AKERLOF

Consumption to contribution

The role of data centres in creating sustainable value

Executive summary

The UK's data centre sector has evolved from niche asset class to critical infrastructure, accelerated by surging digital demand and policy reform that elevates facilities to "nationally significant" status. This growth delivers clear national benefits: boosting productivity, tax receipts, and global competitiveness, but it also generates local pressures. Concentrated electricity loads and water demand are straining systems in parts of London and the South East, testing the resilience of local communities.

This report explores how to reconcile national and local priorities by applying the Four Capitals Framework - Human, Social, Produced, and Natural - to assess the full spectrum of impacts. This approach provides a balanced lens for assessing how data centres create, enable, or consume different forms of value, highlighting where practice is working well, where frictions arise, and how delivery choices can be shaped to tilt developments towards a net positive contribution.

At the national level, the sector's benefits are well evidenced: expanding market value, strong gross value added, high-quality jobs, and tax revenue under supportive conditions. Locally, the picture is more nuanced. Efficiency gains are reducing electricity per unit of compute, yet in West London, data centre demand has represented a competing priority for grid connections needed for housing and business growth. Sustainability credentials are improving rapidly, particularly in water management, where more than half of UK facilities now operate with water-free or closed-loop systems. Nevertheless, historical reliance on evaporative cooling has left a legacy of concern that still shapes public perception.

Not all data centres are equal, but public perception rarely makes that distinction, and that matters. Perception shapes planning debates, influences consent decisions, and can generate friction between developers, regulators, and communities. Whilst other forms of critical infrastructure - energy networks, utilities, transport -are granted legitimacy as enablers of wider ecosystems, data centres, by contrast, are not yet afforded that same courtesy.

This report takes a broader, evidence-led view. The question it tackles is not whether data centres are "good" or "bad," but how siting, design, and delivery shape the balance of their impacts - economically, socially and environmentally. Through the Four Capitals framework, shown opposite, we can better understand these trade-offs and opportunities.

Delivering these outcomes is complicated by the sector's fragmented delivery model: operators specify and run plant, tenants drive IT load and risk appetite, while responsibility for grid, water, heat and highways works depend upon third parties such as utilities and councils, working on their own timetables. Many determinants of sustainable value therefore lie outside the immediate control of the project team, from siting and regulatory interpretation to infrastructure lead times, security constraints, procurement and value-engineering pressures, CAPEX–OPEX misalignment, and stewardship funding. The implication is not to over-promise but to design for reality: front-load coordination, align programmes with external providers, and budget for the operational tail so that benefits endure beyond commissioning.

In short, sustainable value should be treated as part of core infrastructure delivery, not an add-on. When embedded from the outset, data centres can operate as both AI factories and civic assets, enabling national growth while leaving host places demonstrably better off. When neglected, community opposition hardens, approvals slow, and projects consume more political capital than they create.

Human capital

Data centres run with small, highly skilled operational teams, meaning most job opportunities arise during construction: temporary, but significant. Lasting benefit comes from creating clear pathways into technical roles through apprenticeships, accredited retraining, and career progression, while broadening participation beyond the current narrow demographic. This requires an evidence-led local needs analysis to identify skill gaps and targeted investment in local skills and supply chains, particularly in critical service areas such as electrical trades, cooling maintenance, and fibre splicing.

Social capital

Local support depends on understanding and visible benefit. This means opening the "grey box": sharing data on water, energy, and environmental performance; making local commitments tangible; and delivering initiatives such as skills programmes, affordable heat from waste systems, or improved digital access. These should be shaped through structured collaboration with councils, utilities, SMEs, and charities, with governance and funding built into procurement and operational models.

Produced capital

Data centres can strengthen local infrastructure by co-funding or enabling assets like heat networks, substation upgrades, or staged grid capacity releases. To deliver real benefit, sustainable value must be tied directly to the business case so shared projects are both viable and prioritised. Opportunities exist to leverage a data centre's core capabilities to benefit the local area (e.g heat reuse, expanding fibre networks, etc) however such options need to be tested early given their nascent status and challenges.

Natural capital

Minimising environmental impact will remain a constant challenge as AI workloads drive total electricity demand upward. Efficiency is the first obligation: without it, even the best renewable PPAs only scale inefficiency. Strong levers include a brownfield-first approach to limit land-use impacts, siting facilities as multi-energy hubs to balance grid load and export waste heat, adopting water strategies that minimise potable consumption and disclose performance, deploying modern emissions controls with limited backup runtime, and delivering measurable biodiversity net gain backed by long-term stewardship.

Introduction

In less than a decade, the UK's data centre sector has evolved from a niche asset class to a critical component of national infrastructure. This transformation has been propelled by two converging forces:

- **Explosive growth in digital demand:** the rise of streaming, e-commerce, cloud services, and now AI workloads are driving UK computing demand, up by an estimated 15–20% annually.[1]
- **A step-change in planning status:** in 2024, government reforms reclassified data centres as "nationally significant" infrastructure, unlocking Development Consent Order (DCO) pathways, introducing a "Grey Belt" designation to relax certain Green Belt constraints, and embedding data centre expansion within the proposed AI Growth Zones policy framework.[2]

These policy shifts have catalysed a development surge: mega campuses, hyperscale hubs, and scattered edge sites in urban and rural fringes alike. CBRE forecasts London will see 183 MW of take-up in 2025 alone, a 58% jump on the previous year, while national projections expect market value to grow from around £8 billion today to more than £13 billion by 2032. Large-scale proposals are moving forward in Northumberland, Hertfordshire, and West London, while speculative builds continue in established clusters such as Slough, Didcot, and along the M4 corridor.

At a national level, the macro-economic case is strong. The sector contributes an estimated £4.7 billion in Gross Value Added (GVA) annually, supports over 43,000 jobs, and generates more than £640 million in annual tax revenues. Under supportive conditions, forecasts suggest GVA could reach £44 billion by 2035.

Yet at the local level, the picture is more complex. In West London, for example, data centre grid demand has delayed new housing connections. In water-stressed regions such as parts of Oxfordshire and Cambridgeshire, new hyperscale proposals have triggered concern over cooling water use. This tension is shifting the focus of planning debates:

> Do these facilities leave host areas genuinely better off, or do they absorb disproportionate resources while delivering limited direct benefit?

Understanding context

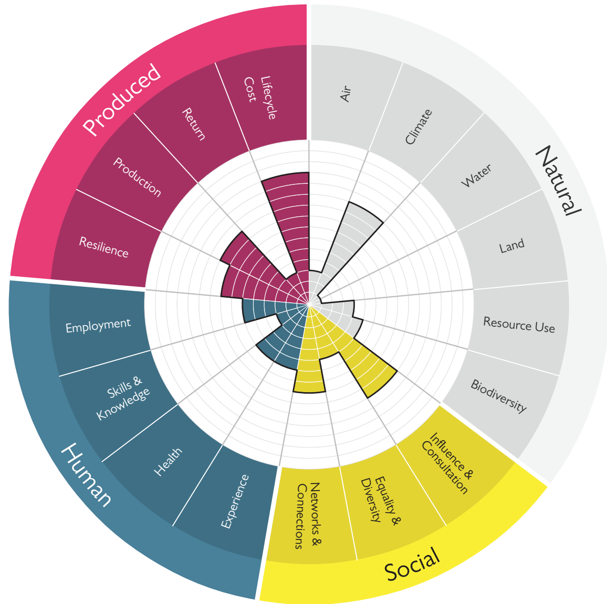
Place-based impact is shaped heavily by local context. A facility in a heat-network zone faces different trade-offs to one in a water-stressed catchment, or a grid-constrained cluster. The feasibility and scale of positive contributions depend on location, planning conditions, and local demand. Across the UK, two extremes are becoming visible:

- Some projects integrate with local economies, invest in skills, and co-fund and create shared infrastructure.
- Others operate largely in isolation, drawing heavily on public utilities and land without returning commensurate benefits.

Public perception tends to veer toward the latter, particularly where benefits are less visible or poorly communicated. That perception matters: it shapes planning debates, influences consent decisions, and can slow or derail development where communities feel left behind.

This report examines this spectrum to prompt reflection within the sector and to identify practical routes for ensuring more consistent, balanced, and sustainable outcomes.

Assessing sustainable value through Four Capitals Framework



To do this, we apply the Four Capitals Framework - Human, Social, Produced, and Natural - as a structured way to evaluate how data centres create, enable, or consume different forms of value.

The framework integrates environmental, social, and economic considerations within a single lens, allowing us to assess both the positive contributions and the trade-offs inherent in data centre development, recognising that facilities influence skills, infrastructure, communities, and ecosystems simultaneously.[3]

This framework is consistent with HM Treasury's Green Book principles for appraising costs, benefits, and wider impacts, making it well-suited to support planning decisions, socio-economic assessments, and investment appraisals for data centre developments.

By taking this broader view, the report recognises that the impact of a data centre cannot be captured by a single metric or judgement. Instead, it is the balance of tangible, verifiable gains and losses across these capitals that determines whether a facility is a net contributor or a net drain.

Through this lens, we do not treat data centres as inherently good or bad. Rather, we examine how location, governance, design, and operational practice can tip the balance towards shared prosperity. Drawing on case studies from both UK and internationally, we ask:

> How do we ensure that the "AI factories" of the future become not only symbols of global competitiveness, but also anchors of local resilience and prosperity?

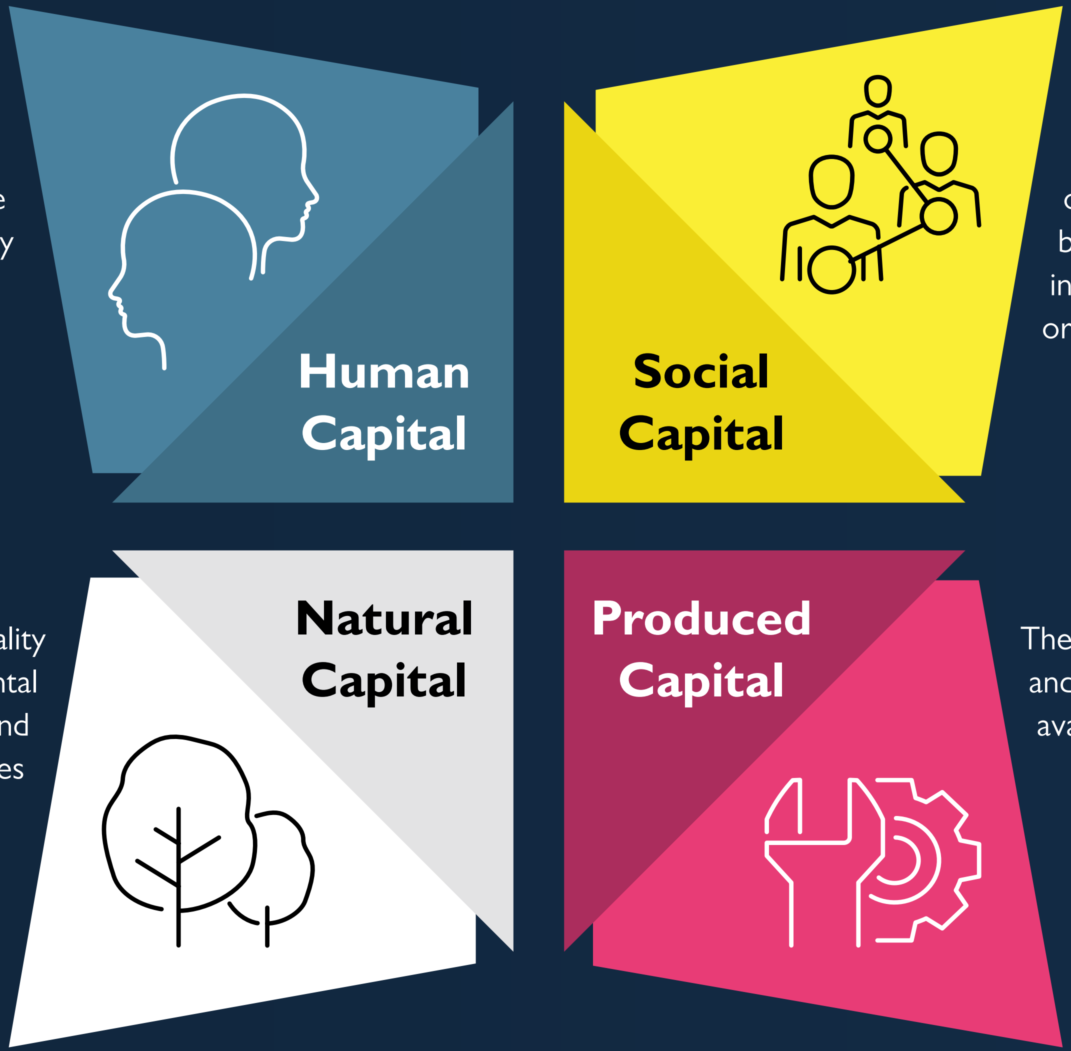
1 Newmark
2 The AI Growth Zones concept draws on precedents from Enterprise Zones and Freeports, blending targeted tax incentives, accelerated planning, and public–private infrastructure co-investment to stimulate sectoral growth.

3 We recognise there are other ways to assess value - including the National TOMs framework and the Social Value Model - but we have adopted the Four Capitals Framework to ensure consistency with HM Treasury's Green Book appraisal guidance.

Four Capitals Framework

The skills, health, and capacity of individuals in the community

The trust, cohesion, and legitimacy of relationships between people, institutions, and organisations



The stock and quality of environmental resources and ecosystem services

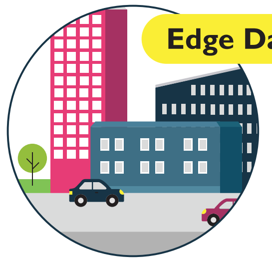
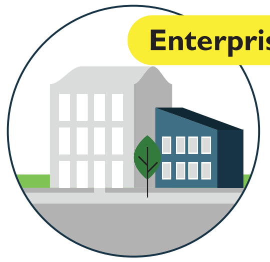
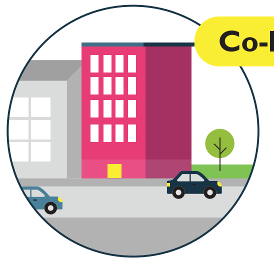
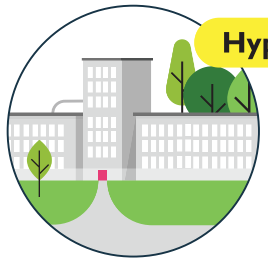
The physical, financial, and technological assets available locally

Map of data centres

With over 34 major facilities and continued expansion, Slough is widely considered as the second largest data centre hub in the world, surpassed by only Ashburn Virginia.

Types of data centres

The UK data centre market spans a spectrum of scales and operating models. The type of facility, its scale, and its business model all influence not only technical feasibility but also the potential for local economic integration, environmental co-benefits, and community engagement.

	Typical power	Business model	Heat recovery	Considerations
 Edge Data Centres	<1 - 3MW	Enterprise, Colocation	High	Urban locations, small-scale integration
 Enterprise / On-Prem	1- 30MW	Enterprise	Moderate - High	Depends on location and owner priorities
 Co-location	5 - 50MW	Single or Multi-tenant	High	Tenant IT ramp-up affects heat output, significant proportion of sites in London
 Hyperscale	30 - 100+MW	Cloud	Low-Moderate	Large-scale but typically remote locations

Delivery models vary widely, shaped by land ownership, financing, and tenant requirements. Common approaches include:

- **Powered shell on a long ground lease:** landlord secures the site, planning consent, and grid connection, then leases a basic building to the operator (e.g. Equinex in Slough with SEGRO)..
- **Developer–operator joint venture:** landlord partners with a specialist operator and pre-lets to a cloud provider on a long-term lease (e.g SEGRO's Park Royal JV with Pure DC).
- **Shell lease with operator fit-out:** landlord provides the building; operator installs technical systems before securing tenants (e.g GTR's Slough campus)
- **Freehold owner–operator:** common where power and land are available at scale.
- **Colocation REIT with investor freehold:** investor owns land/building; operator takes a very long lease (e.g. CBRE IM's acquisition of Digital Realty's Cloud House freehold)

These arrangements create a layered web of responsibilities. Landowners or SPVs typically sign planning obligations; operators control plant specification and operations; end users set IT load and cooling strategies; utilities deliver off-site connections. Each works to its own timetable, investment cycle, and regulatory framework.

Added to this are structural pressures that can pull parties apart: the drive for speed to market, which can sideline integration measures; security and operational secrecy in hyperscale environments, which can limit the data-sharing needed for joint infrastructure; confidentiality obligations in multi-tenant sites that restrict sharing of load profiles; misaligned investment horizons that weaken the case for long-lived shared assets; and fragmented regulation, which makes cross-sector coordination complex and slow.

Without early and deliberate coordination, these factors can lead to missed opportunities - for instance, heat recovery infrastructure that is technically viable but falls outside delivery windows. Well-designed agreements can mitigate this risk: planning conditions, lease "green clauses" for metering, data-sharing and connection readiness, and utility or highways agreements that stage capacity releases for housing, EV charging and local industry are all legitimate mechanisms however all these steps carry additional complexity, commercial implications and effort that need to be balanced with the overall value priorities.

The complexity of this landscape has two consistent implications for delivering sustainable value:

1. **Accountability can be diluted:** without clear, enforceable obligations, commitments to deliver wider economic, social, and environmental benefits risk falling between parties' priorities.
2. **Timing matters:** measures tied to construction, commissioning and operational phases need early alignment to avoid becoming impractical or unviable later.

Given this stakeholder complexity, a sustainable value strategy cannot be an afterthought. It must be woven into commercial planning and governance from the outset, from site selection and design decisions to procurement structures and operational models, if data centres are to maximise their long-term contribution across human, social, produced, and natural capital.

Human Capital

Human capital refers to the skills, knowledge and health capacity of people within a local community.

In the context of data centres, the critical question is not just whether jobs are created, but whether they are accessible, durable and well paid, with clear progression routes for a diverse, local workforce.[4] True additionality occurs when employment raises local capability, narrows inequality gaps, and pays at least competitively against local and sector norms, while supporting workforce wellbeing and, where possible, wider community health.

Employment

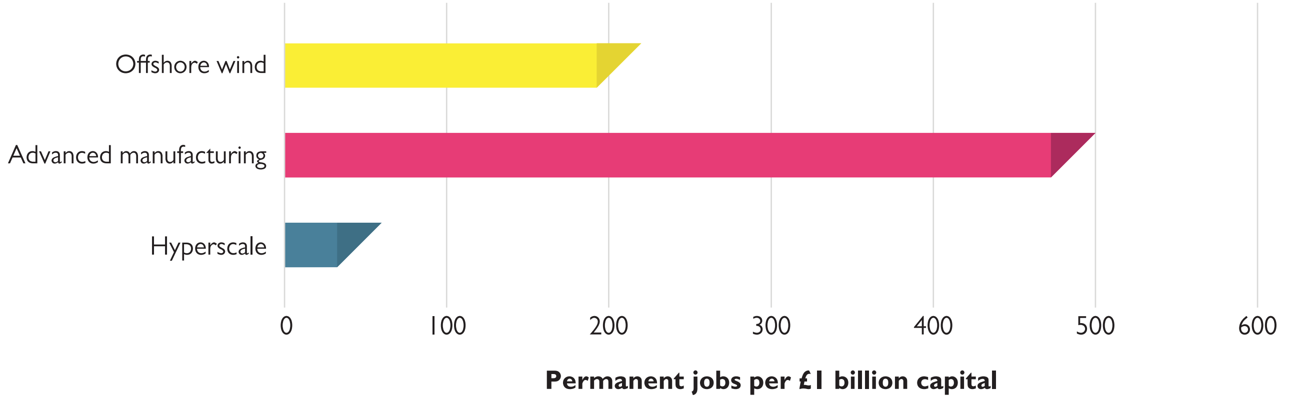
Data centres are capital-intensive rather than labour-intensive assets. Operational staffing typically ranges from 0.5 to 1.8 FTE per MW of capacity, depending on facility size and operational efficiency. With capital expenditure levels of £7-12 million per MW, that means even large-scale investments generate relatively few permanent jobs.

Recent UK schemes reinforce the point: Northumberland's £10 billion hyperscale campus, approved in March 2025, is projected to create around 1,200 long-term construction jobs and "hundreds" of operational roles. Yet planning documents and local reporting suggest closer to 400 permanent posts overall, roughly 40 jobs per £1 billion invested. By contrast, advanced manufacturing plants of similar capital cost typically support far greater ongoing headcounts.

Many in the sector argue against metrics, such as jobs per square foot (common in retail or logistics), but instead encouraging a focus on broader community benefits from apprenticeships and technical training, procurement opportunities and local economic uplift. This includes pointing towards the fact that where operations roles are created, they are generally skilled and well paid.

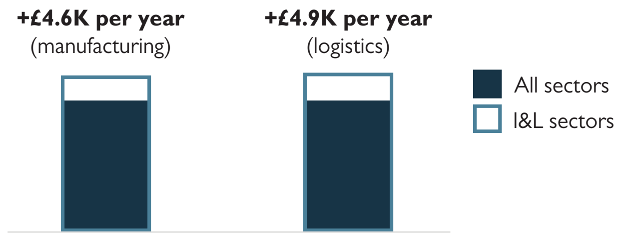
Technicians often earn £30,000-£40,000; electrical and mechanical engineers £50,000 and above; senior technical managers can reach six figures. These levels exceed UK and many local medians however the main challenge lies in ensuring local access.

Hyperscale projects typically deliver fewer than 60 permanent jobs per £1 billion of capital



Some schemes secure local advertising, apprenticeships and supplier participation through Section 106 obligations, while others draw predominantly on regional or national labour pools, due to the limited number of experienced data-centre engineers. Without deliberate local participation requirements, high-quality jobs can remain out of reach for local residents.

Industrial and logistics jobs pay more



Source: ONS (2001) ASHE, UK Gross Annual Pay in 2020

Beyond operations, construction phases deliver significant short-term uplift, often several hundred jobs at peak across civil, electrical, and mechanical trades. The local benefit is highest where contractors and apprenticeships are genuinely local and where site experience converts into longer-term employment. Indirect and induced employment through maintenance contractors, engineering services, telecoms, security and logistics can expand the footprint significantly, with industry estimates putting sector-wide supported jobs in the tens of thousands. However, the local value of this spillover depends heavily on supplier development and contracting choices; without local participation requirements, spending is often distributed nationally.

Skills and knowledge

The sector faces a skills shortage, particularly in specialist electrical, cooling, and IT disciplines, compounded by an ageing workforce. This creates both a challenge and an opportunity for local skills development.

Formal apprenticeships remain modest in scale. The Level 3 "Data Centre Technician" and Level 4 "Data Centre Engineering" standards exist, but uptake is measured in dozens nationally each year. Some operators are investing directly:

- **Amazon's AWS** runs a 36-month Data Centre Engineering Operations apprenticeship (Level 4 Electrical Power Engineering) combining college study with on-site training.
- **Yondr Group**, with CBRE, has committed to training 100 apprentices worldwide over five years, with UK placements.
- **Equinix and Kao Data** run operator-specific apprenticeships.

Planning obligations can reinforce these efforts. Northumberland's Employment and Training Plan, for instance, mandates apprentice starts and an on-site coordinator to work with local colleges.

Similarly partnerships with education providers are expanding. In West London, operators fund vocational courses through a skills board. Microsoft's Datacenter Academy connects local colleges to entry-level operations roles, targeting underrepresented groups, and the Urban Edge Data Centre Academy in London has delivered 15 apprenticeship completions with 80% local retention.

Transferable skills such as critical environment management, advanced electrical systems, and integrated IT infrastructure can all support careers in adjacent growth sectors such as offshore wind and battery storage.

4 Refer to UK Industrial Strategy's "Good Work" principles

Human Capital

The test for success is whether training is additional, completed, and portable. Promises in planning submissions need to translate into measurable completions, with local participants benefiting in numbers proportionate to the scale of the facility. Place-based benefits are strongest when apprenticeship starts translate into completions and sustained employment; when curricula are co-designed with providers; and when opportunities are accessible to local residents rather than filled exclusively through national recruitment. Over time, clusters can create a flywheel, with a thicker skills base attracting investment in adjacent sectors such as renewables, grid services and advanced manufacturing.

> Projects in Newham and Slough have channelled millions into digital skills and device donation schemes. Newham Council secured £4m for "data economy" training. Microsoft's Datacenter Academy partnerships link local colleges to direct entry-level roles.

Experience

Job quality depends on more than pay and training. Operations teams are small and run 24/7, often on 12-hour shifts. That supports resilience but can limit accessibility for some workers. Progression can be constrained by headcount unless clear pathways are in place: cross-training across electrical, mechanical and controls disciplines; rotations between sites; and transparent criteria for advancement.

Some operators have adopted structured career maps, with defined steps from entry-level to senior technical positions, supported by continuing professional development. Others rely on small, stable teams with limited turnover, which may be efficient for operations but less effective for growing local talent.

Externally, the presence of a data centre can signal to local young people that high-technology careers are attainable without relocating. Outreach, via STEM events, open days, or career fairs, makes these roles visible, but remains sporadic.

Equity and inclusion (whilst covered later) is another factor. Women hold around one-fifth of UK IT specialist roles, with even lower representation typical in data-centre operations. Site-level ethnicity and disability data are rarely published. Emerging good practice includes publishing Gender Pay Gap reports, setting site-level diversity targets, and targeted outreach (e.g. Women in Data Centres scholarships). With many senior engineers due to retire within the decade, widening the pipeline is both a social imperative and a business-continuity need.

Health and wellbeing

Where facilities meet environmental standards, operational health impacts are minimal. Urban air quality assessments often show nitrogen dioxide changes of <0.1 $\mu g/m^3$, below detectability; noise levels typically meet ≤ 35 dB at night, within WHO guidelines. Still, perceptions of risk, whether from nuisance or safety, can influence trust. Clear communication about safety measures, environmental performance, and emergency planning can help address these concerns.

There are, however, opportunities for positive contribution. As outlined later, waste-heat recovery can support district heating schemes, lowering household energy bills and reducing fuel-poverty-related health issues

Opportunities

Data centres have the potential to become long-term anchors of skills and employment, but this is not an automatic outcome. High-quality, stable roles, targeted skills development, and inclusive recruitment require the same planning discipline as any other core project component. The goal is not simply to create jobs, but to ensure they are accessible, durable, and embedded in the local economy.

A data centre becomes a genuine net contributor to human capital when:

- Commitments to local hiring, apprenticeships, and fair pay are set early and written into construction contracts, operational agreements, and tenant leases, creating accountability that survives beyond the build phase.
- Training is aligned with actual demand, with developers working alongside education providers to co-design curricula, schedule placements in step with construction and commissioning phases, and track employment outcomes over time.
- Barriers to entry are actively reduced, with pathways created for people often overlooked in tech recruitment, supported by pre-employment programmes and targeted outreach.

These commitments work best when measured and made visible: tracking local hire rates, training completions, 12-month retention, and progression. Public reporting reinforces credibility with planners, investors, and communities, while helping operators benchmark their own performance.

Where developers lead on these measures, the result is a skilled local workforce and a stronger talent pipeline for future projects. Without them, job creation risks being overstated, and the sector's contribution to local economies will rely more on multiplier assumptions than on tangible, lived outcomes.

Produced Capital

Produced capital refers to the man-made assets that enable economic activity.

From the physical data centre itself to the grid infrastructure, heating systems, fibre networks, and transport improvements it catalyses, alongside the substantial fiscal flows it generates. It includes the value created through construction and operational activity as well the resilience and sustainable returns it can deliver to the local community.

At a national level, produced capital is a data centre's greatest contribution. Data centre services underpin virtually every sector of the economy. London leads Europe by capacity and is expected to exceed 2 GW within three to five years, consolidating its role as the EMEA region's largest hub.

- For the Exchequer, the sector contributes an estimated £640 million a year in taxes. Analysis by TechUK and Henham Strategy indicating that raising UK capacity growth from ~10% to ~15% annually could unlock c.£44 billion in additional GVA between 2025 and 2035.
- For UK plc, data centres are critical national assets that drive innovation, underpinning the country's AI ambitions and accelerating growth.

While the broader spill-over effects of digital infrastructure lie beyond this report's scope, the nearer-term question is whether these nationally significant assets build or extract local value. That outcome depends less on the presence of a facility and more on its design, operation, and integration into the wider system.

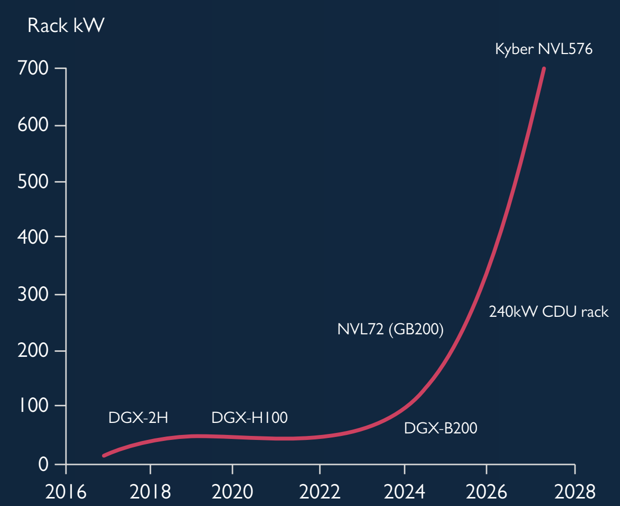
Lifecycle cost, performance and return

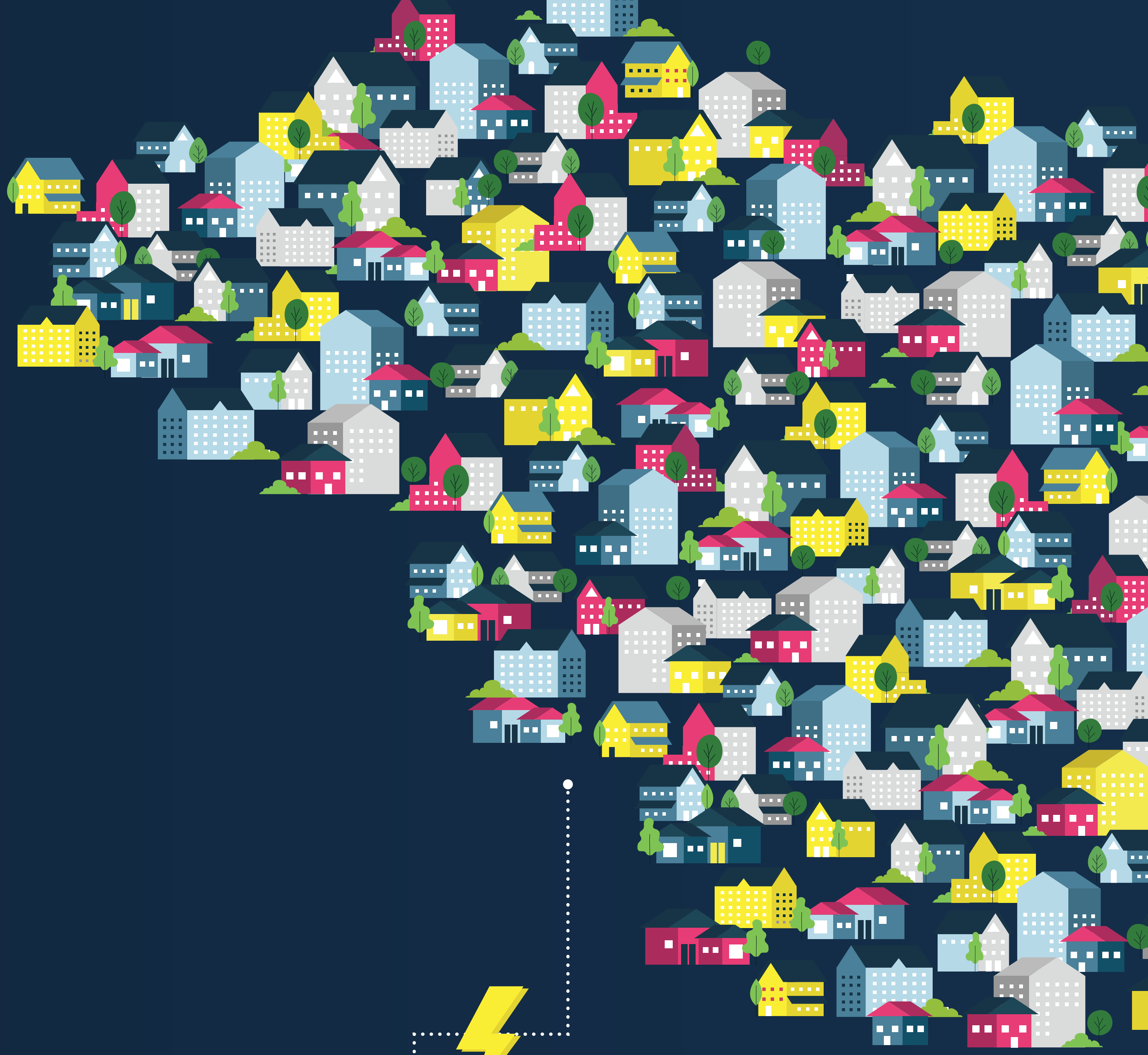
Data centres are high-specification, long-life assets. Capital costs typically range between £10–12 million per MW of IT load, with operational expenditure dominated by electricity (often 10–30% of OPEX) and the balance spread across facilities management, security, maintenance and connectivity. Performance choices have compounding effects on lifetime cost and value: energy efficiency (PUE), water efficiency (WUE), and heat-recovery design can materially influence both. So too do resilience decisions (such N+1 or greater) black-start capability, demand-response participation, and integration of storage. Each can reduce outage risk and ease pressure on the wider grid.

Adapting to changes and responding to future challenges, appraising the resilience of the asset to external threats (related to environmental impacts or security issues) and the ability to adapt to changes in the future provides an insurance policy to stakeholders.

However, the technical profile of these assets is evolving quickly. Nvidia's 2025 roadmap points to ~600 kW racks by the second half of 2027, with suppliers preparing for ~1 MW IT racks in specialised halls. For host locations, such advances translate into rateable value, local contracting opportunities, and either system stress or relief, depending on how efficiently and flexibly the site is designed and operated.

With the mix inside the building changing at pace, energy strategy and systems integration are now the dominant drivers of both OPEX and place-based value, with implications for both operators and local communities. As data-centre performance envelopes expand, adaptability is the new measure of value.





A single 50 MW IT load can match the electricity use of tens of thousands of homes

Produced Capital

Infrastructure and system resilience

West London illustrates both risks and solutions; in 2022, developers in parts of Hounslow, Hillingdon and Ealing were warned that housing connections could slip into the 2030s as capacity was tied up by large-demand users, notably data centres.[5] Joint action by SSEN, National Grid and the GLA introduced ramped connections and flexibility contracts that pulled dates forward. By March 2024, ramping had enabled connections for about 7,800 homes (around 10.5 MVA), with SSEN expecting to procure roughly 76 MVA of local flexibility services to bridge to medium-term reinforcements. The structural fix remains transmission and distribution upgrades and a reformed connections process that prioritises "ready-to-connect" schemes and curbs speculative reservations.

Set against the risks, well-designed schemes can strengthen shared systems via:

- Using staged (ramped) connections plus proven flexibility services to cut unused reserved capacity and help local grid operators manage peaks;
- Installing heat-network interfaces to turn waste heat into a public good;
- Adding new fibre routes to improve resilience and, in places, competition;
- Delivering highway and public realm works that improve safety and freight flows.

The differentiator is delivery discipline: defined milestones, published progress and named accountability that deliver measurable improvements in local system resilience on a defined timetable, not capacity hoarding.

Local wealth and procurement

Construction phases can generate significant local spend. Whilst much of the capital M&E plant is sourced globally, sector studies suggest 60–70% of CAPEX is retained in the UK, with a substantial share captured within 50 km radius of the site during multi-year construction. OPEX tends to be retained domestically to an even higher degree, although operational profits usually flow to parent companies.

Given the scale, specialist requirements and often security sensitive nature of these project, there is an ongoing question as to whether local SMEs can access work. Without explicit local procurement targets and onboarding support, spend can leak nationally, weakening the produced-capital argument.

> The Iver data center project in Buckinghamshire legally committed to 30% local procurement of its £2 billion construction budget, aiming to channel approximately £600 million to local firms

Fiscal contribution

Data centres are consistent ratepayers and taxpayers. Business rates at site level can be material to councils' finances, with order-of-magnitude figures commonly cited at £0.7–1.0 million per hectare per year, depending on valuation. Nationally, sector tax contributions are significant. Transparency helps here: where operators publish headline rates paid (or at least trajectories) and reconcile Section 106/CIL delivery against commitments, the fiscal contribution becomes legible and testable rather than inferred.

Expanding the value definition

Looking ahead, there is potential for a broader value contribution. Data centres are evolving from passive utilities into ecosystem catalysts: facilities that not only deliver commercial compute capacity but also act as active contributors to local infrastructure. In this role, opportunities could include:

- Defining a share of compute-hours for local priority sectors (health, education, SMEs) at regulated rates;
- Contracting flexibility and storage capacity to assist local grid management, with annual reporting on dispatch hours and avoided outages;
- Creating pathways into digital skills aligned to operational needs.

Such measures could position the data centre as part of a local utility ecosystem, delivering both commercial returns and quantifiable public benefit. However, the same shift could move in the opposite direction. As these facilities become more integral to AI workloads and national digital capacity, commercial and security considerations risk driving them toward greater operational closure. In that scenario, the asset's role in local systems would become more isolated; recognising this divergence is essential.

Opportunities

Data centres contribute to produced capital when their enabling works (e.g. grid, fibre, roads, drainage) are designed for shared benefit and when procurement decisions retain value locally. The question is simple: does the investment leave the surrounding economy and infrastructure stronger than it found them?

A data centre becomes a demonstrable net contributor when:

- Off-site grid and fibre works are staged to release early capacity for housing, EV charging, and local industry, with clear milestones and delivery dates agreed upfront.
- Heat export, or heat-ready infrastructure, is designed in from the outset, ensuring future network connections can be made without costly retrofit.
- Procurement strategies are calibrated to maximise SME participation, with clear payment terms and local-spend targets that are tracked and published.

These benefits are most credible when evidenced annually (capacity released, kilometres of fibre delivered, heat exported, SME share of procurement) and when multiple partners, from DSOs to network operators, validate the outcomes.

Developer-led integration of these measures builds a stronger business case for consent and strengthens the local economic base. Without them, the investment's value remains opaque, leaving opportunity costs unexamined and trust harder to secure.

5 Mayor of London - West London Electricity Capacity Constraint

Social Capital

Social capital, in the context of a built asset, is the network of relationships, trust, and mutual support between the people, organisations, and institutions connected to that place.

For a data centre, the choice is stark: appear as an isolated industrial monolith or emerge as a catalyst for local regeneration. The difference lies in how those delivering and operating it engage: early, openly, and with a clear intent to respond to local priorities and share opportunities.

A development team's approach to inclusion, governance, and community integration ultimately determines whether a facility becomes embedded in the area's social fabric or remains isolated from the community it neighbours. Neglecting this work carries cost: planning delays, public opposition, formal objections, and reputational damage that can outlast the build phase.

Influence and consultation

Building social capital starts with meaningful engagement, grounded in an understanding of local needs and evidence. This means demystifying the "invisible infrastructure": explaining what a data centre actually is, how it operates, and where real choices exist for community input.

Smart developers co-create the elements that touch place, involving community representatives in shaping landscape design, access routes, local amenities, construction phasing, and opportunities for heat reuse or grid flexibility services. They also ensure participation extends beyond the loudest voices to include renters, shift workers, small businesses, and community organisations.

Crucially, they translate engagement outcomes into binding commitments: heat network readiness, flexibility participation, local supplier targets, spending commitments, and skills pathways tied to construction milestones. As data centres increasingly site themselves close to communities rather than on remote industrial estates, authentic, early engagement is becoming a licence-to-operate issue, not an optional extra.

Equality and diversity

Representation within both the project and the sector shapes social capital outcomes. When decision-making tables and workforce pipelines exclude large parts of the community, legitimacy is weakened from the outset.

The sector's diversity challenges are well documented. Women typically comprise only 8–10% of data centre staff, with even lower representation in technical roles. Equinix reported a 27.4% median hourly gender pay gap in 2023; industry surveys suggest about one-fifth of UK facilities have no women in technical posts.

> Progress is being made; NTT's Women-in-Tech mentorship programme has lifted the share of new female to 28%; Ark Data Centres' partnership with UTC Heathrow embeds hands-on projects in sustainable cooling and site selection into vocational courses, now reaching students in Swindon, Reading, and Oxfordshire.

An ageing workforce adds pressure but also creates an opening to widen participation, particularly as senior engineers retire in parallel with market growth. Around a quarter of UK data-centre professionals are now aged over 55, highlighting the urgency of structured succession and skills transfer. Targeted recruitment from underrepresented groups, backed by pre-employment programmes and visible role models, can broaden the sector's reach while filling critical skills gaps.

Embedding inclusion into engagement makes consultation more credible: communities see not just outreach, but actual pathways into jobs and decision-making for people who share their lived experience.

Networks and connections

A well-integrated data centre theoretically can strengthen local networks beyond its physical footprint via:

- **Civic links:** Agreements with local authorities on construction scheduling, traffic management, and incident response, plus data-sharing on environmental performance so councils can answer resident queries confidently..
- **Education partnerships:** Sustained relationships with colleges and universities for technician pipelines; guaranteed placements that convert to jobs; and school outreach that builds year on year rather than relying on one-off events.
- **VCSE partnerships:** Multi-year relationships with charities and social enterprises that deliver local benefit consistently, even when project leadership changes.

These ties should be dependable and enduring, surviving staff turnover on both sides. They also provide channels to respond quickly to community concerns and to share benefits from wider initiatives, strengthening the other forms of capital described in this report.

Opportunities

Whilst historically isolated buildings, data centres can deliver lasting social capital when communities have real influence over design decisions, when opportunities reach people who are typically overlooked, and when relationships outlast the construction phase. A data centre enhances social capital when:

- Engagement begins early, with representative voices involved before designs are fixed, and when developers publicly show what was heard and what changed as a result.
- Partnerships with schools, colleges, and community organisations translate development activity into tangible opportunities, particularly for groups facing employment barriers or digital exclusion.
- Points of contact remain open and accessible, so that dialogue continues through construction, commissioning, and operation.

Handled well, this approach shifts the data centre from an abstract industrial use to a recognised part of the local fabric. Where benefits are visible and relationships enduring, community legitimacy strengthens; without them, acceptance is likely to be fragile and opposition to be expected.

Natural Capital

Natural capital is the stock of environmental resources - air, water, land, biodiversity - that support life and economic activity.

In the public perception, data centres are often seen as depleting these resources, drawing heavily on energy, water, and land while offering little in return. The sector's challenge is to shift that perception with evidence of efficiency, restoration, and integration into local environmental systems.

The test is not just consumption but stewardship - whether resources are sourced, used, and replenished in ways that are efficient, resilient, and within the limits of local ecosystems, and whether the long-term environmental condition is improved, not degraded, by the development. This means moving beyond headline usage stats to consider the quality, timing, and management of resource use, as well as the durability of any improvements. Additionality is the benchmark: measurable reductions in absolute emissions, active restoration of resources, and strengthening of ecosystems, all tracked against science-based targets and local baselines.

Emerging standards, such as ISO 30134, EN 50600 and EU Code of Conduct, are defining the metrics against which outcomes are often judged, with voluntary good practice hardening into formal expectation.

Energy and resource use

Electricity is the sector's defining operational footprint. In concentrated markets such as Greater London, clusters of data centres account for 33-42% of local grid demand, levels rarely seen in other sectors. Nationally, large-scale facilities consume around 2.5% of total UK electricity - roughly 7.6 TWh annually, a figure expected to rise to 22 TWh by 2030 as AI workloads expand. .

Significant steps to decarbonise have been taken: the UK grid carbon intensity has fallen by ~70% since 2015, while modern hyperscale design improvements have reduced Power Usage Effectiveness (PUEs) of 1.1-1.2 compared to >2.0 a decade ago. However, Jevons Paradox applies: total load growth is outpacing efficiency gains, a trend amplified by the compute intensity of AI. Redundancy requirements (often N+1 or higher) add further to baseline demand.

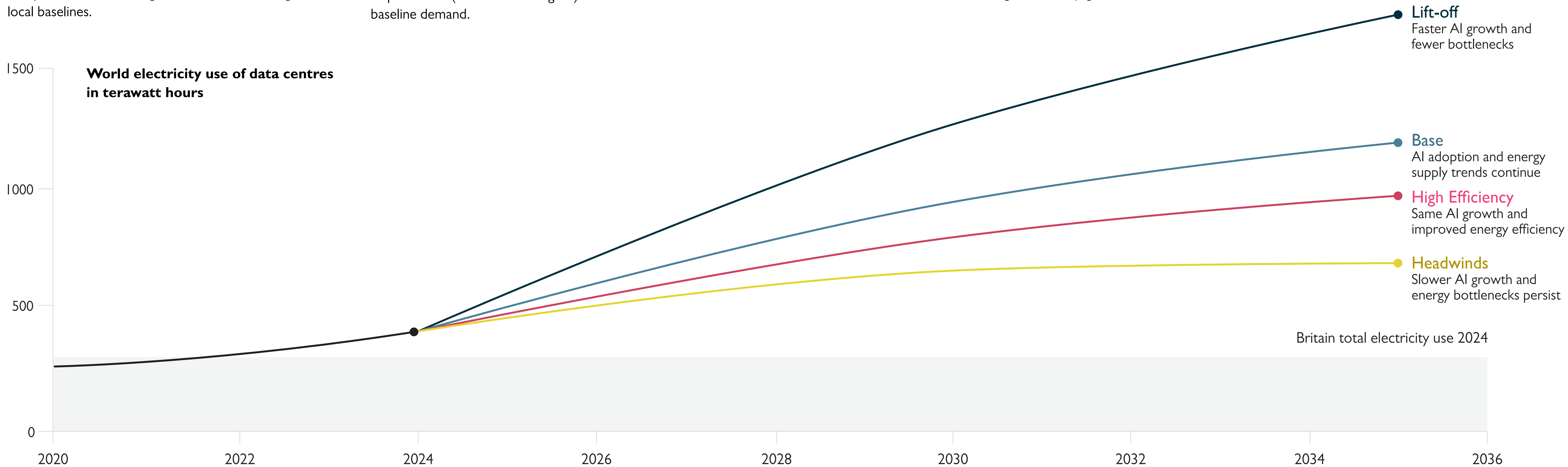
Operators are increasingly securing long-term renewable Power Purchase Agreements (PPAs) to stabilise price and decarbonise supply. Amazon's **473 MW Moray West** offshore wind agreement underwrites a nationally significant clean-energy project - adding 650,000 home-equivalents of renewable capacity to the grid However, most PPAs are still annual rather than hourly matched, meaning facilities often still draw from fossil-fired generation during peak demand or lulls in renewable output. The next credibility test is temporal matching: aligning consumption with clean generation in real time.

At the same time, policy tensions persist: minutes from the UK's AI Energy Council reveal industry representatives floated on-site gas fuel cells as an "interim" measure to bypass grid delays . While ministers have not endorsed the approach, the debate underscores the risk of short-term fossil lock-in if clean baseload and grid reinforcements lag.

Beyond electricity, the sector's material footprint is substantial: server refresh cycles generate high volumes of e-waste, diesel storage for backup generation carries environmental impact and demand for critical minerals such as gallium, copper, and rare earths is rising. While circular IT initiatives are scaling, they remain uneven. Microsoft's **90.9% reuse and recycling rate** in 2024 demonstrates what is possible when circularity is institutionalised, but most operators are well behind this benchmark.

Corporate PPAs enabling new renewables: Amazon's 473 MW offtake from the Moray West offshore wind farm (commissioning 202-25) underwrites a project of national scale, locking in price certainty and grid-connected clean capacity.

World electricity use of data centres in terawatt hours



Source: Progress 2030

Natural Capital

Waste heat recovery: from by-product to circular asset

For a sector under scrutiny for its energy footprint, waste heat recovery represents one of the most credible routes to circular, restorative performance. Server cooling produces a continuous flow of low-grade heat: historically a disposal issue, now a potential community resource.

At scale, the UK is moving from concept to implementation. The **Old Oak and Park Royal** network in West London, supported by **£36 million from the Green Heat Network Fund,** will capture **17 MW of data-centre heat** and deliver around **95 GWh per year** of low-carbon heat to **9,000 homes and 250,000 m²** of non-domestic space. Smaller projects, such as Deep Green's immersion-heated swimming pool in Exmouth, show that reuse can work across scales where three conditions align: an offtaker within practical distance, a technical interface designed in from the outset, and a commercial model that keeps operational risk off the operator.

Internationally, the evidence is more mixed. Microsoft's Finland partnership with Fortum supplies around 40% of district heat demand for 250,000 users, though claimed figures of 200 GWh/year appear to be estimates rather than verified outputs. Meta's Odense facility provides around 160–175 GWh/year, though earlier claims of 215 GWh have proven overstated.

The Greater London Authority's 2025 guidance[6] now makes heat recovery a default design requirement in heat-network zones, backed by early-stage mapping and commercial templates to de-risk delivery. Wider adoption will depend on tackling practical constraints: low heat grade requiring lift via large heat pumps, seasonal demand mismatch, gaps in local heat network coverage, and grid capacity to power additional thermal plant. Where these can be addressed through early planning, public funding, and safeguarded routes, waste heat can move from an occasional demonstration to a standard component of data centre design. With immersion cooling providing higher-quality, more recoverable heat, the technologies now exist - many of the challenges instead rely of stakeholder coordination.

> Waste-heat recovery: Old Oak & Park Royal's scheme is planned to capture 17 MW of data-centre heat and deliver ~95 GWh/year of low-carbon heat to 9,000 homes and 250,000m² of non-domestic space, supported by £36 million in public funding.

Water

Water use, particularly for cooling, is often portrayed as one of the data-centre sector's highest environmental impacts… or at least that is the prevailing perception. Historically, evaporative systems for hyperscalers consumed vast volumes: a 100MW campus could use 1.7 million litres per day, equivalent to the daily needs of ~12,400 people.[7] Those images endure in the public imagination, even as the industry moves rapidly towards near-zero consumption.

In reality, the UK's temperate climate and accelerating technology shift have redefined what water performance looks like. Over half of UK facilities now operate with water-free or closed-loop systems, and best-in-class operators have reduced Water Usage Effectiveness (WUE) to levels once thought unattainable. CyrusOne records 0.37 L/kWh, surpassing the Climate Neutral Data Centre Pact's 0.4 L/kWh target, while Telehouse South achieves zero-water operation through free-air chillers that eliminate evaporation entirely Even in mixed portfolios, Equinix reports a global average below 1 L/kWh, and Virtus's re-engineered adiabatic controls have halved consumption without compromising PUE.

These technical gains matter because water scarcity pressures are rising. England faces a projected shortfall of 5 billion litres per day by 2055, and yet data-centre water demand remains largely absent from statutory Water Resources Management Plans, a systemic planning gap now under review. The policy challenge is therefore as much about governance and transparency as technology. Mandatory reporting, standardised WUE disclosure, and integration of data-centre demand into regional water strategies are prerequisites for credible stewardship.

Equally important is perception. In 2024 Thames Water alone leaked over 500 million litres a day, yet what households notice is the hosepipe ban, not the invisible systemic loss. Against that backdrop, industrial abstractions measured in millions of litres become an easy flashpoint. Not all data centres are equal but without transparency (on site-level water use, abstraction peaks, or WUE), public debate collapses these differences. International reporting frameworks are beginning to set clearer baselines but without visible disclosure, resilience planning remains speculative, and the sector risks being judged by its worst offenders rather than its best practices.

Land and biodiversity

Data centres range from compact footprints to hyperscale campuses of 100+ hectares. With employment densities often below 200 staff on an 85-acre site, questions of opportunity cost are inevitable. Yet the relationship between data centres and land value is more complex than the arithmetic of jobs per hectare.

The certainty of long-term investment they bring can make otherwise marginal or stalled brownfield sites viable for development, underwriting costly remediation or infrastructure works that other occupiers could not justify. The Northumberland Cambois campus, built on a former coal power station site, and schemes on disused industrial land in Slough and Dagenham illustrate this regenerative potential. In some cases, they may be the only realistic anchor tenant capable of unlocking delivery on challenging sites.

The debate becomes sharper where proposals target semi-greenfield or Green Belt locations. Here, the trade-off is between national economic benefit and the permanent loss of local landscape, biodiversity, and amenity. Recent ministerial call-ins at Abbots Langley and Iver show that decisions can go either way. Government policy appears to be moving toward greater permissiveness, through the new "Grey Belt" category and the potential designation of data centres as Nationally Significant Infrastructure Projects (NSIPs) in high-capacity grid zones, potentially streamlining approvals but risking the sidelining of local land-use priorities.

Design measures such as landscaped buffers, wildflower meadows, green roofs, and attenuation ponds can all improve biodiversity and visual integration. The most credible schemes ensure habitat gains are contiguous, ecologically coherent, and ideally accessible to the public, rather than fragmented or remote offsets.

> Some developers have set higher ambitions- CyrusOne's LON6 scheme publicly targets ~71% BNG, a benchmark for what meaningful restoration can look like.

6 Optimising Data Centres in London
7 Based upon current per-capita use (~137 L/day)

Natural Capital

Other environmental externalities

Beyond energy, water, and land, data centres generate a range of more localised environmental effects which, while individually modest, can accumulate where facilities cluster.

Air quality is the most visible example. Standby diesel generators, essential for resilience and regulatory compliance, require periodic testing that can produce short-term spikes in nitrogen oxides and particulates, especially when neighbouring sites test on similar schedules. Emissions abatement technologies, switchable fuels such as hydrotreated vegetable oil (HVO), and coordinated testing regimes can substantially reduce these peaks.

Thermal and microclimatic impacts are another consideration. Conventional cooling systems release large volumes of waste heat to the atmosphere, raising local air temperatures in dense zones. In liquid-cooled systems, rejected heat can also alter receiving-water temperatures. Where heat is not captured for reuse, these outputs represent both a residual burden and a missed opportunity to supply low-grade heat to nearby networks.

Noise from plant, including fans, pumps, and generators, tends to be steady and low-frequency, which, even within planning limits, can be more persistent for neighbours than intermittent industrial noise. Security lighting, if poorly designed, can contribute to light spill and disturb nocturnal wildlife.

The construction phase also carries a high embodied carbon load, much of it associated with mechanical and electrical plant. These systems are often sourced internationally, placing part of the environmental impact outside the host community but within the sector's scope to address through procurement standards, lifecycle design, and reuse.

While individually modest, these effects accumulate in multi-site zones. Coordinated action such as staggering generator tests, publishing aggregated environmental data, and jointly investing in mitigation, can reduce cumulative impacts and strengthen operator-community relations.

Opportunities

Data centres are often cast as unavoidable drains on natural capital but they do not need to be. Well-sited, well-designed facilities can do more than limit harm, they can actively improve resource efficiency and demonstrate circularity.

This shift happens when environmental value is built in from the concept stage, with the same discipline and commercial foresight applied to grid connections, land deals, and construction programming. In the UK, where grid headroom, potable water, and developable land are already under strain, these early strategic choices carry disproportionate weight. Those committed to the Climate Neutral Data Centre Pact[9] show that the benchmark is no longer simply clearing minimum thresholds but aligning with formal performance metrics, reducing embodied as well as operational carbon, and strengthening local resource systems in ways that create benefits which outlive the construction phase.

A data centre becomes a credible net contributor to natural capital when:

- Grid reinforcements triggered by the build are designed as shared assets, staged to release capacity early to housing, EV charging, or industry, with allocation principles agreed and published. This not only supports public trust but can unblock local projects waiting for connections.
- Waste heat recovery is assessed at concept stage, with early testing of viability (policy, zoning, loads, corridors, etc) and collaboration with local network partners to turn surplus energy into a shared asset. Where immediate offtake is not possible, heat-ready infrastructure is safeguarded so future connections are straightforward, supporting a more circular and resilient energy system.
- Cooling strategies default to non-potable water sources where available, achieve best-practice WUE, and offset residual potable use through verified local efficiency programmes, building resilience in stressed catchments rather than competing with them.
- Land selection prioritises brownfield or degraded sites; where greenfield use is unavoidable, biodiversity net gain significantly exceeds statutory minimums, is independently verified, and creates contiguous habitats or accessible green space that enhance both ecology and amenity.
- In zones where multiple facilities cluster, operators coordinate on generator testing, cooling operations, and environmental monitoring, publishing aggregated data on noise, air quality, and microclimate to maintain community confidence.
- Themes of circularity are actively pursued through holistic, collaborative solutions that link environmental, social, and economic value creation.

These outcomes are more readily achieved when developers take the lead: embedding obligations in land and grid agreements before designs are finalised, locking in deliverable co-benefits without adding friction later. Science based targets are increasingly tied to formal performance metrics. Where developers set their own benchmarks, treating them as public commitments and transparently reporting on data such as capacity released, heat exported, water use, biodiversity gain, and cumulative impacts, the sector can begin to prove that growth in AI and digital capacity does not come at the expense of the systems that sustain both economy and ecology.

Without this approach, the perception of extractive development will harden, opposition will intensify, and the approvals pipeline will slow, not because of environmental activism alone, but because consent authorities and other stakeholders will doubt the project's long-term licence to operate.

9 climateneutraldatacentre.net

Insight into action

Delivering sustainable value through data centre development requires a strategic approach that is rooted in local realities, commercially viable, and capable of unlocking long-term benefits for communities. Based on our experience and the work of others (not least Hoare Lea's Social Charter for UK Data Centres) we outline nine considerations to embed sustainable value in your data centre development:

1 Conduct an evidence-led local needs analysis

Establish a robust baseline assessment that captures both socio-economic and environmental needs and the realities of local infrastructure. For data centres, where community benefits can be less visible, grounding commitments in local realities ensures interventions are both viable and measurable. This should map:

This should map grid connection timelines, water availability and licensing risks, fibre and transport networks, and environmental sensitivities and biodiversity baselines.

A strong evidence base provides the foundation for credible proposals, helping to realise impact and secure stakeholder confidence.

2 Link sustainable value directly to the business case

Sustainable value should be intrinsic to, not competing with, the core business objectives: securing planning consent, attracting customers and tenants, and managing operational risk.

When initiatives directly contribute to these priorities, for example co-funding infrastructure upgrades that benefit both the facility and the locality, they are more likely to be delivered and sustained over the life of the asset.

3 Improve awareness and trust

Public narratives around data centres are often negative, focusing on high resource use and low visible benefit. Operators can counter this and build trust by:

- Proactively communicating facts e.g local procurement spend, skills programmes, biodiversity initiatives
- Reporting transparently on water, energy, and environmental performance
- Demonstrating local benefit through case studies and community engagement

Shaping the narrative early builds credibility, anticipates objections, and strengthens political and planning support.

4 Shape priorities through structured collaboration

Engage early with local authorities, utilities, SMEs, and VCSEs to shape priorities that are both relevant and deliverable. In some cases, this may involve jointly developing tangible outputs such as shared infrastructure projects or targeted skills programmes. Clear governance, realistic scope, and agreed funding responsibilities help prevent overcommitment and keep delivery practical.

Insight into action

5 Unlock additional value from core assets

Look beyond compliance and explore opportunities to adapt core capabilities for local benefit:

- Demand-side flexibility to support grid stability
- Extending local fibre networks
- Water-efficiency systems that benefit operators and residents
- Waste-heat recovery to power district heating
- Enhancing site biodiversity and linking to local nature recovery networks

Considering and testing these options as early as possible is key to improving their technical feasibility and commercial viability.

6 Invest in local skills and supply chains

Where the needs analysis highlights gaps in skills or services, target investment in areas that supports both community benefit and operational resilience (for example HV/LV electrical trades, critical cooling maintenance, fibre splicing, commissioning). Prioritising local procurement in these packages not only supports local resilience but builds a more resilient supply chain for the operator.

7 Embed social value in procurement, and operations

Hardwiring commitments into procurement frameworks and operational contracts creates a direct line from intent to delivery.

This should include clear KPIs for local employment, SME spend, skills training, biodiversity net gain, and air quality compliance. Assigning internal ownership is critical to ensuring these commitments are actively managed, not lost between departments or delivery phases.

8 Establish long-term stewardship from day one

Benefits should be designed to outlast the construction phase and developer involvement. This may mean establishing a stewardship trust to manage public-realm improvements, a community-owned utility for a heat network, or long-term service contracts with embedded social value clauses. Early definition of governance, revenue streams, and operational responsibilities is key to mitigating stranded commitments.

9 Measure, report, and adapt

We would recommend focusing on a concise set of meaningful, auditable indicators, such as potable water offset percentage, biodiversity units delivered, and local contractor spend and report them transparently.

Transparent, public reporting will ultimately help you maintain trust, while periodic reviews with stakeholders ensure your strategy remains relevant as technologies, policies, and local priorities evolve.

Reality check

In outlining the steps to enhance value and wider capital contributions, we recognise the inherent delivery challenges, that shape what is achievable.

These constraints are real and, in many cases, sit partly or wholly outside the direct control of the developer. They span investment models, governance structures, infrastructure readiness, and the wider market and policy environment.

The key however is not to ignore them, but to anticipate and plan for them from the outset, shaping commitments that are proportionate, technically feasible, commercially viable, and robust through the life of the asset. While no single party can remove all of these barriers, there is scope to navigate them intelligently: this is where we can help: translating ambition into a practical strategy and implementation plan that recognises the operating environment and still delivers tangible, lasting benefit.

Siting and place constraints

Local context can lock in or rule out certain options from the outset. Factors such as water-stressed catchments, absence of anchor heat loads, Green Belt or flood designations, and sensitive ecology baselines can limit the viability of measures like heat reuse or biodiversity enhancement.

Regulatory uncertainty and inconsistency

Variation in how authorities interpret requirements, from Biodiversity Net Gain to abstraction licensing, heat-network zoning, and Section 106 provisions, can add time, cost, and risk. Evolving national policy can also shift priorities mid-project..

Counterparty and scale limitations

Even with viable technology, delivery depends on creditworthy offtakers and partners. In some locations there may be no suitable demand profile for heat, skills, or SME supply chain initiatives. Single-site projects may also be too small to justify certain shared-asset investments.

Third-party infrastructure dependencies

Key enabling works such as grid reinforcements, water-main upgrades, fibre extensions, or heat-network connections often sit with external providers (DSOs, utilities, councils), whose timelines, technical standards, and investment priorities may not align with the project programme.

Control and contractability gaps

Some commitments made during development can sometimes sit with parties who won't hold the operational levers after completion. Without contractual flow-down through leases, service agreements, or partner contracts, delivery can become dependent on others' decisions. Differing cost tolerances, time horizons, and risk appetites between developer, operator, and tenants can also dilute outcomes.

Security, confidentiality and data fragmentation

High-availability operations often limit new interfaces or shared infrastructure. Tenant NDAs, security protocols, and inconsistent metering architectures can make it difficult to establish open, auditable baselines for energy, water, and heat flows, limiting the ability to prove, optimise, or report performance.

Procurement and VE pressures

Tight delivery programmes and lump-sum contracting naturally prioritise measures essential for energisation and PC, creating a structural risk that non-mandated enhancements are deferred or removed.

CAPEX/OPEX misfit

Many outcomes require a funded operational tail, but the investment cases are typically framed as CAPEX-only. Without a clear revenue model or ring-fenced OPEX budget non-essential measures can fall away over time.

Funding and governance gaps for long-term stewardship

Social value assets (public realm, training hubs, community benefit funds) often lack a ring-fenced revenue stream or accountable owner post-construction, leading to gradual decline once the capex phase ends.

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