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Insights

THE DATA CENTER POWER CRUNCH: HOW BUSINESSES AND GOVERNMENTS ARE ADDRESSING ENERGY DEMANDS

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The world's insatiable demand for digital infrastructure is running headlong into an increasingly pressing problem: energy supply. The rapid expansion of data centers, fueled by artificial intelligence (AI), cloud computing, and hyperscale operations, is outpacing the ability of utility companies to provide power.

This shortfall is not just an operational inconvenience, but a structural challenge that threatens the future of digital economies. In response, companies are scrambling for solutions, governments are revising regulations, and the energy market is undergoing a fundamental shift.

A GLOBAL RACE FOR POWER ACCESS

The launch of ChatGPT in late 2022 triggered an explosion in AI development, sending demand for high-performance computing infrastructure soaring. Governments worldwide have rushed to position themselves as AI hubs, further fueling expansion.

Tech giants like Meta, Google, and Microsoft are building hyperscale data centers at unprecedented rates. Meta alone has reported that it's investing in a Louisiana data center that will cover an area comparable to Manhattan. These facilities require staggering amounts of power—a single large data center can consume as much electricity as 80,000 homes.

Emerging models such as China's DeepSeek, which claim to be more efficient, doing more with fewer resources, could theoretically reduce the overall carbon footprint of AI operations. But history suggests otherwise. The Jevons paradox—an economic theory stating that efficiency gains often lead to increased overall consumption—may apply here. If AI computing becomes more efficient, the lower costs and greater accessibility could drive even greater adoption—amplifying energy consumption rather than reducing it.

HOW THE WORLD IS RESPONDING

Governments are struggling to respond to this mounting demand for energy, as the rapid expansion of AI and hyperscale data centers pushes existing infrastructure to its limits.

In the UK, the national grid is under extreme pressure. Developers must navigate the Appendix Q queuing system, where grid connections depend on hitting strict milestones. The inability to reallocate power leaves many projects stranded in a backlog. The government introduced rules designed to kick out “zombie” wind and solar farms from the lengthy queue—but delays persist, with many projects still struggling to meet milestones, and the backlog continuing to grow.

The U.S. faces similar challenges. Securing grid connections for data centers is a complex process, with long queues for transmission capacity—particularly for renewable energy projects. Energy providers sometimes prioritize long-term clients, such as established data center operators, based on existing relationships rather than project feasibility. This has led to power access becoming a competitive advantage, as companies with established connections are better positioned to meet the growing energy demands of AI and cloud computing.

Meanwhile, data center operators are exploring new energy sources. Onsite generation, once a niche strategy, is becoming mainstream. Natural gas, which may not be the "cleanest" option, is also increasingly being considered a necessary solution to keep power-hungry data centers running smoothly. This signals a shift towards a broader, more dynamic energy ecosystem—integrating renewable sources like wind and solar, as well as more reliable “backup” options like natural gas.

And tech giants are making bold moves. Microsoft has reportedly explored restarting a nuclear generator at Three Mile Island to meet its energy needs, while Amazon is investing in small modular nuclear reactors (SMRs). These ventures reflect a growing reality: traditional renewables like wind and solar, although essential, are not currently enough to support the exponential growth of AI and cloud computing.

THE REGULATION DILEMMA

Governments are struggling to respond quickly enough to the rapid expansion of AI and hyperscale data centers. Data center operators are becoming increasingly concerned that policy lags behind industry realities, leading to poorly designed regulations that may hinder rather than help.

In Europe, regulation is evolving to address environmental concerns. Germany has introduced mandatory heat offtake agreements, requiring data centers to repurpose waste heat for local energy use—a model that may spread across the EU. Developers are shifting attention to Italy and parts of Eastern Europe, where grid access is more feasible.

The UK, by contrast, is positioning itself as data center positive. It has designated the sector as critical national infrastructure, a move that could pave the way for more favorable planning and grid access policies. Slough—the country’s largest data center hub—is becoming crowded, pushing investment towards the North of England. QTS, a subsidiary of US private equity firm Blackstone,

plans to invest up to £10bn to build one of Europe's largest AU data center campuses in Northumberland.

The U.S. appears set for a wave of deregulation, particularly at the federal level, where data infrastructure is increasingly viewed as a national security priority. Emerging policies, such as the "Advancing United States Leadership in Artificial Intelligence Infrastructure" initiative, aim to position the U.S. as a global data center leader. But tensions persist, with progressive states like California remaining committed to stringent environmental standards, potentially limiting data center expansion.

WHAT HAPPENS NEXT?

The global data center industry is at a crossroads. The demand for digital infrastructure is soaring, but energy constraints pose a fundamental challenge. Companies are racing to secure power, experimenting with onsite generation, and even reviving nuclear energy as a viable solution.

Governments, meanwhile, must strike a delicate balance—ensuring sustainability while allowing innovation to flourish. In the UK, pro-development policies may bolster growth, while in the U.S., the tug-of-war between federal deregulation and state-level restrictions will shape the landscape.

One thing is clear: the digital economy's expansion is contingent on solving the power problem. Whether through new technologies, revised regulations, or alternative energy sources, the next decade will define the future of data center real estate.

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