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DATA CENTRE REVIEW

TREND REPORT



From backup to backbone

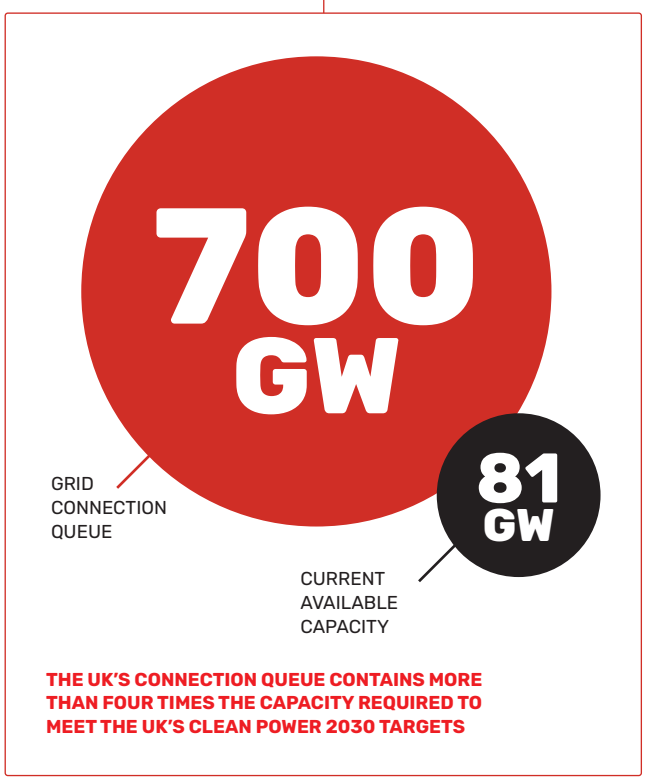
Why battery strategy is changing in 2026

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YUASA
by GS YUASA

Introduction

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THE UK'S CONNECTION QUEUE CONTAINS MORE THAN FOUR TIMES THE CAPACITY REQUIRED TO MEET THE UK'S CLEAN POWER 2030 TARGETS

Data centres have always been built around resilience. If power fails, the facility cannot simply pause, wait and restart when the grid is ready. That's why uptime is dependent on multiple layers of protection, from grid connections and generators to uninterruptible power supply (UPS) systems and the batteries that sit behind them.

But in 2026, resilience is becoming a more complicated question. That's as a result of the speed in which the data centre sector is growing, driven in large part by the continued rise of artificial intelligence (AI). The awkward part of that growth is that it's creating huge demand for new power capacity, at the same time grid access has become harder to secure.

The UK's grid connection queue currently stands at over 700 GW[1], and while that is a mix of both generation and demand, it absolutely dwarfs the current 81 GW of capacity that is currently available on the grid. Of course, many of those projects are speculative and unlikely to ever be built – but it's forcing data centre operators to think differently.

That's because power is no longer just a question of securing a larger grid connection or installing enough backup to ride through an outage. It is becoming a question of how that power is managed, how resilient the site is under changing conditions, and how infrastructure can be designed to support growth without placing unsustainable pressure on the wider electricity system.

While AI has driven the growth in data centre construction, the technology has also contributed to other changes elsewhere. After all, the technology is not only responsible for increasing how much power data centres need, but also how the demand curve plays out. Traditional cloud workloads were often more predictable, but AI training and inference can create more volatile load profiles, with rapid changes in demand as large clusters of graphics processing units (GPUs) ramp up and down[2]. That has implications for the grid, but also for the UPS and battery systems expected to support critical loads when stability matters most.

As Damir Špoljarič, Founder and Managing Partner of Gi21 Capital, puts it, "It is common knowledge that AI has increased how much power a given data centre draws. What is less discussed is how AI has changed the shape of that draw."

This is why batteries can no longer be treated as passive backup components that sit quietly in the background until something goes wrong. They are becoming part of a wider power strategy, tied to uptime, flexibility, sustainability, operational efficiency and long-term infrastructure planning.

That does not mean every site needs the same answer. Some operators will continue to rely on well-established VRLA batteries where proven performance, cost and recyclability remain priorities. Others may turn to lithium-ion where space, weight and lifecycle advantages are more important. In some cases, batteries may also form part of broader on-site power strategies, supporting renewables, peak shaving, microgrid-style architectures or future grid flexibility services[3].

The challenge is choosing the right strategy for the right application. Battery selection now involves far more than comparing upfront cost. Operators need to weigh footprint, service life, maintenance requirements, safety, monitoring capability, replacement cycles, sustainability expectations and total cost of ownership.

This report examines that shift. It looks at how AI is changing backup power requirements, why batteries are playing a broader role in on-site power strategies, and how monitoring, safety, service life and regulation are reshaping decision-making. Above all, it explores why, in 2026, the battery is moving from backup to backbone.

The new pressures on data centre resilience

The biggest challenge facing data centre operators today is no longer simply securing enough power. It is ensuring that power infrastructure is resilient enough to support a new generation of AI workloads while operating within an increasingly constrained electricity system.

As mentioned in the introduction, grid connections remain one of the industry's biggest challenges. The demand for new connections rose from around 41 GW in late 2024 to approximately 125 GW by the middle of 2025. Around 140 proposed data centre projects represent roughly 50 GW of that demand sitting in the queue[4].

That's forcing a rethink for operators who are looking to build new data centres. Rather than relying on the traditional data centre hubs around London and Slough, new projects are popping up in areas with an abundance of power – such as Scotland and the North East of England.

It's also forcing speculative investors to scramble to get into the grid connection queue in the hope that their project will attract a data centre operator looking for a site. That's why the queue is likely bigger than the eventual built reality, but for operators – simply getting grid access is not the only challenge.

AI is changing not only how much electricity data centres consume, but how they consume it. Traditional cloud workloads tended to produce relatively predictable demand, whereas AI training and inference can introduce rapid swings in power consumption as large GPU clusters ramp workloads up and down.

As Karl Mendez, Chief Executive of CWCS Managed Hosting, explains, "AI training and inference workloads swing fast. You are increasingly protecting against your own demand profile, not just a mains failure."

That changing demand profile has significant implications for power infrastructure. Amey Karnik, Head of Solutions for Industry at Ramboll UK & Ireland, notes that the combination of sustained AI training loads and the rapid fluctuations associated with inference creates sudden step changes in demand that place greater stress on transformers, switchgear, UPS systems and the batteries supporting them. Equipment designed around more predictable load profiles now has to respond faster and more frequently, potentially accelerating wear while reducing the margin for error.

At the same time, operators face more choice than ever before when selecting battery technology. It's no longer a straightforward decision between lead-acid and lithium-ion. Factors including service life, footprint, maintenance requirements, charging characteristics, safety, sustainability and total cost of ownership all need to be balanced against the specific requirements of each site. The right solution for one data centre may be entirely unsuitable for another.

Visibility has also become increasingly important. As battery systems become more strategic assets, operators need better insight into how they are performing throughout their lifecycle. Many battery manufacturers now include improved monitoring, which allows faults to be identified earlier, maintenance to be planned more effectively, and replacement decisions to be based on real operational data rather than fixed schedules[5]. As battery estates grow larger and more complex, this level of intelligence becomes increasingly valuable.

Alongside these technical challenges, operators are also navigating growing regulatory and environmental scrutiny.

> AI TRAINING AND INFERENCE CAN INTRODUCE RAPID SWINGS IN POWER CONSUMPTION AS LARGE GPU CLUSTERS RAMP WORKLOADS UP AND DOWN

Governments, regulators and local communities are paying closer attention to how data centres consume electricity and demonstrate resilience. Reporting expectations are increasing, while operators are also being encouraged to make better use of on-site energy assets to support wider grid flexibility where appropriate[6].

Finally, supply chains continue to add uncertainty. While battery availability has improved significantly, the supporting infrastructure required to connect new capacity – including transformers, switchgear and high-voltage equipment – can still introduce significant delays[7]. For many projects, securing the battery is no longer the limiting factor; energising it is.

Taken together, these pressures mean battery strategy can no longer be treated as an afterthought. Selecting the right technology, understanding how it will perform throughout its operational life, and integrating it into a wider resilience strategy has become one of the defining infrastructure challenges facing modern data centres.

Insights from the industry

Across the data centre industry, the role of batteries is being reassessed. What was once treated primarily as a compliance requirement or back-up safeguard is increasingly being viewed as part of a wider power strategy.

Tim Foster, Director of Energy for Business at Conrad Energy, is seeing that shift first-hand. "Batteries are increasingly moving from a purely resilience-focused role to becoming active energy assets," he says, with operators exploring how flexibility markets, peak-demand savings, optimised renewable consumption and grid-stability services can support the business case for investment.

That marks an important change in how resilience is understood. It is no longer only about having enough redundancy to survive an outage, but about building infrastructure that can adapt to changing conditions.

Harqs Singh, Chief Technology Officer and Founder of InfraPartners, argues that resilience should now be seen as "the facility's ability to adapt to changing conditions, whether that is fluctuating energy availability, evolving AI hardware requirements or future shifts in power architecture." That means looking at the whole power chain, from grid connection and behind-the-meter storage through to cooling, UPS systems and IT load.

This broader view is also changing how operators assess battery technology. There is no single chemistry or configuration that can meet every requirement. Instead, battery selection has become a site-specific decision shaped by footprint, lifecycle, maintainability, safety, response characteristics and total cost of ownership.

For Tate Cantrell, Chief Technology Officer of Nordic operator Verne, the decision has moved beyond headline runtime or megawatt-hours. Operators now have to consider degradation, control integration and fire protection, alongside the practical realities of where and how a battery system will be installed. "Battery incidents have increased the focus of insurers, permitting authorities and emergency-response teams," he says, adding that chemistry, enclosure design, location, separation distances, detection and suppression all need to be weighed together.

Monitoring is becoming just as important as chemistry. As battery estates become larger and more strategically important, operators need a clearer understanding of how their systems behave under real operating conditions, not just during routine checks.

Darya Rüwald, Head of Battery Intelligence at ACCURE, warns that even apparently simple metrics can mislead. "State of charge is not a fixed number," she says. "It shifts with the power rate the battery is operating at and a basic battery-management system rarely accounts for this." A reading taken at rest can look very different from the true state of charge when a battery is called on to deliver full back-up power.

That visibility matters because it can change how maintenance is planned. Instead of waiting for faults to become failures, operators can identify early signs of degradation, schedule intervention more effectively and reduce the risk of unexpected issues affecting resilience.

Nigel Hedges, Application and Technical Specialist at Fluke, puts the point simply, "Performance depends on physical infrastructure that has to be installed, monitored and trusted under load."

The same thinking is beginning to shape wider on-site power strategies. Batteries are increasingly being considered alongside generation, renewables, UPS systems and energy management platforms, particularly where grid capacity is constrained. For some operators, that could mean using batteries to support peak shaving, improve renewable consumption or participate in flexibility services where the regulatory and commercial model allows.

> BATTERY INCIDENTS HAVE INCREASED THE FOCUS OF INSURERS, PERMITTING AUTHORITIES AND EMERGENCY-RESPONSE TEAMS
>
> TATE CANTRELL, CHIEF TECHNOLOGY OFFICER, VERNE,

This does not mean the battery's back-up role is disappearing. Instead, that role is expanding. Data centres will still need batteries that can support critical loads when called upon, but they will also need systems that are monitored, maintained and integrated into a broader strategy for resilience, sustainability and long-term operational value.

The industry direction is clear: by 2028, best practice is unlikely to be defined by battery capacity alone. It will be defined by how intelligently those batteries are selected, monitored, maintained and integrated into the wider power architecture.

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Building battery resilience for the AI era



BY PAUL LOWBRIDGE, GENERAL SALES MANAGER – RESERVE & RENEWABLE POWER, GS YUASA BATTERY SALES UK LTD

The rapid growth of artificial intelligence is reshaping the data centre industry. As workloads become more dynamic and power demands continue to rise, resilience is no longer defined simply by having enough backup power available. Instead, operators must think strategically about how battery technology supports the wider power infrastructure – today and well into the future.

With decades of experience supporting critical power applications around the world, Yuasa understands the evolving challenges facing data centre operators. As AI workloads drive greater power density and increase the demand for uninterrupted availability, selecting the right battery technology has become a critical component of building resilient, future-ready infrastructure.

For decades, batteries have quietly protected critical systems behind the scenes, stepping in only when the unexpected occurs. Today, however, their role is evolving. Modern UPS battery systems are becoming an integral part of resilient power architectures, helping operators respond to increasing energy demands while supporting greater efficiency, improved monitoring and long-term sustainability.

As highlighted throughout this report, there is no single battery technology that suits every application. Every data centre has unique operational requirements, from available footprint and runtime expectations to maintenance strategies, environmental conditions and total cost of ownership. Selecting the right battery should therefore be based on the specific needs of the facility rather than simply following technology trends.

Yuasa's extensive battery portfolio encompasses proven Valve Regulated Lead Acid (VRLA) technologies alongside advance lithium-ion solutions. Together these technologies provide reliable, high-performance energy storage for UPS and critical standby power applications. Designed to deliver dependable high-rate discharge performance, long service life and exceptional reliability, these batteries remain a trusted choice for organisations where business continuity is non-negotiable. Dual-chemistry battery systems can also combine the fast response of lithium-ion along with the endurance of lead acid giving operators greater flexibility to tailor their battery strategy to the specific requirements of the facility.

Understanding the strengths and limitations of each battery chemistry is becoming increasingly important as facilities seek to balance performance, lifecycle expectations, sustainability targets and capital investment. Rather than simply adopting the latest technology, operators should focus on selecting the solution that best aligns with their operational objectives.

Just as important as battery selection is understanding how those batteries perform throughout their operational life. As power infrastructures become increasingly sophisticated, intelligent battery monitoring and proactive maintenance are no longer optional extras. Greater visibility into battery condition enables operators to identify potential issues before they become failures, supporting predictive maintenance strategies that reduce risk, minimise unplanned downtime and maximise return on investment.

This visibility becomes even more valuable as AI workloads introduce increasingly variable power demands. Rather than relying solely on scheduled replacement intervals, operators can make informed decisions based on

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real battery condition, helping optimise performance while extending service life wherever possible. Supporting this approach, Yuasa's technical expertise and battery sizing tools, including ISY, help consultants, contractors and end users accurately specify battery systems that meet the precise requirements of each installation.

Sustainability is also playing an increasingly significant role in battery strategy. As organisations work towards ambitious environmental targets, battery manufacturers must demonstrate responsible sourcing, efficient manufacturing and robust end-of-life recycling processes. A well-managed battery lifecycle not only supports operational resilience but also contributes to wider ESG objectives. With one of the world's most established lead-acid recycling infrastructures, VRLA technology continues to offer a strong circular economy proposition, enabling valuable materials to be recovered and reused to support future battery production.

At Yuasa, we believe effective battery strategy is about far more than supplying products. It begins with understanding each customer's operational requirements and helping them select the most appropriate solution for their application. Our batteries continue to support critical infrastructure projects across a wide range of industries, while our technical specialists work alongside consultants, UPS manufacturers and end users to deliver dependable, long-term power solutions tailored to each installation.

As data centres continue to evolve, so too will the role of batteries. Success will depend not simply on choosing the newest technology, but on building a resilient power strategy where battery selection, intelligent monitoring, technical expertise and sustainable lifecycle management work together to support continuous uptime.

In today's AI-driven world, resilience starts long before the power goes out.



Building a better battery strategy

If battery strategy has become more complex, the answer is not to default to the newest technology or the largest system available. It is to treat batteries as part of the wider power architecture from the outset.

That means looking beyond the battery as an isolated back-up component – in 2026, it is so much more. Batteries need to be considered alongside UPS systems, generators, on-site generation, renewables, energy management platforms and the grid connection itself. The aim is not simply to survive a power failure, but to create a more resilient, efficient and adaptable power strategy.

A good place to start is ensuring you select the right battery technology for the job – and there are numerous options you can choose from.

- VRLA batteries remain a proven option for many UPS environments, particularly where upfront cost, reliability and established recycling routes are important.
- Lithium-ion, including LFP chemistries, can offer advantages where footprint, weight, charge time and lifecycle are higher priorities.
- Other technologies, including sodium-ion, flow batteries and second-life EV batteries, may also play a role in some use cases, but their suitability will depend heavily on the site, duty cycle and risk profile.

And that's the important point to take away – there is no universal answer. You have to assess your own strategy – a strategy that should be shaped by the requirements of the facility, including load profile, available space, runtime expectations, maintenance access, safety requirements, sustainability goals and total cost of ownership.

For AI-ready environments specifically, operators also need to consider how often batteries may be called upon to support more variable demand, and what that means for service life and replacement planning.

That's where monitoring can come in. As batteries become more strategically important, operators need better visibility of how they are performing in real conditions. That means moving beyond basic status checks and towards systems that can identify degradation, flag anomalies, support predictive maintenance and provide a clearer picture of remaining useful life. In practice, this can help operators move from reactive maintenance to planned intervention, reducing the risk of unexpected failure.

Better data can also support better investment decisions. If operators understand how batteries are aging, how they respond under load and where capacity is being underused, they can make more informed choices about replacement, expansion and future system design. That is particularly important as data centres face increasing pressure to demonstrate resilience, efficiency and environmental responsibility.

Battery storage can also support more flexible operating models. Where sites are paired with on-site generation or renewables, batteries can help smooth demand, improve consumption of locally generated power, reduce peak loads and potentially support a phased approach to energisation while grid upgrades are awaited. In some cases, and where regulatory and commercial frameworks allow, batteries may also create opportunities to participate in flexibility or grid-balancing services[8].

This is where constraints can become an advantage. The most forward-looking operators are beginning to view batteries, UPS systems, on-site generation and energy management as parts of a coordinated system rather than separate assets. As Damir Špoljarič suggests, these elements can start to behave as a microgrid in their own right.

> IF OPERATORS UNDERSTAND HOW BATTERIES ARE AGING, HOW THEY RESPOND UNDER LOAD AND WHERE CAPACITY IS BEING UNDERUSED, THEY CAN MAKE MORE INFORMED CHOICES ABOUT REPLACEMENT, EXPANSION AND FUTURE SYSTEM DESIGN

That does not mean every data centre should become a grid-responsive asset overnight. Nor does it mean battery storage is a simple workaround for constrained grid capacity. But when designed properly, batteries can help operators strengthen resilience, manage more volatile loads, improve operational flexibility and support long-term infrastructure planning.

The solution, then, is not simply more battery capacity. It's a better battery strategy: the right technology, in the right architecture, monitored in the right way, and integrated into the wider power system from day one.

From backup to backbone

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The AI boom is changing the power challenge for data centres. It is increasing demand, but it is also changing how that demand behaves, with more variable load profiles placing new pressure on the grid, UPS systems and the batteries that support critical infrastructure.

At the same time, grid access is becoming harder to secure, regulatory expectations are tightening and operators are under growing pressure to demonstrate that new data centre capacity can be delivered responsibly. In that environment, resilience can no longer be viewed simply as a matter of installing enough back-up power to survive an outage.

As a result of all these changes, so too is the role of the battery. For a long time it's been treated as passive insurance, and yet now batteries are becoming strategic assets that can support uptime, flexibility, operational efficiency, and long-term infrastructure planning. And that's just the beginning – we've seen cases of operators using batteries to make better use of on-site generation, reduce peak demand, and support wider grid flexibility – all things that look great on sustainability reports.

But it's important to remember, when it comes to batteries, it's not as simple as putting one in and calling it a day. Every data centre has its own constraints, from load profile and available space to safety requirements, maintenance access, sustainability expectations and total cost of ownership. That means a poorly chosen battery strategy can create as many problems as it solves.

That is why operators need to treat power as a strategic design decision from the outset. The right approach will depend on selecting the appropriate battery technology, integrating it into the wider power architecture and ensuring it is properly monitored throughout its service life.

As Gareth Williams, Director and Data Centre Lead for the UK, India, Middle East and Africa at Arup, puts it, "Adaptability, not redundancy alone, will be the marker of mature practice."

KEY QUESTIONS FOR OPERATORS

IS POWER BEING TREATED AS A STRATEGIC DESIGN DECISION FROM DAY ONE OF YOUR PROJECTS?

DOES YOUR BATTERY STRATEGY DEFAULT TO THE NEWEST TECHNOLOGY, OR ARE YOU MATCHING THE CHEMISTRY TO THE USE CASE?

COULD ON-SITE BATTERY STORAGE EARN ITS KEEP THROUGH GRID-BALANCING OR FLEXIBILITY SERVICES?

ARE YOUR MONITORING AND PREDICTIVE-MAINTENANCE CAPABILITIES GOOD ENOUGH TO CATCH PROBLEMS BEFORE THEY BITE?

HOW EXPOSED ARE YOU TO CONNECTION DELAYS, AND COULD FLEXIBILITY MOVE YOU UP THE QUEUE?

That captures the direction of travel. The data centres best placed for the next phase of growth will not be those that view batteries as a static back-up component, but those that understand how battery strategy can support resilience, efficiency, sustainability and future flexibility.

In 2026, the battery is no longer sitting quietly in the background waiting for something to go wrong. It is becoming one of the key enablers of resilient, efficient and future-ready data centre infrastructure – moving from back-up to backbone.

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