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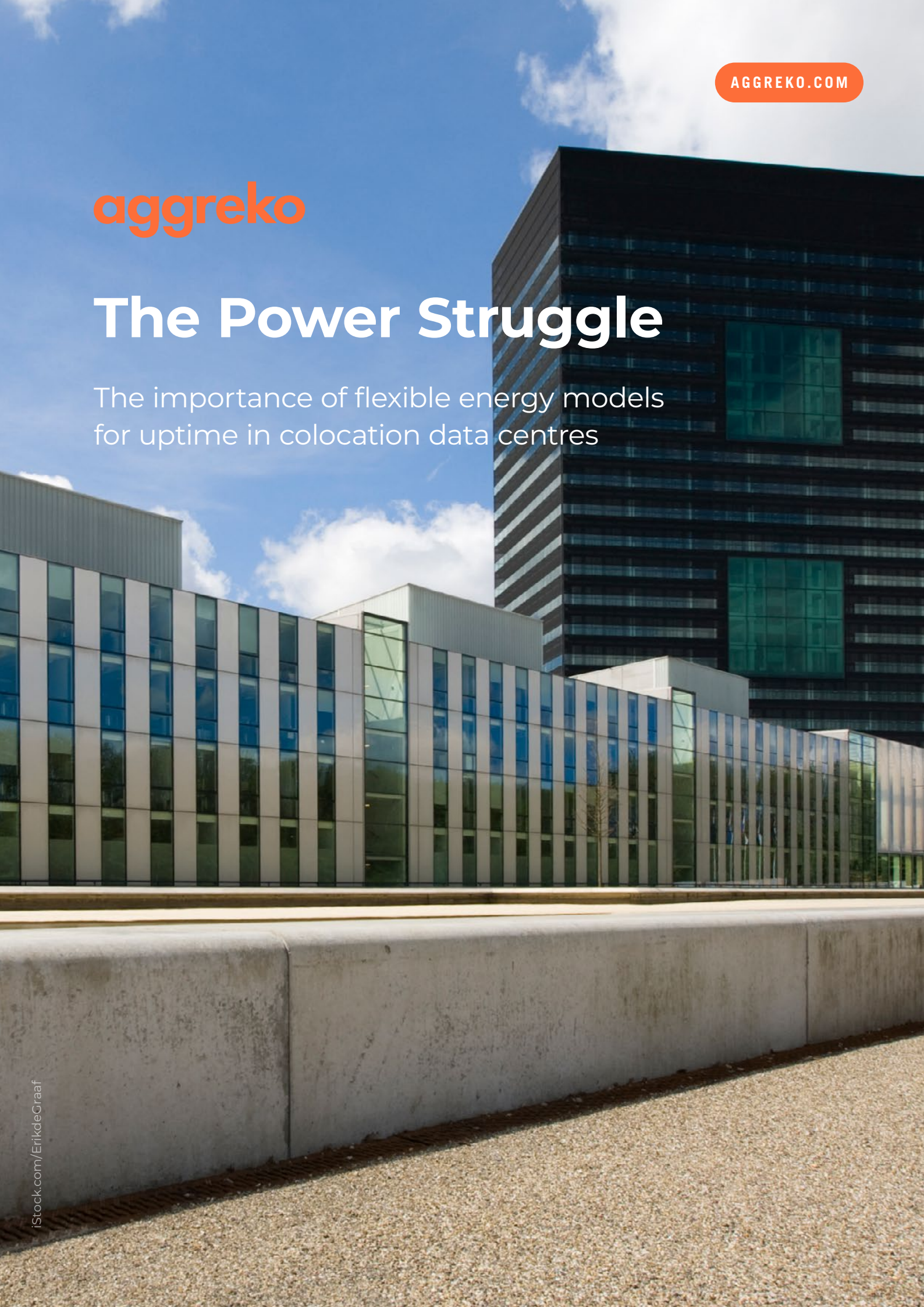
The Power Struggle

The importance of flexible energy models for uptime in colocation data centres



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The Energy Crisis in Context

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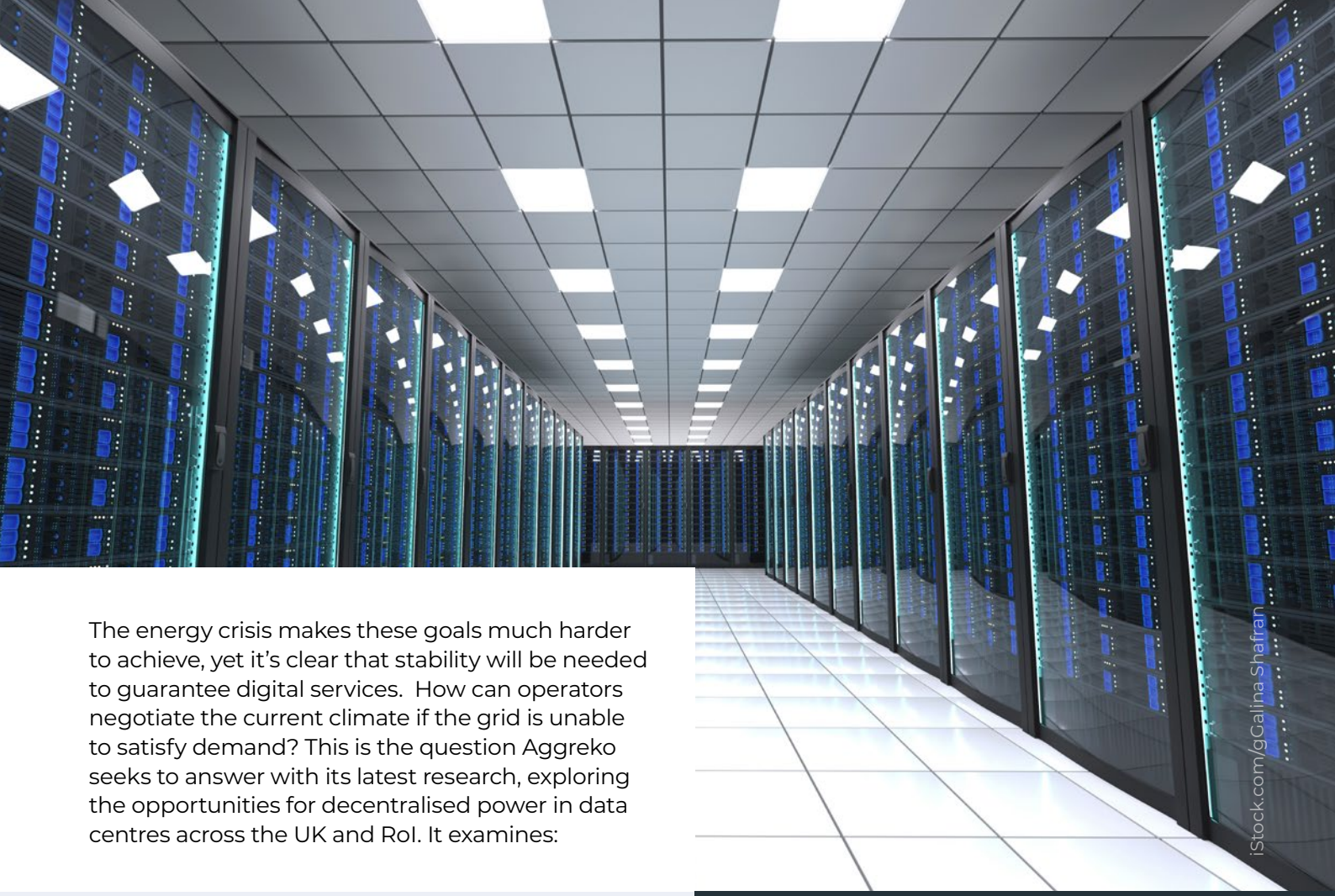
Data centres are critical infrastructure, but the power needed to keep them online cannot always be guaranteed.

According to the Irish Times, electricity consumed by data centres in Republic of Ireland (RoI) has jumped 144% in five years.[1] Meanwhile in the UK, there have been long-held concerns about the 'fragility' of the national grid and its ability to cope with the market's exponential growth.[2] How can these issues be managed effectively during a global energy crisis?

As it stands, businesses cannot rely on a stable market where prices are predictable and supply is steady. The 'perfect storm' of factors that have led to dramatic price hikes show no sign of easing, especially as flows of natural gas have been interrupted by political instability in mainland Europe. The price per thermal unit for natural gas reached record highs in June 2022 (correct at time of writing).[3] While the UK and RoI benefit from access to domestic gas reserves, neither country has been immune from the volatility seen in every market across the world.

Some point to the strain data centres place on existing infrastructure and how this is exacerbating the problems for stable grid operation. But as the RoI's Industrial Development Agency notes, these businesses cannot be solely responsible for the threat of outages and many of the central issues remain supply side. Regardless, getting power into these facilities is paramount – not only to keep servers running but also to alleviate concerns from both customers and investors.[4]

1. https://www.irishtimes.com/business/energy-and-resources/electricity-consumed-by-data-centres-jumps-by-144-in-five-years-1.4781365
2. https://www.thetimes.co.uk/article/fragility-of-national-grid-amid-data-centre-surge-is-a-shocking-state-of-affairs-0s5ld0mnn
3. https://tradingeconomics.com/commodity/natural-gas
4. https://www.irishtimes.com/business/economy/data-centres-scapegoated-for-electricity-supply-crisis-ida-records-show-1.4772426



The energy crisis makes these goals much harder to achieve, yet it's clear that stability will be needed to guarantee digital services. How can operators negotiate the current climate if the grid is unable to satisfy demand? This is the question Aggreko seeks to answer with its latest research, exploring the opportunities for decentralised power in data centres across the UK and RoI. It examines:

- **The impact of energy prices on competitiveness**
- **Grid reliability and maintaining uptime**
- **The trend towards Energy as a Service (EaaS) models**
- **Confidence in government support**
- **Opportunities and challenges around Demand Side Response**

By surveying operators, our aim is to identify where flexible bridging solutions can forge a credible path through the crisis. No single action can bring energy prices down for all, but certain technologies will be able to stabilise supply and help businesses tackle other challenges in process, such as carbon emissions. The survey's results are discussed in this report.

WHO DID AGGREKO INTERVIEW?

253

data centre professionals across the UK and Republic of Ireland (202 in the UK; 51 in RoI)

Facilities with

100-2000+ employees

Junior and Senior Managers, Directors and C-suite Executives

Research took place

April 2022

Note: the majority of respondents to this research are expected to be colocation operators, given they had fewer than 1,000 employees and an annual turnover of less than £10 million.

Key Findings

50%

Both UK and RoI data centres have seen their energy bills increase significantly over the last three years. Some by as much as 50%.

Energy Crisis

The energy crisis is hitting the industry's margins, with 58% of the UK reporting a 'significant impact'.

65%

of UK data centres have experienced power outages in the last 18 months; 60% in the RoI.

Confidence Lukewarm

Industry confidence in government support is lukewarm across both regions.

of UK operators said they have considered generating their own electricity; 49% in the RoI.

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Sustainability and power security

are the main drivers for decentralised energy solutions.

Demand Side Response

Lack of in-house technical skills hinders some data centres' participation in Demand Side Response and other saving mechanisms.

Sustainability

Sustainability will be key to the wider roll-out of decentralised energy solutions across the industry.

Capex constraints

Hired power has become a popular route to avoid capex constraints.

Energy Service Contracts

EaaS models, where operators pay per kWh are a popular means of procuring on-site power, though long-term contracts may expose them to high penalties if demand changes. The volatile energy market may also lock businesses into inflated pricing.

iStock.com/Jian Fan

What are Data Centre Operators Thinking?

Understanding Energy Use

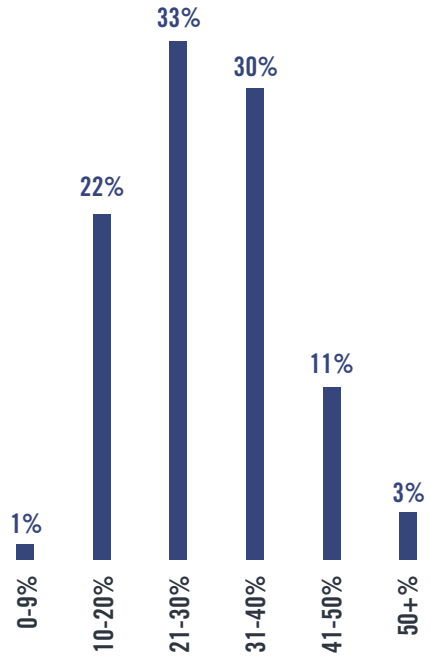
The impact of the energy crisis is arguably best seen through businesses' energy spend.

Over

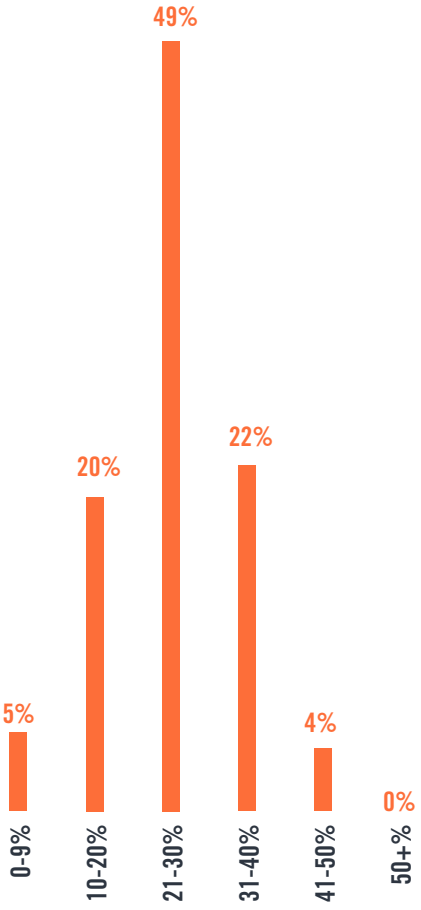
60%

of UK data centres, for example, said their electricity bills had increased between 21%-40% over the last three years.

Some of the sample even reported hikes of more than 50%. For 49% of RoI data centres, electricity bills had increased between 21%-30%, though again some recorded higher. These results are perhaps unsurprising given the current cost of wholesale energy and reports of data centre consumption growing by three figures over the past five years, but it's still illustrative of the pressure that many operators are under.



HOW MUCH HAVE YOUR COMPANY'S ELECTRICITY BILLS INCREASED IN THE LAST THREE YEARS? (UK)



HOW MUCH HAVE YOUR COMPANY'S ELECTRICITY BILLS INCREASED IN THE LAST THREE YEARS? (ROI)

Expectations around spending also offer some insight.

At

57%

the majority of UK operators are currently spending between 10%-30% of their total operating costs on electricity.

However, 25% of the sample are paying well over that amount. In the next six months, most expected to be paying similar, although those who said they anticipate paying 40% or more had increased. In 12 months' time, the majority again expected to pay between 10%-30%, but those who chose one of the higher bands increased once more. This gradual shift suggests low confidence in the energy market over the short-term, with most expecting greater strain on the balance sheet.

The RoI's results paint a slightly different picture. At 63%, most are currently spending between 21%-40% of their total operating costs on electricity. Over the next six months, representation across the different bands was largely similar and the pattern repeated by the one-year mark.

On first inspection, the RoI appears better equipped to deal with the financial challenges associated with the energy crisis, though reports suggest otherwise.

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As Data Centre Dynamics points out, turbulence in the energy market is now causing a rapid "deterioration in bottom-line metrics", particularly as its all-in pricing model requires facilities to absorb any additional costs and price increases.[5] This is where hired solutions offer a convincing alternative for the market, providing the stability operators need without the threat of dramatic price hikes or long-term agreements with unfavourable terms.

5. https://www.datacenterdynamics.com/en/news/uk-and-european-colo-firm-faces-energy-price-turbulence-warns-fti/

Crisis and Competition

Results suggest the UK data centre market has suffered more than the RoI. At 58%, the majority said rising energy bills had a 'significant impact' on their margin in the last two years. In the RoI, the results were more evenly split between 'slight' and 'significant' impact at 47% and 49% respectively. That said, in both markets only 4% reported no change.

Schemes like Demand Side Response (DSR), heating system upgrades and the introduction of LED lighting were the most popular methods for lowering energy consumption among UK operators. However, representation was consistent across all listed options. In the RoI, Combined Heat and Power (CHP), LED lighting and newer, more efficient heating systems took the top three. Again, all options listed scored high, with only renewables in the RoI recording slightly lower when compared to the UK. Whether this is down to the RoI already being more involved with renewable power will need further examination.

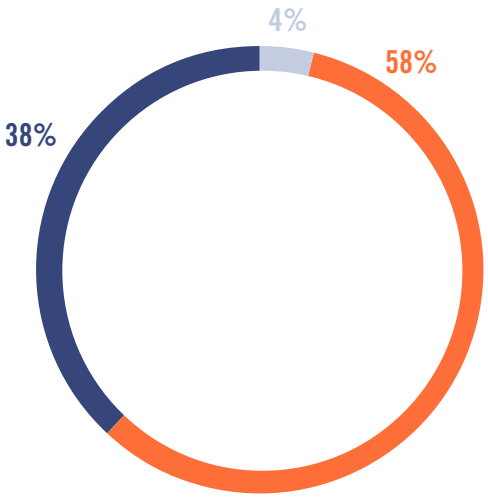
Arguably the most significant results came from questions relating to competition.

Over

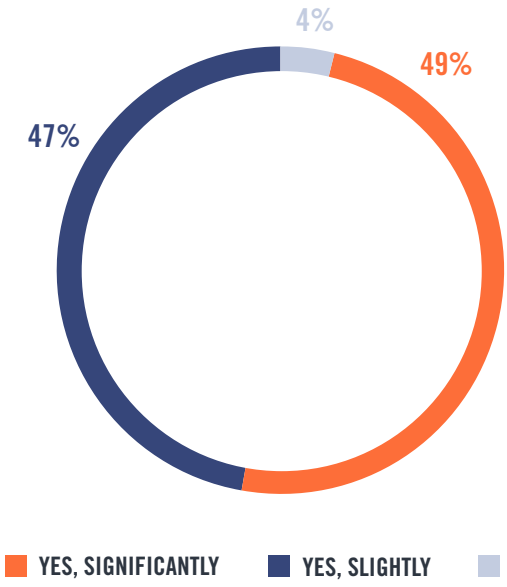
70%

of UK businesses said the energy crisis was making it harder to be competitive; only 20% disagreed.

HAVE ENERGY BILLS HAD AN IMPACT ON YOUR COMPANY'S MARGIN IN THE PAST TWO YEARS? (UK)



HAVE ENERGY BILLS HAD AN IMPACT ON YOUR COMPANY'S MARGIN IN THE PAST TWO YEARS? (ROI)



In the RoI,

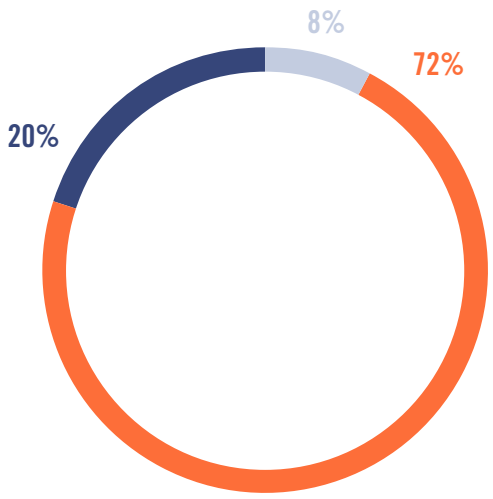
73%

said the current market was making it harder to stay on level terms with other businesses.

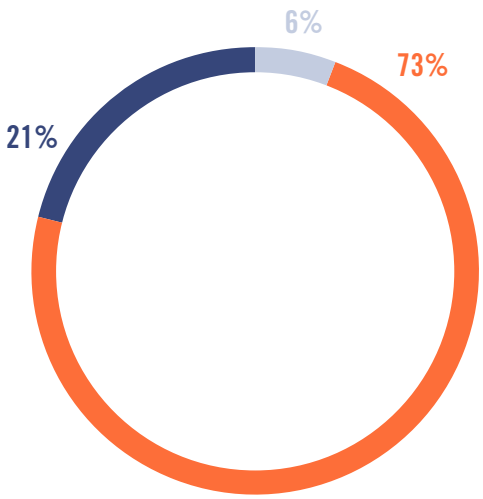
In light of these challenges, both regions understandably said they take efficiency seriously. Almost the entire sample in the RoI described their company's attitude to reducing energy consumption as either a 'medium' or 'high' priority. In the UK, 88% said the same.

The European data centre market has several prime locations for operators, many with free natural cooling and readily available renewable power. As such, it was important for Aggreko to determine where respondents ranked their organisation against peers on the continent. UK businesses were evenly split on whether the current energy crisis had made them more competitive when compared to key markets such as France and Germany, while 12% were unsure. The RoI saw things differently – at 47% the majority said it had made them less competitive.

ARE INCREASING ENERGY COSTS IMPACTING YOUR COMPANY'S COMPETITIVENESS? (UK)



ARE INCREASING ENERGY COSTS IMPACTING YOUR COMPANY'S COMPETITIVENESS? (ROI)



YES NO UNSURE

Power Security

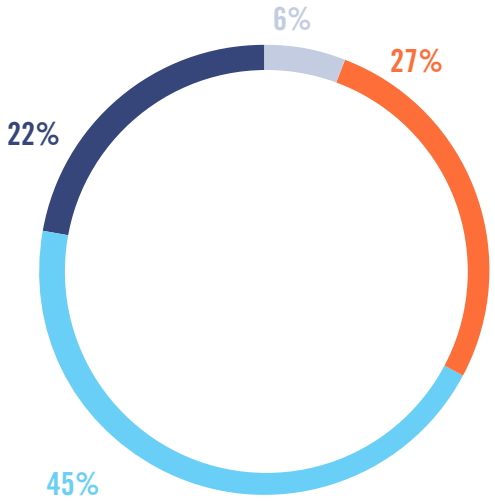
Over 70%

of UK businesses described power continuity as either ‘a concern’ or ‘major concern’ to their business, while just 6% said it was not. These results are not unfounded, as 65% admitted they had experienced power cuts in the last 18 months. Of that group, many reported having to either reduce or pause operations while the outage was resolved.

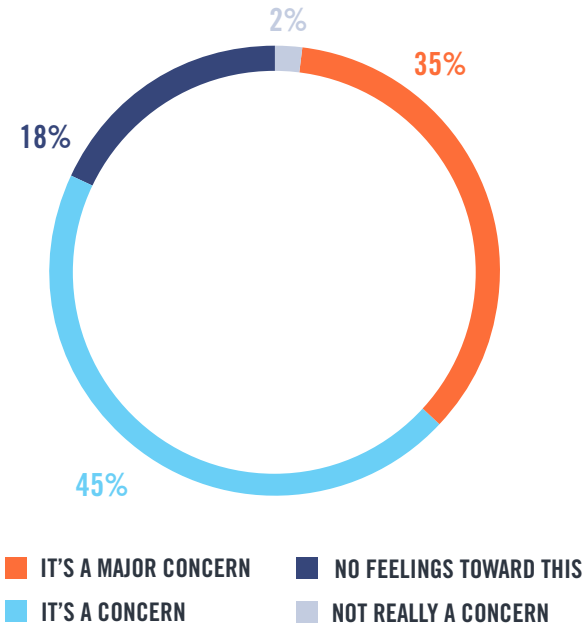
Similar numbers were also seen in the RoI, where 80% described power continuity as ‘a concern’ or ‘major concern’. Like the UK, over 60% of businesses in the region had recently suffered from power outages. All within that group reported having to either pause or reduce operations. These numbers are particularly concerning for an industry that is predicated on availability and where downtime should be kept under 28.8 hours for the entire year at a minimum. For higher tier facilities, this number is even lower.[6]

In the UK, businesses are somewhat confident in the government’s latest energy strategy. For example, 29% said they were ‘very confident’, although 36% were ‘slightly unconfident’ or ‘very unconfident’. The number of those selecting ‘very unconfident’ also increased when the group were asked about the next five years.

IS POWER CONTINUITY
A CONCERN TO YOUR BUSINESS? (UK)



IS POWER CONTINUITY
A CONCERN TO YOUR BUSINESS? (ROI)



6. https://journal.uptimeinstitute.com/explaining-uptime-institutes-tier-classification-system/

The UK government announced financial support for high energy users in April 2022. However, this mostly focused on heavy industry, such as steel and paper production.[7]

Lower confidence was reported in the RoI, where only 6% said they were 'very confident' in their government's energy strategy.

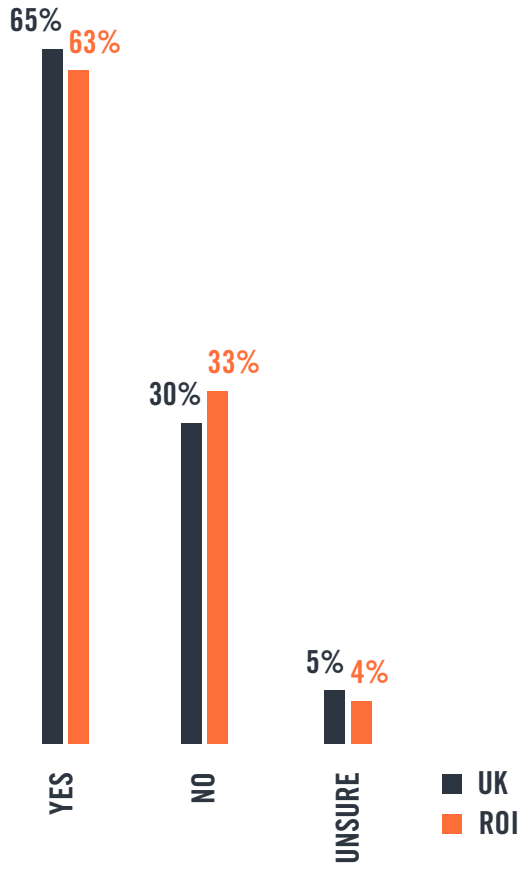
At

45%

the majority said they were either 'slightly unconfident' or 'very unconfident'.

Respondents were mostly split when asked about the mid- and long-term outlook. These findings follow reports of a government-imposed restriction on data centre development in order to manage electricity demand and keep climate targets on track.[8]

HAS YOUR BUSINESS EXPERIENCED ANY POWER CUTS IN THE LAST 18 MONTHS?



7. https://www.gov.uk/government/news/high-energy-usage-businesses-to-benefit-from-further-government-support
8. https://www.irishtimes.com/business/energy-and-resources/climate-plan-government-may-clamp-down-on-data-centre-development-1.4719572

Decentralised Energy Solutions

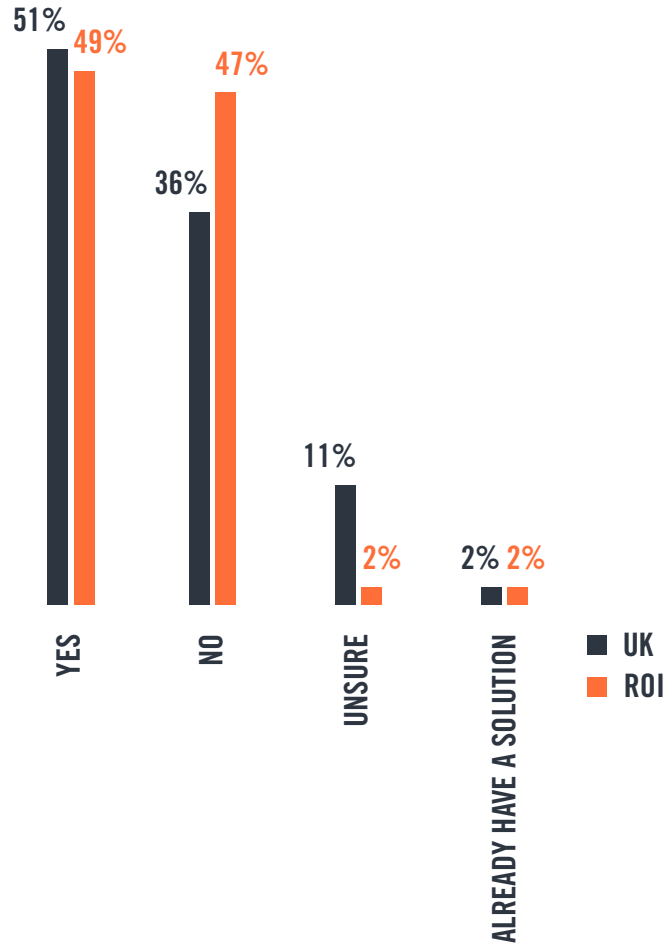
Decentralised energy solutions provide greater independence from the grid – a key advantage for uptime in data centre markets where existing infrastructure is struggling to cope.

Yet only

51%

of UK operators said they had considered generating their own electricity, while 36% said they had not and 11% were unsure.

HAS YOUR COMPANY EVER CONSIDERED GENERATING ITS OWN ENERGY? (I.E. DECENTRALISED ENERGY SOLUTION)



Similar splits were also recorded in the RoI, though fewer were unsure. Just 2% of businesses in both markets said they already had a solution in place.

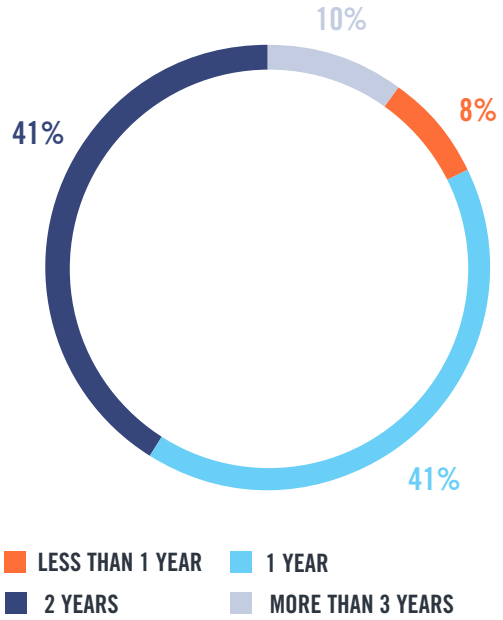
Sustainability was the most popular driver among UK respondents who said their business had considered generating its own electricity. This was followed by security of supply and lower energy costs. In the RoI, security of supply was the most popular answer, with sustainability and lower energy costs a distant second and third. It's evident that stability is what motivates the industry despite the challenges that rising costs have inflicted on operating margins in recent months. That said, sustainability is also influential for both markets, so any investment put towards a solution would need to have tangible benefits for the environment.

Energy as a Service (EaaS)

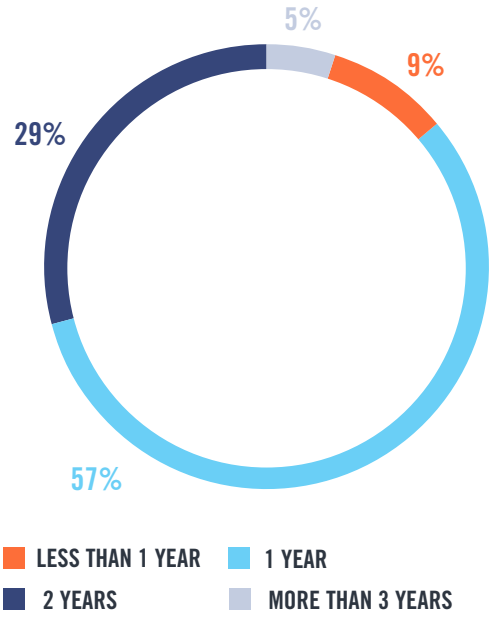
In both markets, EaaS contracts, where businesses pay for electricity per kWh, were the most popular way to procure decentralised energy solutions. However, in the RoI just under half said they would purchase outright. The majority using a form of capex-free EaaS in the UK had either a one- or two-year fixed energy price agreement in place. In the RoI, most were on a one-year deal, though almost a third were locked into a two-year contract.

These figures reveal a serious challenge that could see costs snowball without a coherent strategy. Those currently on one-year EaaS contract, for example, will soon be met with exorbitant fixed energy prices, while those tied into longer deals run the risk of penalties for excessively high demand during peak periods.

HOW LONG ARE ENERGY PRICES FIXED FOR AS PART OF YOUR EAAS CONTRACT? (UK)



HOW LONG ARE ENERGY PRICES FIXED FOR AS PART OF YOUR EAAS CONTRACT? (ROI)



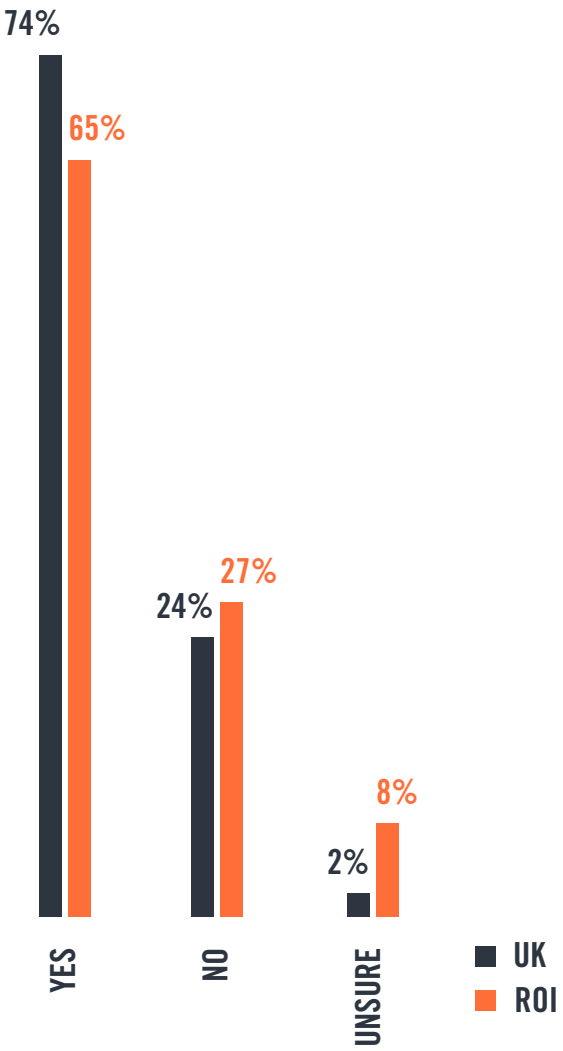
For those purchasing a solution outright, the preferred payback period averaged seven years in the UK; in the RoI it was six. These long repayments may alleviate some of the upfront investment needed for new equipment, though businesses could end up paying off a balance for obsolete or outdated plant.

Among UK respondents, outdated technology was given as the biggest barrier to implementing a decentralised energy solution. Again, hired power will be able to solve these issues as packages are typically supported by engineers who are able to guarantee optimal performance. These solutions can also be easily replaced as newer, more efficient models are introduced to market.

Demand Side Response (DSR)

The short-term lowering of electricity use in exchange for reduced wholesale prices is a popular tool for energy-intensive businesses. In the UK, 74% said they were engaged in a DSR scheme; in the RoI 65% said the same. These figures are notable given the well-publicised grid challenges in Ireland. EirGrid, for instance, announced it will no longer accept new data centre applications in the Dublin area before 2028, while the rest of the country will be assessed on a case-by-case basis.[9]

ARE YOU ACCESSING LOWER ELECTRICITY TARIFFS IN RETURN FOR SHORT-TERM LOWERING OF ELECTRICITY DEMAND (DEMAND SIDE RESPONSE)?

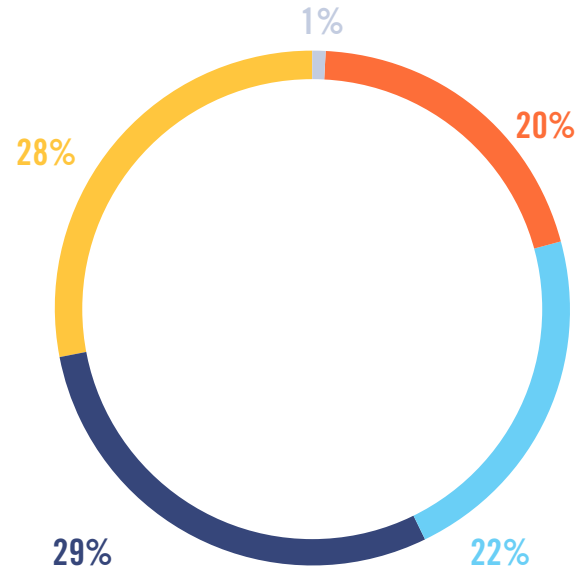


DSR will not be able to solve the country's supply challenge on its own, but it's not unreasonable to think it will eventually become a requirement for high energy users in the region. Recent policy recommendations in the RoI appear to support this argument. In September 2021, researchers from the University of Cork proposed that new data centres should only be allowed to connect to the grid if they meet their own electricity requirements with low-carbon on-site power when national supplies are under pressure.[10]

9. https://www.datacenterdynamics.com/en/news/irish-government-could-restrict-data-center-building/
10. https://www.irishtimes.com/news/environment/data-centres-should-use-zero-emissions-electricity-when-grid-faces-high-demand-experts-say-1.4668671

UK facilities that had not participated in a DSR scheme identified ‘concerns about impact on uptime’ as the biggest barrier. Both regions also listed ‘lack of technical resource’ as another potential issue. Again, these issues highlight the need for consultants with relevant engineering knowledge as they will be able to make changes to a facility’s power profile without causing disruption.

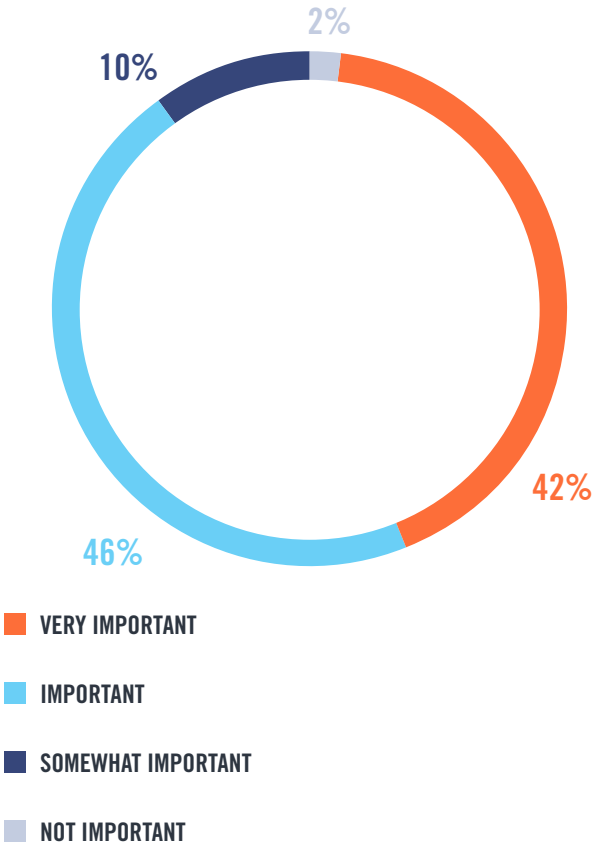
WHAT IS THE BIGGEST SINGLE BARRIER TO YOU IMPLEMENTING A DECENTRALISED ENERGY SOLUTION? (UK AND ROI)



Sacrifices and Sustainability

The energy crisis is inevitably putting pressure on other important industry issues. Respondents in both regions said development of skills, CSR initiatives and sustainability drives had all been sacrificed to compensate for energy price increases over the past year. Only 5% of the entire sample said no cutbacks had been made.

HOW IMPORTANT IS THE SUSTAINABILITY ARGUMENT IN ANY DECISION TO IMPLEMENT A DISTRIBUTED ENERGY SOLUTION? (UK AND ROI)



But there are areas where progress has been made –

50%

of UK data centres said the energy crisis had accelerated their efforts towards net zero. In the RoI,

33%

said the same.

These figures are important, not least because many of the industry's most recognisable names have already committed to carbon-free operation well before 2050.[11]

It appears the wider roll-out of decentralised energy within data centres will largely depend on how sustainable it can be. Clear majorities in both regions said it was either 'important' or 'very important' when deciding whether to implement a solution. This emphasises the importance of strategic suppliers that are committed to the most efficient technologies, with engineers who are able to make effective interventions within data centres when newer, more efficient equipment is introduced.

11. https://www.datacenterdynamics.com/en/opinions/data-center-sustainability/

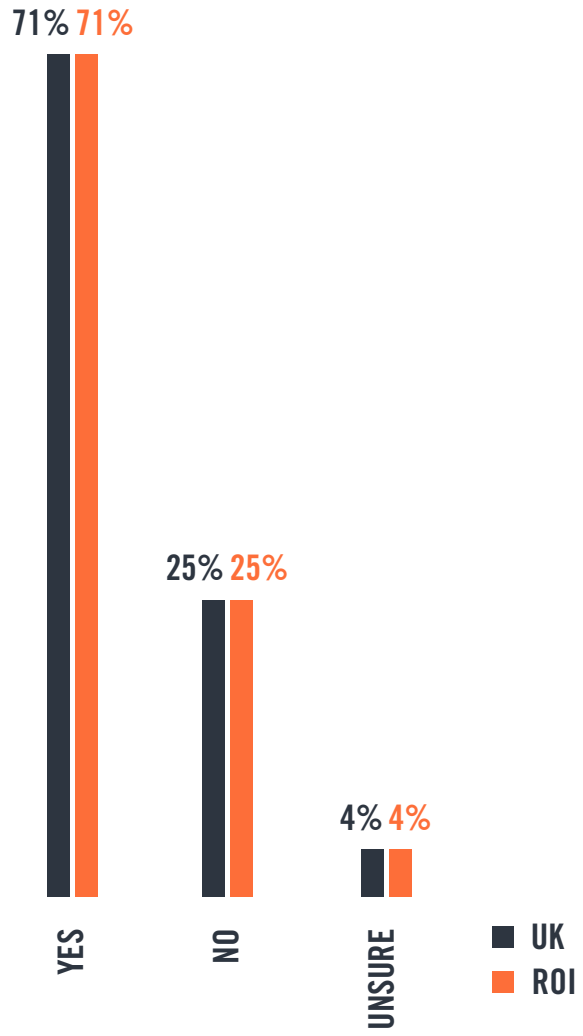
Financing and Investment

Respondents have shown stability and sustainability surpass cost when implementing a decentralised energy solution. Still, the significant rise in energy costs will have forced colocation providers to take another look at their outgoings, especially with margins taking such a hit over the last two years. As such, it was important for Aggreko to determine which technologies were deemed to have the most potential and whether financial barriers impeded uptake.

On-site gas generation, solar and wind were the most popular solutions listed by UK data centres. In the RoI, solar and battery storage were clear favourites, with other options, like wind, much further behind. This omission requires more examination, as reports show the technology has enjoyed wide uptake within the country's data centres.[12]

Familiarity with gas may explain why it still remains popular despite prices reaching record highs over 2021 and 2022.[13] If these costs continue to rise, however, it's likely that other forms of generation will eventually supersede it, especially as supporting technologies like battery storage have become more affordable in recent years.[14]

HAVE YOU HAD AN INVESTMENT REQUEST FOR NEW EQUIPMENT TO REDUCE ENERGY CONSUMPTION TURNED DOWN IN THE LAST FIVE YEARS DUE TO CAPEX RESTRICTIONS?



12. https://www.offshorewind.biz/2020/11/17/irish-wind-farm-to-share-onshore-substation-with-data-centre/
13. https://www.theguardian.com/business/2022/mar/04/gas-prices-hit-record-high-again-as-ukraine-invasion-disrupts-markets
14. https://www.energy-storage.news/behind-the-numbers-the-rapidly-falling-lcoe-of-battery-storage/

iStock.com/zhengzaishuru

Despite the market being primed for wider use of decentralised energy solutions, financing continues to stand in the way for many organisations.

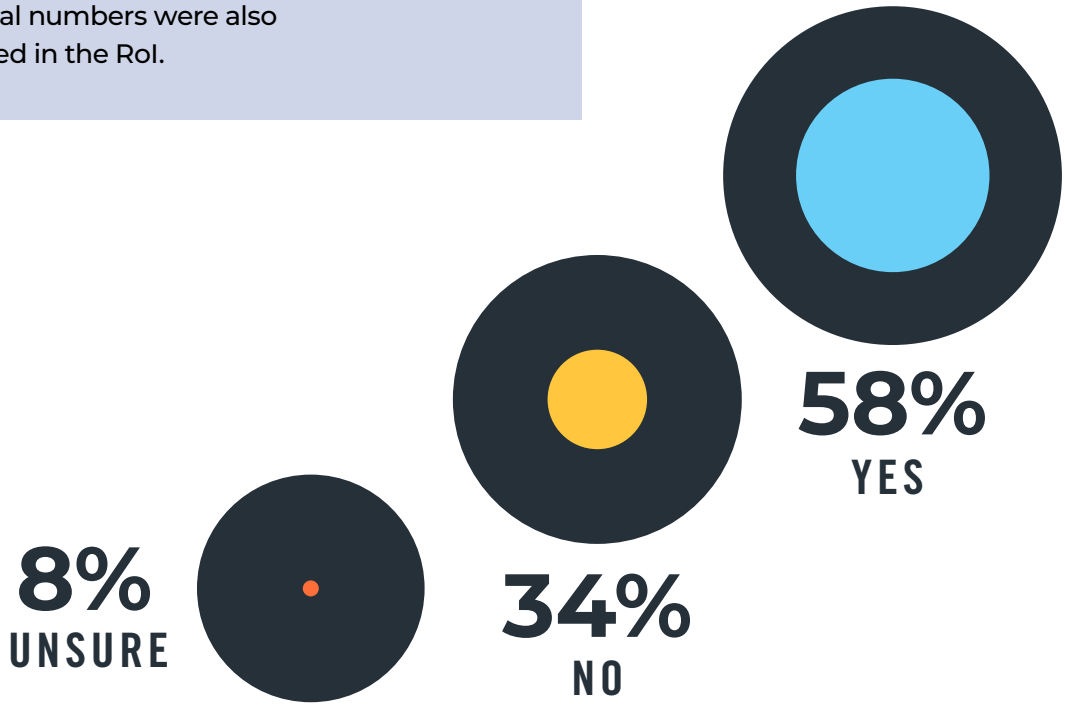
For instance,

70%

of UK respondents said they'd had an investment request for newer, more efficient equipment turned down over the last five years due to capex restrictions. Identical numbers were also recorded in the RoI.

Some might assume these figures dent the hopes for a data centre market powered by more decentralised sources. Yet parts of it appear to acknowledge the opportunity for bridging power to navigate challenges around the balance sheet. Over 60% in the UK said they had used hired equipment to avoid capex restrictions. The RoI was more evenly split, though again greater numbers said they had yet to explore it as a tactic.

DO YOU EVER HIRE EQUIPMENT TO AVOID CAPEX RESTRICTIONS? (UK AND ROI)



IMPROVING RESILIENCE AND STABILITY

Conclusion

The power struggle can be boiled down to a 'perfect storm' of three core issues.

The first, and most apparent, are spiralling energy costs. While respondents made it clear availability was more important than cost, there is clearly a tipping point. This situation leaves operators struggling to remain competitive, particularly as confidence in government support appears tepid across the UK and RoI.

Secondly, electricity demand from data centres now exceeds the supply available from the grid. This problem looks set to worsen in key markets like the RoI, where plans for new facilities are already on hold due to existing issues with power infrastructure.

Finally, there's a need for colocation providers to scale up capacity while also lowering carbon emissions – although data centres are generally much further forward on this issue when compared to other energy-intensive industries.

How can the energy gap be bridged without worsening the financial pressure? This question has been driving the sector's power strategy for some time, with many becoming early adopters of decentralised energy.

These technologies allow businesses to manage demand, improve resilience and lower operating costs, offering a clear route forward through the energy transition. However, high upfront costs and lengthy payback periods during uncertain trading conditions have made investment harder to justify.

It's not surprising, then, to find the sector leaning more towards capex-free solutions like EaaS. In a stable energy market, both the 'all-in' and fixed pricing models where customers pay per kWh make good business sense. But current volatility could now see operators paying way over the odds with little room for manoeuvre while an agreement runs its term.

This is where Aggreko's flexible, hired model comes into its own. It can bypass fixed hourly rates, giving data centres much-needed stability without added contractual pressure or the threat of penalties. The findings show on-site generation is a strategic resource still to be fully exploited by the industry. Now is the time for operators to transition towards a more independent decentralised future.

For more information about Aggreko hired EaaS contracts, visit:

aggreko.com/eaas

03458 247 365

aggreko

For more information

03458 247 365

aggreko.com