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Insights

THE ENERGY NEXUS: UK DATA CENTRES AND POWER STRATEGY

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SUMMARY

Power decides which UK data centre projects get built.

AI and high-performance computing are pushing campus demand into the hundreds of megawatts. Electricity grid capacity is scarce in key UK data centre locations. Connection dates sit at board level.

Developers, operators and investors need a power strategy before they commit capital, sign anchor tenants or acquire land.

The tension between data centre power demands and electricity grid capacity constraints will result in data centre developers:

- Having to navigate complex electricity grid connection reform to capture scarce connection capacity.
- Seeking viable alternatives to electricity grid connections, against the background of electricity grid capacity constraints and delayed connection dates.
- Assessing alignment of projects with increasing Government intervention designed to incentivize strategic demand projects, for example through the AI Zone initiative;

In addition, data centres – particularly hyperscaler and AI operations – require increasing supplies of power, once connected, that match 24/7 demand with ESG requirements.

Project teams and their advisors that provide solutions to the tension between power demand and capacity and source ESG compliant power will create viable projects that can leverage required capital and create successful outcomes.

UK MARKET CONTEXT

The build out of UK AI data centre capacity is one of the frontier sectors in the UK's industrial strategy:

- Data centres are classified by the UK Government as critical national infrastructure.
- Following the December 2024 reforms to the government's National Planning Policy Framework, English local authorities are required to consider the need for data centres when setting local policies and deciding planning applications.
- Data centres will also be able to opt into the Nationally Significant Infrastructure Projects (NSIP) regime. NSIP applications are determined by the Secretary of State, rather than local planning authorities.

The IEA estimated global data centre electricity consumption at about 415 TWh in 2024. Demand is expected to rise to about 945 TWh by 2030[1].

In the UK data centres currently consume around 2.5% of the UK's electricity. NESO expects annual electricity consumption by data centres to rise from 5 terawatt hours in 2025 to 22 terawatt hours by 2030.[2]

However, surveys of data centre developers indicate that electricity connection availability and delays are the primary obstacle to project delivery. According to Turner & Townsend's Datacenter Construction Cost Index, nearly half (48%) of developers cite power access as the biggest scheduling constraint. Grid connection queues stretch for years with some developers being offered connection dates in 2037 and beyond for viable projects.

OFGEM has stated that since November 2024, total contracted offers in the electricity demand queue rose sharply from 41 GW (17 GW Transmission, 24 GW Distribution) to 125 GW (97 GW Transmission, 29 GW Distribution) in June 2025. For comparison, peak electricity demand in GB on 11 February 2026 was 45 GW[3].

OFGEM has stated that the demand connections process is currently facing three interrelated challenges[4]:

- The demand queue is large and growing and contains a significant number of projects that are likely non-viable.
- The demand queue contains a significant number of well-progressed projects that cannot progress to connection quickly enough, due to the time required for network or generation build, and the presence of non-viable projects.

- There are no mechanisms to prioritise strategically important demand projects.

DENZ, NESO and OFGEM are now focusing, at both transmission and distribution levels, on how to reduce the existing electricity grid demand queue and adopt more stringent queue entry criteria under the banner of Curate, Plan and Connect[5].

Recent government announcements on accelerating grid connections for data centres to support AI Growth Zones, including Delivering AI Growth Zones, complements this work.

THE DATA CENTRE DEVELOPER DILEMMA

Electricity grid capacity constraint has created material uncertainty as to whether and when large scale demand projects can connect to the electricity transmission and distribution networks. The grid reform proposals may mitigate the problem but it is unclear:

- When the reforms will come into force.
- What the precise impact on the demand queue will be– will the reforms free up sufficient capacity and provide sufficient cost and connection date certainty?
- Which specific measures NESO/OFGEM will pursue and their impact on specific data centre projects – for example "strategic need" criteria.

This has created an environment where developers are ready to assess alternative data centre power solutions to ensure their projects can proceed as planned and to programme. To some extent that optioneering process is not wholly driven by electricity grid capacity constraints but the capacity issue has meant and will mean that assessing alternative power options will be an integral part of any business and investment case in the future.

Clients need a clear view of which UK power routes are feasible and sufficiently certain to enable commercial operation dates to be met in the context of capital raise.

For UK projects, power connection and capacity strategy and options analysis can usefully be focused on three main areas:

- An electricity grid-led strategy where site location and project readiness may support a viable connection to the electricity transmission or distribution network in a reformed connections landscape.
- A gas grid-led strategy where connection is made to the gas national transmission system or distribution network to facilitate on-site baseload electricity generation via gas turbines; gas engines or fuel cells.

- A private grid energy park strategy where data centres connect to third party power infrastructure operated by the energy park, effectively outsourcing the connection and/or supply risk to third party connection/capacity providers.

Nuclear power, including SMRs, has strategic value for large baseload demand. In the US significant progress has been made, particularly by hyper-scalers, in inking contracts for the supply of nuclear power not only from SMRs but from major grid connected nuclear plants. Microsoft announced in 2024 that it had agreed a deal to reopen and purchase all the power from the Three Mile Island nuclear facility in Pennsylvania, In June 2025 Meta announced that it had signed a deal to keep a nuclear power plant in Illinois operational for another 20 years.

The UK Government's Nuclear Regulatory Review 2025 makes clear that nuclear is to play a significant part in safeguarding AI baseload requirements and further work will be undertaken to realise that ambition.

However in the UK gas is ahead of nuclear as a realistic near-term UK solution. The gas network exists, gas poses fewer technical and regulatory complexities and has no "first of a kind" risk.

ROUTE 1: ELECTRICITY GRID-LED PROJECTS

Some data centres will secure adequate grid power with acceptable connection dates. Well-developed projects, projects in less constrained areas, projects prepared to accommodate flexible solutions (e.g capacity ramping/grid management products/demand side response) and projects aligned with strategic policy (if that becomes a relevant criterion) should have a better route to connection. Site choice, land assembly, planning status, financial commitment, and readiness to meet connection related milestones and the integration between these components are fundamental considerations if Route 1 is to be pursued.

The legal work should:

- Assess the transmission or distribution connection route.
- Assist in submission of a compliant and optimised connection application, whether opposite NESO or DNO and assess the timing fit between connection application/offer and funding.
- Review all material aspects of any connection offer including connection date, reinforcement dependencies, milestones, securities any capacity ramping and non-firm capacity issues.
- Provide advice on rights of recourse and mitigants in the event of adverse connection application outcomes.
- Assess contestable works and self-build scope and provide appropriate contracting strategy/documentation.

- Confirm available land rights to ensure cable route availability from connection point to site.
- Assess wider dependencies – for example battery co-location optionality and impact of that generation on demand connections.

The connections reform process should reward projects with a joined-up and viable delivery strategy.

ROUTE 2: GAS GRID-LED PROJECTS

Gas generation now sits at the heart of the UK data centre power debate.

Gas networks are currently processing approximately forty six applications from data centre developers[6].

Seven applications have been secured for connection to the UK gas network equalling a combined capacity of 15.4 terawatt-hours[7].

New demand connections to the gas network currently typically take six to twenty four months, while developers can face a wait of up to fifteen years for access to the electricity grid.

Securing a gas connection is generally quicker than constructing the data centre itself meaning power is not a pinch point for operational start-up.

Subject to proximity to the project site, connections to the UK gas network can be made rapidly, facilitating generation of power from gas engines, turbines or fuel cells. Gas gives a dependable route to energisation, firm baseload output and phased campus growth.

Gas grid-led projects which do not utilise low carbon gas will need to deal with the ESG implications of the choice of source fuel. Unabated gas raises carbon, air quality, planning, permitting and reputation issues. Local opposition is likely where gas generation is to be permanent, large scale or inconsistent with owner/operator net zero claims. Investors and tenants will ask whether gas is a bridge, a long-term baseload solution or a stranded ESG problem.

However gas grid-led options may eventually include the use of low carbon energy. National Gas's Project Union will repurpose some of their existing pipelines and new pipelines will be built to create up to create a 1,500-mile national hydrogen network, transporting 100% hydrogen across Great Britain. The intent is to realise a goal of 10 GW of low-carbon hydrogen by 2030.Project Union will connect the industrial clusters at Teesside, the Humber region and Grangemouth, and link up with Southampton, the North West and South Wales as well as connect to strategic hydrogen production sites – including at St. Fergus.

The legal work should:

- Assess the transmission or distribution connection route.
- Whether gas is temporary, transitional or permanent and, if temporary or transitional, the strategy for a permanent solution including connection to the electricity grid.
- Assist in submission of a compliant and optimised connection application and assess the timing fit between connection application/offer and funding.
- Review all material aspects of any connection offer.
- Provide advice on rights of recourse and mitigants in the event of adverse connection application outcomes.
- Assess self-build scope and provide appropriate contracting strategy/documentation.
- Confirm available land rights to ensure cable route availability from connection point to site.
- Assess wider dependencies – for example battery co-location optionality.
- Confirm who will own/lease and operate the gas turbine/engine or fuel cells and document supply arrangements.
- Confirm regulatory/licensing requirements for on site power generation/distribution and supply.
- Confirm which planning, environmental permit, air quality and noise controls apply and progress appropriately.
- Confirm which if any decarbonisation route exists (where relevant), such as carbon capture, biomethane, hydrogen blend, full hydrogen conversion and progress appropriately. Investors will expect a plan for carbon cost, permitting, technology replacement and tenant reporting.
- Assess the impact of generation ramp up times on tenant uptime and back-up generation.

ROUTE 3: PRIVATE GRIDS AND ENERGY PARKS

A private power platform operating as an energy park might combine third party generation, storage, substations, grid import rights, gas connection, fibre routes and serviced plots. Data centres then locate inside or next to the energy park and procure required services. The power platform creates the site.

The platform may be connected to the electricity transmission network but could alternatively be a connection to a privately owned hydrogen network.

This model may align well with proposed AI Growth Zones, offer the required level of connection and capacity certainty and move the complexity of grid connection application and build out from the data centre developer to the power platform operator. Procurement models will need to be tested and may borrow from privately owned power infrastructure models such as CATOs and OFTOs.

Former industrial sites, former power sites and locations with existing gas or electrical infrastructure and connections (thereby mitigating connection queue and capacity availability issues) deserve early review.

The legal work should cover:

- Due diligence on the robustness of the power platform owner/operator, procurement model and the upstream connection arrangements.
- Any requirements to alter existing legacy grid connections.
- The process for connecting to the power platform.
- Regulatory interface between the public grid and the power platform.
- The regulatory treatment of the on-site power platform e.g. DNO/IDNO adopted or private wire and consequent regulatory risk analysis.
- Power platform access rights and charging methodology.
- Priority between multiple data centre customers.
- Reserved capacity and expansion rights.
- Availability risk, outage, curtailment and force majeure rules.

A private grid changes value. The scarce asset is the controlled power platform serving the data centre.

ELECTRICITY SUPPLY

Connection and capacity is only part of the energy nexus. Supply of electricity (preferably renewable) shaped to load profile and supplied at a commercially affordable and predictable price is a key component of a viable data centre project.

Data centres require baseload power. Solar/wind power sourced from utility/third party PPAs will not reflect the 24/7 load profile of a typical data centre nor the increasing prevalence of demand spikes and troughs caused by AI requirements, but it can form a significant component of supply requirements with the remaining power sourced from supply contracts, futures market products, spot procurement or structured curtailment and balancing energy solutions.

Additionally energy suppliers now offer 24/7 "one-stop" renewable electricity products where grid non-intermittent renewable sources (e.g. hydropower) or battery storage can plug the gaps where solar/wind is not available. These also provide greater transparency of ESG claims.

Energy storage (co-located or on an adjacent site) can help manage demand peaks, improve resilience and reduce exposure to high-price periods.

- Where power is supplied from the public grid, data centre operators/tenants can procure PPA power through a sleeved PPA where power moves via the grid to a licensed supplier and is billed as part of the customer's electricity supply bill;
- A "virtual" PPA where the customer buys financial price support and environmental attributes without physical delivery of power.

In the UK PPA renewable grid power will usually be packaged with "guarantees of origin" which evidence renewable supply within UK fuel disclosure reporting rules and as such from an important part of corporate ESG reporting

Where the data centre is supplied through a private wire with power generated by on site or nearby generation facilities the owner/operator/tenant will enter into a PPA for the supply of that power with the generation asset owner. If renewable power, the source of the power will be obvious and transparent for ESG purposes.

LEGAL AND STRUCTURAL FRAMEWORK

Implementing the selected power strategy will require a raft of common documentation regardless of Route adopted but also Route specific documentation. For example:

- Connection offer/agreement.
- Land rights for cable routes/sub-stations.
- Grid/cable/pipeline works contracts downstream of publicly owned networks.
- Adoption agreements for self-build assets.
- O&M agreements for on-site generation assets.
- Grid Supply agreements/PPAs.
- Private wire supply agreements for on site generation assets.

- Demand response contracts.
- Emissions permits.
- Route-to-market agreements for on-site assets e.g. power storage.

WHAT THIS MEANS FOR UK DEVELOPERS AND INVESTORS?

Developers and investors will need:

- A robust power connection strategy to interface with the land, planning and construction plans and programmes and vice versa to create a viable investment opportunity.
- To recognize that connection to the electricity grid has become and will continue to be a complex proposition with connection reform only rewarding projects that align to specific regulatory requirements and in particular will require seamless integration of power, land assembly and planning.
- To consider that power solutions may encompass a number of inter-locking components which must all come together to provide a viable way forward – for example temporary gas power provision before transition to electricity grid power; a mix of grid and "behind-the meter" power; accommodation of demand response solutions to access grid connections – all of which add complexity to the regulatory and contractual landscape.
- To consider ESG compliance and potentially emissions mitigation where non green gas is selected as a route forward.
- A robust power supply strategy that aligns with ESG requirements.

The strongest projects will treat power as the first design question, not the last procurement item.

FOOTNOTES

[1] International Energy Agency - World Energy Outlook Special Report 2025.

[2] House of Commons - Data centres: planning policy, sustainability, and resilience 3rd November 2025.

[3] OFGEM Demand Connections Reform 13th February 2026.

[4] OFGEM Demand Connections Reform 13th February 2026.

[5] OFGEM Demand Connections Reform 13th February 2026.

[6] Institution of Gas Engineers and Managers April 2026.

[7] Institution of Gas Engineers and Managers April 2026.

RELATED CAPABILITIES

- Data Centers & Digital Infrastructure
- Power
- Renewables & Storage
- Energy Transition
- ESG & Energy Transition

MEET THE TEAM

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