



The Hidden Risks Inside Data Centre Energy Demand: What AI Power Requirements Mean for Infrastructure Resilience

~ Adam Muggleton





We live in a fragile moment for power systems. A once-in-a-generation surge in energy demand from data centres, driven by AI and digitisation, is colliding with ageing power infrastructure. The result is a growing set of hidden risks to national power infrastructure resilience that policymakers have not yet understood.

The New Drivers of Data Centre Energy Demand

Four structural forces are driving power demand in data centres and exposing weaknesses in existing power infrastructure.

- **Digitisation of life and government:** Everyday activities such as banking, education, health, media, and public services are shifting onto digital platforms that need 24/7 hosting and processing in data centres.
- **Rise of AI technologies:** Training and running large language models and other AI workloads requires far more compute and energy per unit of data than traditional IT.
- **Deglobalisation and digital sovereignty:** Governments need critical data to stay within national or regional borders, which fragments the cloud into sovereign nodes and multiplies the number of facilities requiring power.
- **Ageing power and electrical infrastructure:** Many developed grids were not built for today's electrification and digital loads, let alone AI-era data centres.
- Together, these forces do not just increase the number of data centres; they multiply both the volume and intensity of digital workloads that must be powered without interruption.

How AI Power Requirements Change the Game

AI is not another incremental load; it changes the shape of data centre power demand.

- AI workloads are driving a 165% increase in data centre power demand by 2030.
- Global data centres consumed ~415 TWh of electricity in 2024, i.e., around 1.5% of total world electricity. This is an increase from 360 TWh in 2023.
- The International Energy Agency projects consumption could double to 945 TWh by 2030. AI and hyperscale data centre build-out will be the main accelerants.

For power grid planners, this is not about more megawatts; electrical load is concentrated in specific clusters. This requires large, rapid connections, long-duration reliability, and tight power quality tolerances. The result is new stresses on the power grid that capacity plans were never designed to handle.



Where Infrastructure Resilience Is Already Straining

The regional picture shows how data centre energy demand is intersecting with infrastructure limits.

- **North America:** U.S. data centres consumed ~183 TWh in 2024 (over 4% of national electricity demand), with projections rising to ~325–580 TWh (7–12% of power) by 2028–2030. Power requirements are expected to climb from roughly 17 GW in 2022 to about 35 GW by 2030, with clusters such as Northern Virginia already accounting for more than a quarter of state power demand.
- **Europe:** Demand is expected to grow 70%, reaching ~100 TWh by 2030, with countries such as Ireland and the Netherlands already imposing restrictions on new data centre grid connections.
- **Asia-Pacific:** China alone accounts for an ~70–130 TWh of data centre power, placing it alongside the U.S. as a top consumer. Large growth is expected across India and Southeast Asia as mega-data centre capacity approaches 430 GW globally by 2030.
- **Middle East and Africa:** Data centre power demand is growing at ~20–25% annually in Africa, while the Middle East is developing campuses up to 5 GW, often paired with large-scale solar and storage to meet demand.

Across these regions, the core bottleneck is grid capacity rather than land or cooling. The IEA warns that without major transmission upgrades, up to 20% of planned data centre projects could face delays of five to ten years.

The Hidden Societal Risks

One of the clearest lessons from recent years is that AI is only as useful as the information it relies on.

For digital tools to work at scale, projects still require consistent naming and classification, structured and machine-readable data, clear version control and ownership, and ways of working that reflect how teams actually operate. These fundamentals are often overlooked, but without them even sophisticated platforms struggle to deliver repeatable, defensible outcomes.

As AI-driven data centre energy demand grows, it reshapes the risk profile for countries that electrify and digitise everything.

- Single points of failure: When transport, buildings, payments, identity, health records, and government services all rely on electricity and data centres, outages become systemic events rather than local inconveniences.
- Rights and resilience: Interruptions in power or cloud services can affect access to essential services and, by extension, personal rights and quality of life.
- National competitiveness: Countries that fail to forecast and provision for AI-era data centre demand may find themselves constrained in digital innovation, cloud capacity, and economic growth.

Given the risks, energy security becomes a central pillar of digital sovereignty. Reshoring data and compute into national borders is only as resilient as the underlying power grid that keeps everything running.

What This Means for Infrastructure Resilience

To manage these risks, governments and grid operators must treat data centre and AI power requirements as critical infrastructure questions, not real estate or IT issues.

That implies several shifts:

- Moving from incremental upgrades to long-term, scenario-based planning for high-density digital loads and clustered mega-campuses.
- Accelerating investment in transmission, substations, and flexible generation to keep up with data centre and AI-driven power peaks.
- Integrating on-site renewables, storage, and advanced controls to reduce power grid stress and improve resilience.
- Developing talent pipelines to design, build, and operate both power and digital infrastructure as a unified, strategic system.

This emerging "digital Game of Thrones" between nations demands active risk management. Also securing necessary talent and investment will separate the winners from the losers.

Aligning power requirements and robust infrastructure resilience will gain a durable strategic advantage. Countries that cannot may find their power grids constrained, their services brittle, and their sovereignty increasingly dependent on infrastructure they do not fully control.

How AESG can help



Adam Muggleton

Chief Technical Officer
UK

Adam has over 30 years in the industry with an MSc in Project Management from the University of Greenwich, UK. He has held leadership positions at several firms and is an advocate for high performance buildings. He has a unique skill set derived from experience in property development, design team and project management plus building commissioning. As well as being an industry philosopher, blogger and podcaster, Adam has contributed to several commissioning codes & guides. He also has unique knowledge and experience leading digital solutions for building commissioning and building information asset management. Adam devises and delivers successful project, leadership and testing strategies that achieve optimum outcomes for all involved and affected.

For further information relating to specialist consultancy engineering services, feel free to contact us directly via info@aesg.com

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