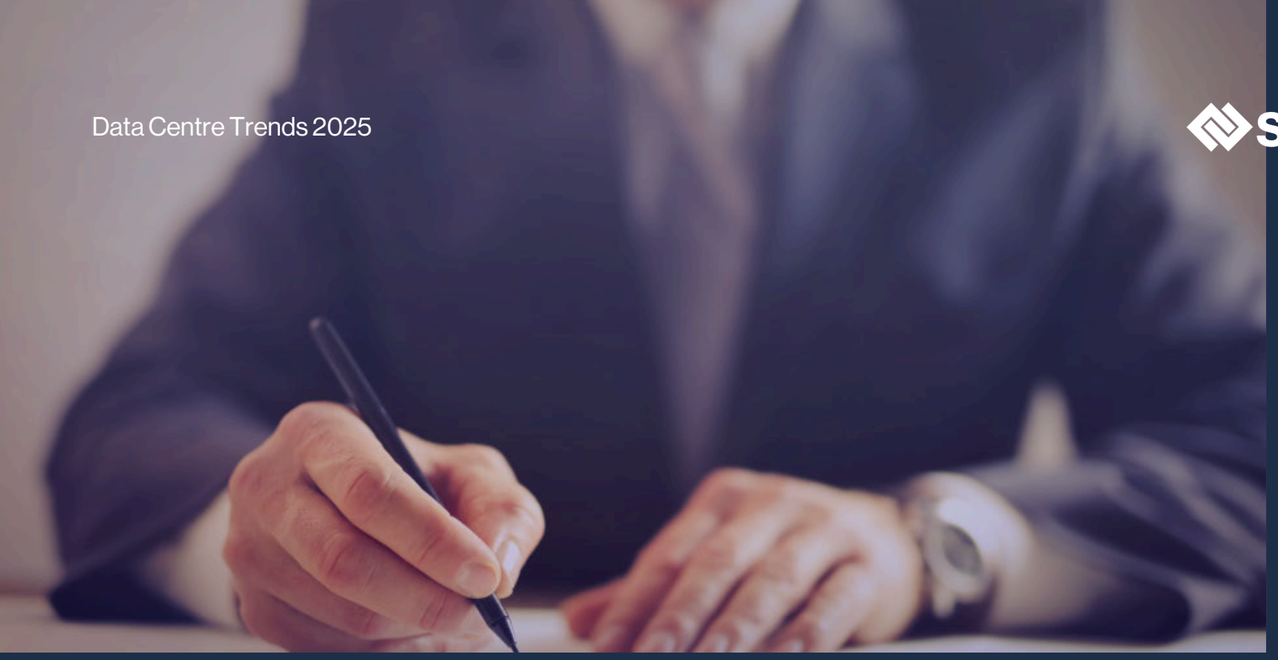
The sheer number of data centre projects underway at the moment means that there aren't enough competent general contractors (GCs) to go round. To tackle this, clients are turning to new forms of contract to better manage the risks.

In Europe, rather than running the risk of employing an inexperienced GC, some developers are turning to the Project Management Consultant (PMC) approach, a model borrowed and adapted from the oil and gas sector. With this approach, the GC is one of multiple contractors employed directly by the client – rather than the GC employing all the subcontractors.

There can be multiple benefits for the developer who deploys this PMC model. They have greater visibility and control over the project, better speed to market, and the risks should the GC fail are reduced.

Pieter Schaap, Group Development Director at Soben, believes that an open-book approach to cost estimates and eliminating changes on projects increases the chance of success. *"The data centre industry can be very collaborative and there have been major successes over the years. The speed of the industry makes it difficult to replicate success repeatedly, so there are always challenges around projects in new locations, but the industry adapts quickly and overall we are pretty good."*





Regional shifts in contracting practices

Although the PMC approach is more prevalent in Europe, the big players are starting to test its application in the Americas. It has been deployed in South America, with limited success, and we're seeing the first contracts coming through in North America. The PMC model depends on the competency of the consultants involved, who need both project controls expertise and construction management skills.

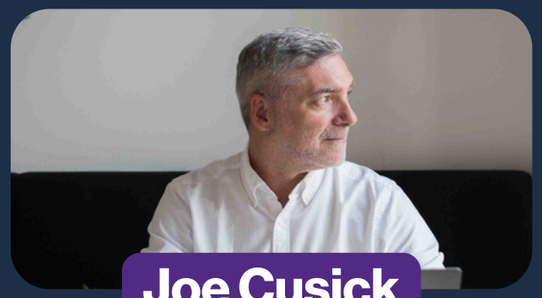
Another alternative approach we will see more of in the US is the partnership or sole source model where clients contract with a small number of GCs, providing them with a pipeline of projects and negotiating costs. The advantages of this model are reduced time for tender, and the competency of the GC is assured. However, since there is no competition between GCs, costs will tend to be higher.

In some markets, clients are effectively forced to go down this route, says Soben Group COO **Joe Cusick**: *"In markets like Charlotte in North Carolina, the biggest construction managers in the US in the data centre market just refused to competitively bid. The work is there, they have the reputation, they don't need to compete for projects."*

In this situation, clients could consider a hybrid approach, says Cusick, using the partnership route for most data centres, while competitively bidding occasional projects to provide a benchmark for costs on the others.

The glut of projects is also seeing contractors bid on a guaranteed maximum price (GMP) basis, converting that to a lump sum once the tender is awarded. *"It's easier for the client to manage and easier for them from an administrative point of view. Clients are realising if they want the contractors to do the projects, they must go down this route,"* says **Mark Smith.**

However, the tides will turn next year, predicts **Rob Kim**, CEO, Americas: *"Some of the major clients are switching from 'build as quick as possible' to 'can we look at the cost, and improve how we do things on projects?'"*



Joe Cusick

"There's so much work, that the big players are really making the running."

8 | Ongoing skills shortages

Experienced resources come at a premium

Contractors must upskill workforce

New approaches to find recruits

The perennial problem of skills shortages across the board in delivery will remain an issue. From general contractors who need leadership and management staff to shortages of tradespeople including electricians, HVAC technicians and plumbers to project and cost management firms who are desperately seeking people with the relevant CV.

"Our clients want people with X years' experience and Y years of data centre experience," says **Sophie Smith**, director, Americas at Soben. *"It is still a relatively new sector so it is difficult to find someone who can do it all. They want a unicorn, and the unicorns are already placed."*

As a result of these shortages, projects must pay a premium to get the resource they need, or face programme delays, says **Sophie Smith**: *"I worked on a project in Phoenix, Arizona where the GC could not find a contractor for the fire alarm and security packages. The ones that did bid more than tripled the budget price, so if they expected the price to be $5m, the bid price was coming in at $15m."*

In new markets, this can be even more challenging. For instance, construction workers and professionals from countries such as Greece and Portugal, have moved overseas due to the poor economic conditions in their own countries. *"Now those countries are on the hunt for talent. They need to find ways to attract their own talent back to work there,"* says **Pieter Schaap**, Group Development Director at Soben.

Shortages among trade people are compounded by the issue of demographics. In many countries, the workforce is ageing, and the industry is struggling to attract young people. In the MEP sector, where companies and individuals with appropriate experience are particularly thin on the ground, there is the added challenge of new technologies:

"Many MEP contractors now also require workers who are proficient in integrating emerging technologies like BIM and smart building technologies which require training," says **Mark Smith**, Group Account Executive at Soben.

Building the workforce of the future

To counter these challenges, more training is required across the board, **Sophie Smith** says: *"Contractors must invest in upskilling the existing workforce through continuous professional development, such as offering certifications, training in new technologies, and on-the-job training programmes."*

The hyperscalers are taking issues into their own hands. In the US, Amazon for instance is creating targeted training programmes and partnering with construction companies to help them source tradespeople through careers fairs [31].

Given the scale of development ahead, it is vital to find the next generation of engineers and managers who will work on tomorrow's data centre projects. In the UK, University Technical College (UTC) Heathrow launched its Digital Futures programme in 2021, which trains students from the age of 14 with the aim of developing their skills in mechanical and electrical engineering, IoT devices, cabling infrastructure and project management.

In early career development, modern apprenticeship programmes in the UK are helping to attract a more diverse range of people to the data centre construction sector. Offering qualifications up to degree level, these programmes allow people to study at associated universities while working and earning at the same time, effectively fast-tracking their industry-specific knowledge and experience.

In the near term, there will be constraints due to limited skilled resource. Especially in newer markets, developers will have to accept slower programme durations and hold bigger risk contingency pots as local contractors and their supply chains get up to speed with the demands of data centre projects.

Mark Smith

"The industry needs to develop on-the-job training to upskill tradespeople and managers."

9 | Beyond tax breaks: attracting new data centres

- **Streamlined planning**
- **Transparent power commitments**
- **Investment in fibre**

Where data centres were once considered a necessary evil by many regional and national governments, the narrative is changing. Politicians now recognise that they are a critical piece of the jigsaw in growing their digital and national economies.

Tax breaks have traditionally been a tool for attracting data centres, but proactive governments are looking to offer would-be data centre developers more incentives. For instance, Alberta in Canada is looking to attract CA$100bn of AI data centres in the next five years with a package of measures that includes a 'concierge programme' alongside tax breaks, aimed to ease the path of projects through the state's regulatory framework.

Creating competitive advantages

Planning and permitting can be significant hurdles to development, particularly in newer markets for data centres. For instance, countries such as Germany and the Netherlands accept combined planning applications that cover every element of a development whereas Luxembourg requires individual applications for decontamination works, foundations, building and then operation, slowing starts on site and introducing additional risk to the success of the project.

Governments such as Aragon in Spain – home to the burgeoning Zaragoza data centre hotspot – are promising faster planning processes. Aragon has promised it will halve the 24 months it generally takes to get permission in Spain in its bid to attract more projects.

Access to renewable energy is a big attraction for data centre companies. But the promise of more green power is not enough. Governments could take a leaf out of Norway's book: its national electricity supplier Statnett assigns power to data centre projects going forward and publishes that data. Germany keeps tabs on the progress of planned data centres, with developers losing their power commitments if they are not making enough progress.

Fibre connectivity is another fundamental issue that Governments need to address if they are serious about attracting data centre operators. In the Middle East, subsea connections to Iraq could help Qatar overtake Oman as the frontrunner to be a regional hub.

In the UK, the Scottish Government is considering investing in connections to subsea cables to boost the country's connectivity.

Finding ways to deliver all these incentives at once is the holy grail. The UK Government's new AI Action Plan, announced in January 2025, promises to establish 'AI Growth Zones' (AIGZs) which could benefit from streamlined planning approvals and accelerated provision to clean power [32]. However, translating action plans into action on the ground will be far from straight forward.

10 | AI to the rescue

- **Optimise the use of scarce human resources**
- **Attract a new generation of professionals and tradespeople**
- **Boost efficiency and resilience in operation**

Perversely, the very challenges that the rise of AI has thrown up could be tackled by deploying more AI – alongside other digital tools – in the development and operation of data centres.

With the resources needed to construct new data centres in short supply globally, contractors and those overseeing projects, need to do more with fewer resources. And, as power demand from AI data centre continues to rise, operators need every tool in the box to improve efficiency.

Harnessing AI for smarter solutions

The design phase too could be approved, says **Mark Smith**, Group Account Executive at Soben: *"Digital tools for modelling and designing buildings are well established but could be used more in the data centre sector."* Parametric design, for instance, allows a wider range of options to be considered, for a lower time cost.

In the construction phase, there are AI-based tools that can optimise schedules, testing a far wider range of sequences than a human programmer could to find the shortest route or to reprogramme if elements are delayed. Such tools can also be used across portfolios of multiple data centre projects to optimise the allocation of owner furnished contractor installed (OFCI) equipment which is subject to long and varying lead times.

Out on site, augmented reality (AR) tools can aid setting out, and can be used for quality control checks after elements have been installed, for instance to check the positioning or services. AI-driven tools, which compare video footage taken around a project site with the Building Information Model (BIM), can both track progress and spot any deviations from the design early.

Once data centres are in operation AI-trained algorithms can be deployed to track, adjust and optimise a range of elements such as heating and cooling and power distribution. AI tools can be trained to predict periods of high activity, adjusting cooling in advance when needed and so reducing energy consumption [33]. It can also analyse power consumption patterns and shift tasks around to different time slots to improve efficiency.

Deploying machine learning to analyse data on past problems, by looking at historical data and patterns, could also help reduce downtime, flagging up problems or predicting failures of equipment before they occur. This would allow predictive maintenance, which in turn would reduce downtime.

AI can also help improve performance by shifting where data is stored, so that more frequently used data is stored in faster media. And it can find data that is redundant and suggest actions to save storage space.

Aside from boosting efficiency, an added bonus of the wider adoption of digital and AI-driven tools in the construction phase would be that the sector would be more attractive to younger people.

AI itself holds the key to addressing many of the challenges we face in the construction and operation of data centres.

Scott Smyth

Collaboration, transparency, and adaptability

The rapid expansion of AI data centres is reshaping the industry, bringing new challenges – as well as new opportunities. Innovative solutions to ongoing power constraints, and a continued drive for improved energy efficiency, promise more symbiotic relationships between data centres and their neighbouring industries and communities.

2025 will be another record-breaking year for data centre development globally, in terms of the MW delivered. Collaboration, transparency, and adaptability from every part of the industry – clients, consultants, supply chain, governments and investors – will be vital if we are to rise to the challenges old and new and deliver the digital transformation the world is demanding.

The last decade bears testament to the industry's ability to adapt and evolve. Expect more creativity and growth in 2025.

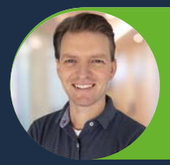
Our Authors

Scott Smyth
CEO & Group Founder

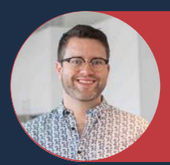
Joe Cusick
Group COO

Mark Smith
Group Key Account Director

Peter Alexander
Director - EMEA



Pieter Schaap
Group Development Director



Robert Kim
CEO - Americas

Sophie Smith
Director - Americas

Global data centre specialists

Soben is the industry leader in innovative data centre construction consultancy. Our global data centre specialists provide construction consultancy solutions to the world's leading data centre providers and tenants. Our services range from cost, project and programme management to strategic advice around sustainability, procurement and risk.

To date Soben has delivered over $18 billion and 5000 MW of projects across six continents. We are currently working with the global leaders in hyperscale and colocation data centre development on some of the world's largest, most complex schemes.

About Soben

Soben offers something different: world-class construction consultancy, paired with hands-on commercial experience.

We increase certainty in our clients' investments through cost, schedule, risk, and project management. With a track record of successfully delivering major construction projects, we pride ourselves on going the extra mile. And we always deliver on our promises.

An obsessive commitment to excellence, and forensic attention to detail are the cornerstones of our culture. They're how we help our clients deliver on time, on budget and with certainty, every time.

Soben
We're a people business

Soben

We're a people business

Sources

1 McKinsey & Company. "AI Power: Expanding Data Center Capacity to Meet Growing Demand." McKinsey & Company, https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/ai-power-expanding-data-center-capacity-to-meet-growing-demand.
2 "ECL Says It Will Build a 1GW Hydrogen-Powered AI Data Center in Texas with Lambda as Its First Tenant." Data Center Dynamics, https://www.datacenterdynamics.com/en/news/ecl-says-it-will-build-a-1gw-hydrogen-powered-ai-data-center-in-texas-with-lambda-as-its-first-tenant/.
3 "Data Centers Tap Pipelines for Onsite Natural Gas Generation." Power Engineering, https://www.power-eng.com/on-site-power/data-centers-tap-pipelines-for-onsite-natural-gas-generation/.
4 "Gas-Fired Generation Data Centers in MISO: Moeller." Utility Dive, https://www.utilitydive.com/news/gas-fired-generation-data-centers-miso-moeller/732618/.
5 "Google's Journey Towards Carbon-Free Data Centres." Energy Digital, https://energydigital.com/technology-and-ai/googles-journey-towards-carbon-free-data-centres.
6 Climate Neutral Data Centre Pact, https://www.climateneutraldatacentre.net/.
7 "Dubai's Green Data Center Breaks Guinness World Records." Wired Middle East, https://wired.me/science/dubais-green-data-center-guinness-world-records/.
8 "Google Breaks Ground on Norway Data Center." Data Center Dynamics, https://www.datacenterdynamics.com/en/news/google-breaks-ground-on-norway-data-center/.
9 "Google Expands Data Centre Footprint with Finnish Land Deal." Data Centre Magazine, https://datacentremagazine.com/articles/google-expands-data-centre-footprint-with-finnish-land-deal.
10 "Spain Sets New 2030 Solar Target of 76 GW." PV Magazine, 25 Sept. 2024, https://www.pv-magazine.com/2024/09/25/spain-sets-new-2030-solar-target-of-76-gw/.
11 "Aragon Primed to Become Europe's New Data Centre Hub." fDi Intelligence, https://www.fdiintelligence.com/content/news/aragon-primed-to-become-europes-new-data-centre-hub-83944.
12 "Seven Consortia Selected to Establish AI Factories to Boost AI Innovation in the EU." Digital Strategy – European Commission, https://digital-strategy.ec.europa.eu/en/news/seven-consortia-selected-establish-ai-factories-which-will-boost-ai-innovation-eu.
13 "Renewables on the Rise in Arizona: Solar and Wind Generation Grew by 187% Over the Past Decade." Environment America, https://environmentamerica.org/arizona/center/media-center/renewables-on-the-rise-in-arizona-solar-and-wind-generation-grew-by-187-over-past-decade.
14 "Ørsted Commissions Hybrid Solar Plant in Arizona Tied to Meta Data Center." Data Center Dynamics, https://www.datacenterdynamics.com/en/news/orsted-commissions-hybrid-solar-plant-in-arizona-tied-to-meta-data-center/.
15 "Google in South Carolina." Capacity Media, https://www.capacitymedia.com/article-google-south-carolina.
16 "Amazon Signs Deals to Invest in Nuclear SMRs to Power Data Centers." Data Center Dynamics, https://www.datacenterdynamics.com/en/news/amazon-signs-deals-to-invest-in-nuclear-smrs-to-power-data-centers/.
17 "Amazon Buys Nuclear-Powered Data Center from Talen." American Nuclear Society, https://www.ans.org/news/article-5842/amazon-buys-nuclearpowered-data-center-from-talen/.
18 "Meta Launches Nuclear Power RFP, Targets 14GW for Data Centers." Data Center Dynamics, https://www.datacenterdynamics.com/en/news/meta-launches-nuclear-power-rfp-targets-14gw-for-data-centers/.
19 "Three Mile Island Nuclear Power Plant to Return as Microsoft Signs 20-Year 835MW AI Data Center PPA." Data Center Dynamics, https://www.datacenterdynamics.com/en/news/three-mile-island-nuclear-power-plant-to-return-as-microsoft-signs-20-year-835mw-ai-data-center-ppa/.
20 "Data Centers Driving Oklo's Nuclear Project Pipeline." Power Engineering, https://www.power-eng.com/nuclear/data-centers-driving-oklos-nuclear-project-pipeline/.
21 "In Wyoming, Bill Gates Moves Ahead with Nuclear Project Aimed at Revolutionizing Power Generation." Power Engineering, https://www.power-eng.com/nuclear/in-wyoming-bill-gates-moves-ahead-with-nuclear-project-aimed-at-revolutionizing-power-generation/.
22 "Advanced Nuclear Technologies: Small Modular Reactors (SMRs)." Gov.uk, https://www.gov.uk/government/publications/advanced-nuclear-technologies/advanced-nuclear-technologies#small-modular-reactors-smrs.
23 "Revitalising Nuclear: The UK Can Power AI and Lead the Clean Energy Transition." Tony Blair Institute for Global Change, https://institute.global/insights/climate-and-energy/revitalising-nuclear-the-uk-can-power-ai-and-lead-the-clean-energy.
24 "Optimizing Data Center Efficiency with Direct-to-Chip Liquid Cooling." Data Center Dynamics, https://www.datacenterdynamics.com/en/opinions/optimizing-data-center-efficiency-with-direct-to-chip-liquid-cooling/.
25 "AWS Unveils Next-Gen Data Centres for AI Computing Demands." Data Centre Magazine, https://datacentremagazine.com/articles/aws-unveils-next-gen-data-centres-for-ai-computing-demands.
26 "Two-Phase Liquid Cooling: The Future of High-End GPUs." IDTechEx, https://www.idtechex.com/en/research-article/two-phase-liquid-cooling-the-future-of-high-end-gpus/31999.
27 "Microsoft Adopting Direct-to-Chip Liquid Cooling, Exploring Microfluidics." Data Center Dynamics, https://www.datacenterdynamics.com/en/news/microsoft-adopting-direct-to-chip-liquid-cooling-exploring-microfluidics/.
28 "Female-Led Swiss Startup Apheros Raises $1.85M to Cool Down Data Centres Sustainably." Tech Funding News, https://techfundingnews.com/female-led-swiss-startup-apheros-raises-1-85m-to-cool-down-data-centres-sustainably/.
29 "Rechenzentren und Abwärme: Ein Überblick Über die Gesetzlichen Vorgaben zur Abwärmenutzung." Bird & Bird, https://www.twobirds.com/en/insights/2024/germany/rechenzentren-und-abwaerme-ein-ueberblick-ueber-die-gesetzlichen-vorgaben-zur-abwaermenutzung.
30 "Meta and Alphabet's X Developing Direct Air Capture Systems Using Data Center Waste Heat." Data Center Dynamics, https://www.datacenterdynamics.com/en/news/meta-and-alphabets-x-developing-direct-air-capture-systems-using-data-center-waste-heat/.
31 "Amazon Web Services Data Centers in the US." About Amazon, https://www.aboutamazon.com/news/aws/amazon-web-services-data-centers-us.
32 "AI Opportunities Action Plan." Gov.uk, https://www.gov.uk/government/publications/ai-opportunities-action-plan/ai-opportunities-action-plan.
33 -"How AI Is Driving Innovation and Growth in Data Centers." Data Center Dynamics, https://www.datacenterdynamics.com/en/opinions/how-ai-is-driving-innovation-and-growth-in-data-centers.

Soben

Get in touch

Key Contacts

Andrew Gallacher
Senior Director, EMEA
andrew.gallacher@sobencc.com

Joe Cusick
Group COO
joe.cusick@sobencc.com

Kevin Carr
Managing Director – Australia
kevin.carr@sobencc.com

Pieter Schaap
Group Development Director
pieter.schaap@sobencc.com

Robert Kim
CEO - Americas
robert.kim@sobencc.com

Scott Smyth
Founder & Group CEO
scott.smyth@sobencc.com