KAO DATA

Critical National Infrastructure

UK DATA CENTRES: THE NEXT STEPS NEEDED TO DRIVE THE UK'S DIGITAL TRANSFORMATION

If data is the lifeblood of the modern economy then data centres are the beating heart that keep it flowing.

The UK is leading the way in Europe on data centre provision, helping the country make the most of innovative technologies such as cloud storage and AI which will reshape the way we work, rest and play for centuries to come.

We live in an increasingly digitised world. The internet, smartphones and cloud computing have revolutionised our lives, yet as recently as 2020 data centres were "the most important industry you've never heard of"[1]. The Covid pandemic changed all that, bringing data centres to public awareness thanks to the crucial part they played. Data centres kept us connected throughout the pandemic, providing the infrastructure required to shift to remote working; to keep in touch with friends and family; even providing crucial support for vaccine research[2] and development.

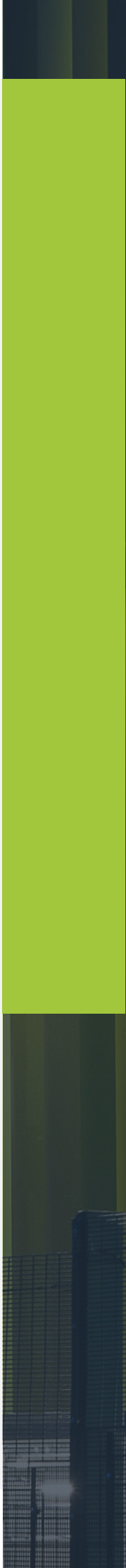
Unsurprisingly given their centrality to modern life, data centres have recently been designated as Critical National Infrastructure (CNI)[3], putting them on the same footing as energy, water and emergency services infrastructure. The designation brings government support in preparing for and weathering emergencies and attacks, safeguarding our data when we need it most. The only surprise is how long it took for the designation to come!

The government has also underscored its commitment to placing Britain at the forefront of the digital age with its AI Opportunities Action Plan, which calls for investment in infrastructure and in the people who will power the digital revolution forward.

We welcome both of these developments wholeheartedly, but what does all of this mean in practice? What does the government need to do for the UK to truly become "an AI maker, not an AI taker"? In this white paper, we look at six recommendations from the Kao Data team. Each recommendation focusses on a specific action the government can take to help raise the data centre industry to the next level, putting Britain on the best possible footing for success.

[1] The UK Data Centre Sector: The most important industry you've never heard of. May 2020. Tech UK
[2] https://digital.nhs.uk/blog/tech-talk/2021/the-tech-behind-the-jab
[3] https://www.gov.uk/government/news/data-centres-to-be-given-massive-boost-and-protections-from-cyber-criminals-and-it-blackouts

AS THE UK STEPS INTO A NEW ERA AT THE FOREFRONT OF THE TECHNOLOGICAL REVOLUTION, DATA CENTRES HAVE NEVER BEEN MORE IMPORTANT. TOGETHER, INDUSTRY AND GOVERNMENT CAN WORK TO SAFEGUARD THIS CRUCIAL INDUSTRY FOR TOMORROW.



UK Data Centres in Numbers

#1

The **UK leads the way** in Europe for colocation data centre provision[4]

£13.51bn

in **revenue** in 2024[6]

514

Data Centres currently in the UK[7]

89%

of data centre **planning applications** given the green light[8]

£4.7bn

in **GVA** annually to the UK economy on average[5]

£640m

in **tax** to the exchequer[2]

43,500

jobs in the UK economy[2]

[4] https://brightlio.com/data-center-stats/#pp-toc-huja89rng0qk-anchor-0
[5] Foundations for the future: How data centres can boost UK economic growth. November 2024. TechUK
[6] https://www.statista.com/outlook/tmo/data-center/united-kingdom?currency=GBP
[7] https://www.statista.com/statistics/1228433/data-centers-worldwide-by-country/
[8] Across 20 UK cities over the last five years. https://www.onnecgroup.com/2024/11/13/uk-data-centre-growth/

Create a Joined-Up Data Centre Strategy for the UK

DOUG LOEWE
CEO, Kao Data

THE PROBLEM:

While the UK government recently designated data centres as Critical National Infrastructure (CNI)[9], as a nation, we still have no holistic, joined-up strategy for the placement or zoning of new data centres. Instead development has been sporadic, led by operators and especially the American hyperscale giants. Local Authorities are often in the dark about the role data centres play, what they need, and the benefits they can bring to a region, and are understandably nervous that their only source of information is the industry itself. This is in contrast to neighbouring countries like France, Germany and the Netherlands who have strategic frameworks for data centre developments, helping streamline planning decisions and supporting local government on essential infrastructure requirements.

THE SOLUTION:

The UK urgently needs an objective, impartial strategy for data centre placement; a one-stop document that local authority planners can pull down off the shelf and consult when considering an application for a new data centre. Ideally the document would allow planners to understand what a data centre is, and what its likely requirements will be in terms of land, water, power and other essential infrastructure. It will lay out the benefits in terms of jobs and investment into the local economy, but also list potential drawbacks, allowing planners to make an informed decision on whether a new data centre is right for their area. Furthermore, the document should take a holistic look at the data centre industry alongside associated sectors, to identify zones for data centre construction, and likewise, potential exclusion zones such as greenbelt areas.

However, one document cannot be seen as the end of the story. Too often, responsibility for data centres falls between government departments and/or NGOs like techUK. The outcome is chaos whenever the inevitable bumps in the road occur. For that reason, the government would be well placed to establish a body, with teeth, that is dedicated to keeping data centres and AI plans alive, structured and delivered. By steering a long-term vision for the sector, the organisation would ensure Britain's success as a tech and AI leader.

[9] https://www.gov.uk/government/news/data-centres-to-be-given-massive-boost-and-protections-from-cyber-criminals-and-it-blackouts
[10] https://www.datacenterdynamics.com/en/news/microsoft-to-invest-716bn-in-new-data-centers-in-aragon-spain/
[11] https://www.reuters.com/technology/microsoft-invest-716-bln-new-data-centres-northeastern-spain-2024-06-14/
[12] https://www.datacenterdynamics.com/en/news/box2bit-plans-34bn-data-center-in-zaragoza-spain/
[13] https://www.gov.uk/government/publications/ai-opportunities-action-plan/ai-opportunities-action-plan

Providing Local Authorities with the low down on data centres would enable them to decide whether the industry is one they want to court for their area. Zaragoza in Aragon, Spain, has done just that, and in the last few months has been rewarded with circa €18 billion[10,11,12] of investment by companies including Microsoft and Blackstone. Simply having a joined-up strategy would make the process in the UK so much easier and more efficient for all sides.

The government is already committed to creating a long term plan for the UK's AI Infrastructure needs. Its AI Opportunities Action Plan[13] calls for that work to be complete by summer 2025. With that work already underway, there is no better time to put in place a joined-up strategy for data centre placement, under the auspices of a dedicated organisation that can cut through the hysteria and see data centre technology advancement for what it is.

Doug Loewe CEO, Kao Data

Use Data Centres to Drive the Transition to Renewable Energy

MATTHEW HARRIS
CFO, Kao Data

THE PROBLEM:

It's an unavoidable fact that data centres are large energy users, and that as the industry grows, the energy requirement is heading ever higher. National Grid estimates show that the UK data industry currently utilises about one percent of UK energy output, and that figure is set to rise exponentially to around six percent[14] by the end of the decade. The increase in AI use alone will create an energy demand equivalent to an extra nuclear power station[15]. At the same time, the UK government has committed[16] to slashing greenhouse gas emissions by 81% over the next decade, leading to calls for a radical overhaul[17] in the nation's energy infrastructure and an increased focus on power-hungry industries. How can we turn data centres' power demand to our advantage in the fight against climate change?

THE SOLUTION:

A recent report by the National Energy System Operator (NESO)[18] on achieving clean power for Great Britain by 2030 identified strategic use of data to unlock flexibility of both demand and supply, across domestic and commercial sectors. However, we believe that viewing data *only* as a tool for driving efficiency, divorced from the hardware that carries and stores it, is a major strategic error.

Far from seeing data centres as being at odds with the UK's sustainable energy targets, data centres can and should be regarded as a catalyst for the UK's transition to sustainable energy. Data centre developments have the ability to effectively underwrite investment in renewables by guaranteeing to purchase 'green' energy at industrial scale and on long-term, fixed contracts.

Off-site and on-site Power Purchase Agreements (PPAs) are already proving to be effective[19]drivers of cross-industry co-operation between data centre operators and the renewable energy industry. On-site PPAs typically[20] fall within the 500kW to 3MW range.

Off-site includes solar arrays, and windfarms. NESO identifies offshore wind as the "bedrock" of Britain's future clean energy system, but admits that to reach the goal of clean energy by 2030, the UK must expand its offshore wind capacity faster than ever before. Data centres can provide the large-scale contracting projects required to backup mass deployment of offshore and onshore wind.

Furthermore, renewable energy provision doesn't have to mean solar and wind. The long-term, steady-state energy demands of a data centre make pilot projects for small modular nuclear reactors eminently feasible, which could place the UK at the cutting edge of the global green economy.

[14] https://www.herbertsmithfreehills.com/insights/2024-01/decarbonisation-digitalisation-and-data-centre-debt-decoding-the-key-data-centre-financing-considerations
[15] https://www.telegraph.co.uk/business/2025/01/13/starmers-ai-dreams-will-need-an-extra-nuclear-power-station/
[16] https://www.bbc.com/news/articles/cx2ny8zndpxo
[17] https://www.itpro.com/infrastructure/data-centres/a-super-supergrid-ceo-of-uk-power-network-says-legacy-infrastructure-requires-major-overhaul-to-meet-soaring-data-center-energy-demandsClean Power 2030: Advice on achieving clean power for Great Britain by 2030. September 2024. National Energy System Operator.

We've already seen in Dublin[21] and Amsterdam[22] what can happen when energy provision fails to keep up with demand: operators have suffered a slow-down in production, moratoriums on further development have been issued and expansion plans put on hold – all due to a limited horizon in terms of power availability.

Amsterdam presents a particularly stark warning. Its data centre market was growing at a rate of 10-15% annually, until in 2019 the municipality placed a year long moratorium on new developments on 20% of the city. That was enough for international firms to look elsewhere to develop their capacity, and the city has yet to recover its previous pace of growth.

Worryingly, we're already seeing the same issue in parts of the UK, most notably Slough and West London. If we are to avoid the same fate we must start thinking strategically about supporting and underpinning energy provision for the next generation of data centres.

Ultimately, creating designated data centre planning zones alongside, and linked to, renewable energy developments is not only something that the largest tech companies in the world are proactively seeking out, but is an opportunity to catalyse economic growth while accelerating the green transition.

Matthew Harris CFO, Kao Data

[18] https://www.computerweekly.com/feature/Datacentre-power-purchase-agreements-Are-they-the-right-way-to-lower-emissions
[19] https://www.datacenterdynamics.com/en/analysis/everything-data-center-operators-need-to-know-about-power-purchase-agreements-ppas/
[20] https://www.datacenterdynamics.com/en/analysis/everything-data-center-operators-need-to-know-about-power-purchase-agreements-ppas/
[21] https://www.computerweekly.com/feature/Dublin-in-distress-Power-supply-issues-threaten-growth-of-Europes-second-biggest-datacentre-hub
[22] https://nltimes.nl/2021/06/24/amsterdam-power-grid-maximum-capacity-two-areas

Ensure Geographic Compute Diversity Across the UK

THE PROBLEM:

Currently, more than 80 percent of the UK's data centres are located in and around London[23] and more specifically Slough and West London. For an industry centred around risk management, the irony is that the UK's data centre 'eggs' are all in one basket, which makes little sense from a resilience point of view, let alone the security of our new 'critical national infrastructure'. The issue is also starving the rest of the UK of much-needed economic investment and high tech development.

THE SOLUTION:

The UK needs to ditch the London centric view and follow our neighbours France (Paris, Marseille and Lyon) and Germany (Frankfurt, Berlin, Cologne and Munich) and Spain (Madrid, Zaragoza and Barcelona) in rapidly diversifying our data centre map.

The government's own AI Opportunities Action Plan correctly identifies the need for 'AI Growth Zones' (AIGZs)[24], streamlining planning and accelerating the provision of green energy to ensure that the AI data centre market is well placed to secure investment. Many former industrial heartlands of the UK – South Wales, the Midlands, Greater Manchester and the North East - now have under-utilised energy grids, prime brownfield land ready to develop, and a readily available workforce. With connectivity improving across the UK and hollow-core fibre reducing latency requirements, the UKs regions have never been in a better position to benefit from the data centre industry's boom by providing locations for AIGZs.

The data centre industry has already delivered £4.5 billion in Gross Value Added to the UK economy, and is on track to deliver ten times[25] that amount over the next decade. Yet figures like those are, to some extent, abstract. In practical, boots-on-the-ground terms, each and every large data centre built in the UK requires an army of professionals, from architects, lawyers, and accountants to engineers, construction workers, and operators. The build alone can employ upwards of a thousand individuals; over the 25 year lifespan of the centre, hundreds more job opportunities are created in the wider tech ecosystem through customers, suppliers and partners. As many as nearly 60,000 jobs are expected to be created by data centres within the next decade[26] alone. For areas which have suffered the loss of manufacturing and other heavy industries, data centres can provide good high net-worth, future proof employment opportunities.

SPENCER LAMB
CCO, Kao Data

[23] https://www.cbre.co.uk/insights/books/uk-mid-year-market-outlook-update-2022/09-data-centres
[24] https://www.gov.uk/government/publications/ai-opportunities-action-plan/ai-opportunities-action-plan
[25] https://uk.finance.yahoo.com/news/data-centres-uk-economic-powerhouse-115624083.html
[26] Foundations for the future - How data centres can boost UK economic growth. November 2024. TechUK

“Any way you cut it, pooling the nation’s data centres in the south east, where space is already at a premium, makes little sense. If the government is looking for an easy win on economic regeneration in stagnant areas, one of the best moves it could make would be to designate data centre planning zones alongside AI Growth Zones across the UK. Encouraging data centres to be developed outside of the Slough and west London ‘bubble’ more easily would draw substantial amounts of private investment and high-net worth jobs into the areas that most need them, and provide greater resiliency and security to the UK data centre industry as a whole.”

Spencer Lamb CCO, Kao Data

Prioritise Brownfield Land for New Data Centres Over Green-Belt

PETE JUDSON
COO, Kao Data

THE PROBLEM:

One of the first acts by the incoming Labour government was to re-open the planning process for two large data centre developments previously refused permission. While this would seem to be a win for the industry, the proposed sites[27], (in Buckinghamshire, and Hertfordshire), were turned down by the local authorities in large part due to concerns over building on green belt land – that is, the zone around London designed to prevent urban sprawl from encroaching into neighbouring towns and villages.

A perception that data centres are contributing to urban sprawl in the south east, and the idea that they can spoil green belt land, is starting to see communities protesting against their development. Public awareness of the data centre industry is still nascent in the UK. As data takes on an ever more central role in the nation's economic, innovative, and cultural life, positive perceptions of the industry are crucial for gaining and holding public support for the industry. Green belt development around London flies in the face of this effort on two fronts: casting the industry as a coloniser of green spaces, and as a driving force behind the 'London v's Rest of UK' economic divide.

THE SOLUTION:

Building on green belt land is a backward step, especially when there is ample brownfield (lots left vacant by industries whose life spans have drawn to a natural end) around London and across the rest of the UK that can be re-purposed. Not only does this avoid obvious battles with local communities and those who understandably wish to protect the UK's green spaces, it also provides much-needed rejuvenation for areas which have seen an exodus of industry.

[27] https://www.datacenterdynamics.com/en/news/rachel-reeves-two-rejected-london-data-center-plans-could-get-green-light/

Data centres offer so much opportunity for the UK. The compute power they house underpins our growing digital economy and gives researchers huge scope to innovate across a variety of industries – from AI to vaccines, and everything in between, the possibilities are endless. Given the amount of viable brownfield land out there, it's a no-brainer to side-step the potential public relations disaster that green belt development would provoke.

Let's ensure that we reap the rewards data centres can bring, by keeping the public on site and the environment protected.

Pete Judson COO, Kao Data

Invest in The Next Generation of Data Centre Talent

KALAY MOODLEY
CPO, Kao Data

THE PROBLEM:

In the UK, one in five data centre professionals are over the age of 55. Globally, research suggests that as much as half of all data centre engineers may retire within the next three years, yet in the same period, some 300,000 more engineers will be required[28].

There are multiple reasons for the shortage: demand for digital infrastructure and modular scaling has led to rapid growth within the sector, and at the same time the sector is also growing ever more complex, requiring increasingly specialist expertise. At the other end of the pipeline, education is failing to keep up with the rapid pace of change and equip young people for work within digital industries, and the industry has suffered a lack of funding for specific training or re-training from declining industries. Additionally, the UK has not yet fully embraced global talent[29]. The consequence is that the UK, like many countries, is facing a tech talent crunch which threatens to hold up data centre developments, and ultimately risk the industry's growth potential[30].

THE SOLUTION:

In the short term, the skills gap can be bridged by developing talent[31] from among the ranks of existing data centre construction workers, engineers, and operatives. The short term gap can also be met by creating innovative visa and relocation packages, increasing diversity in the field by bringing in global talent. In the longer term, however, the UK needs to get on firmer footing, creating a clear pathway for young people to enter the industry, particularly for girls and minority ethnic candidates who might not see data as a viable career path.

That requires outreach[32] from the data centre industry to educational facilities, to work with them on developing educational programs that can lead to a career within data centres. But it also requires investment by public and private entities alike into education at all levels to create training schemes, graduate entry schemes, and apprenticeships. There are a number of excellent, isolated 'lighthouse' projects like the Digital Futures programme run at UTC Heathrow and government agencies are well placed to build on these and create a joined-up framework within the industry. This will help reinforce the good work that is taking place and then feed that information into the wider education sector, encouraging it to develop pilot schemes and training projects in tandem with the data centre industry.

[28] https://dataxconnect.com/insights-5-reasons-for-the-skills-shortage/
[29] https://www.sobencc.com/news/powering-growth-in-data-centres/
[30] https://datacentrereview.com/2024/03/the-continuing-impact-of-the-skills-shortage/
[31] https://datacentrereview.com/2024/11/fighting-the-skills-shortage-war-in-the-right-way/
[32] https://www.telehouse.net/blog/skill-shortages-in-the-data-centre-industry/

“Given successive governments’ state commitment to keeping Britain at the forefront of the digital revolution, the lack of investment in educating data workers of the future seems to be quite the oversight. As a nation, we must take firm steps to identify and foster talent wherever it’s found. That means helping young people to enter and stay within the industry for years to come, and tapping new pools of talent both at home and abroad.”

Kalay Moodley CPO, Kao Data

A group of Year 12 and 13 students from the UTC Heathrow ‘Digital Futures’ programme visiting Kao Data’s Harlow campus.

Invest in AI to re-discover the UK's position as a global AI leader

PAUL FINCH
CTO, Kao Data

THE PROBLEM:

The UK has a tremendous legacy in technology innovation, providing the bedrock of the digital revolution: the internet, the laptop, even the iPod[33], all had their roots in British ingenuity. We also have more than our fair share of unicorns:[34] Deliveroo, Wise, and Revolut all call the UK 'home'. Little surprise, then, that the UK is one of only three countries globally to boast a tech industry worth more than $1 trillion[35].

Aside from a native ability to tinker and come up with unique, world-changing ideas, we have some of the world's leading universities, and a strong financial services sector. What we're lacking, it seems, is the cultural drive to think big. As James Dyson said: "UK culture doesn't celebrate the entrepreneur."[36]

Whispering our successes has led global tech giants like NVIDIA to overlook the UK and Europe, as they are instead drawn to flashier regions like the USA, the Far East and the Middle East which aren't afraid to boast of their advantages. But we are also victims of that more timid mentality, seemingly afraid to make the bold investments in AI infrastructure required to draw world-beating companies to our door.

THE SOLUTION:

We agree with the government that the UK "must be an AI maker, not just an AI taker". We do "need companies at the frontier that will be our UK national champions." But what does that look like in practice?

Over in the US, OpenAI has pitched the creation of 'AI Economic Zones,' and the passage of a 'National Transmission Highway Act' to put in place the connectivity infrastructure required to make full use of AI - alongside the energy network required to power it. "AI presents an unmissable opportunity to revitalise the American Dream and reindustrialise the US," the pitch reads.[37]

The planned AI Growth Zones, supported by the new 'UK Sovereign AI' unit dedicated to identifying and financially supporting promising start-ups will go a long way toward creating the conditions required for AI to flourish in the UK. But they must be supported by adequate infrastructure – across the country, not only in the London-Slough corridor – and the energy to run them.

Until we invest in infrastructure, our centres of academic excellence such as Oxford and Cambridge will serve only to train up world-leading talent, along with a path that leads this talent directly to warmer, sunnier nations that can provide a well-equipped sandbox to play in, and high salaries to match.

"The culture within the UK is starting to shift. Massive Bio, CyLock, and Bottobo, all winners of The Department for Business and Trade's 'Unicorn Kingdom Pathfinder Awards' in 2024[38], are prime examples of startups that have scaled within the last decade without relocating – a feat which would have been impossible just a few years ago.

The planned UK Sovereign AI unit is a welcome step forward in creating the right environment for Britain's AI industry to maintain its position as a world leader. Yet it is not enough to invest only in world class entrepreneurial talent; we need world class infrastructure, including a robust energy grid, if Britain is to lead the way on AI."

Paul Finch CTO, KTO Data

[33] https://www.techradar.com/news/world-of-tech/15-best-british-tech-inventions-ever-548346
[34] https://www.beauhurst.com/research/unicorn-companies/
[35] https://www.bbc.co.uk/news/business-67921461
[36] https://www.ft.com/content/5466b46d-9cb4-479f-bf5a-1bd15783eb22
[37] https://media.datacenterdynamics.com/media/documents/OpenAI_Blueprint-DCD.pdf
[38] https://www.gov.uk/government/news/government-backs-next-generation-of-tech-scale-ups

The Future is Bright

DAVID BLOOM
Chairman, Kao Data

The UK has every right to be proud of its achievements in creating a modern digital economy. We have a long list of inventions to our name which have been instrumental in building the digital revolution: pioneering optical fibre, internet coding and web browsers, the first laptop, and lately, advances in AI.

Like the government, we share the ambition to see Britain "step up", and shape the digital revolution "rather than wait to see how it shapes us". As the economy is increasingly cloud-based and digitally accessed, and with the rollout of AI, data centres will be to the digital age what steel mills were to the industrial age. They are as essential a part of our national infrastructure as electricity stations, or transport hubs.

Too long forgotten as 'the most important industry you've never heard of,' it is time for data centres to step into the light and take their rightful place as a cornerstone of the modern British economy. That means investment, both private and public, into buildings, compute, and people, now and into the future.


THE WORLD IS RAPIDLY MOVING INTO A NEW AGE.
THE TIME TO GET DATA CENTRE POLICY RIGHT, IS NOW.

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