5 Ways Grid Constraints are Reshaping How Companies Deploy Power

Two years ago, 1% of data center developers planned to generate all their power on-site. By 2030, it's expected that number will grow to 33%. The existing grid isn't enough. The industry knows it.

Interconnection queues across the globe have grown to record levels. According to the IEA, some 2,800 GW of global solar and wind generation capacity is waiting to connect. In high-demand markets, the lag between developer expectations and grid connection timelines is measured in years. Then you have equipment shortages to consider, with transformers, switch gears, and gas turbines all backordered for years as well.

In response, companies are beginning to rethink how they deploy power, considering modular, factory-built approaches like e-houses, modular substations, and integrated microgrids. But the first bottleneck on the whiteboard? Power availability, which affects everything else downstream.

Here are five ways this is reshaping deployment strategies:

1. **Power Access Moved to the Front of the Project Timeline**
2. **Equipment Lead Times Are Now the Project Schedule**
3. **Factory-Built Systems Are Winning on Speed and Predictability**
4. **Onsite Generation is Moving from Contingency to Strategy**
5. **Manufacturing Capacity Has Become as Important as Product Capability**

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1 Power Access Moved to the Front of the Project Timeline

Historically, power delivery considerations sat at the tail end of a project. After securing the site and finalizing design, then came the requisite energy. That sequence is no longer feasible.

Thanks to interconnection backlogs and regional capacity constraints, power strategy is now one of the earliest phases in the project lifecycle. In constrained markets, the question is no longer "when can we get power to this site?" It's, "does this site have a viable path to power at all?"

Grid operators like PJM have shifted interconnection model frameworks. What used to be "first come, first served" is now "first-ready, first served," prioritizing projects with completed engineering work. The reform accelerates queue processing. It doesn't shorten transformer lead times or speed construction of the transmission equipment itself, though. The physical bottlenecks remain.

If power sequencing isn't part of site selection, it will be the reason a project stalls.

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2 Equipment Lead Times are Now the Project Schedule

Securing a grid connection or deciding to bypass it only solves part of the problem. The components needed to build, integrate, and energize power systems are still in short supply. Now, the shortage is structural.

Historically, main transformer lead times sat between 12 to 20 weeks. Now according to Bank of America Global Research, they're as much as 80 to 150 weeks. Extra-high-voltage transformer lead times have swelled too: the gap between order and delivery is 210 weeks — roughly four years. Medium-voltage switchgear typically exceeds 80 weeks.

Gas turbine demand? Around double that of available supply, pushing lead times of four years or more. Wedbush characterizes this as structural, not cyclical. Meaning, near-term production increases won't close the gap.

Companies that push off transformer availability until the procurement phase will wait years for the equipment they need. By standardizing system designs and locking in production capacity earlier in the timeline, you can minimize long-lead components and stay on schedule.

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3 Factory-Built Systems are Winning on Speed and Predictability

The biggest difference between modular, factory-assembled systems and site-built power infrastructure is a known timeline.

Prefabricated e-houses and modular electrical pods are engineered and tested before they ever leave the factory. There's no site-built variability, no field labor dependency for system integration, no waiting until energization to find out if the components work together. In fact, over 80% of operators plan to deploy prefabricated modules in new builds according to AFCOM's 2025 State of the Data Center Report. It's more than double the amount from the previous year.

That speed advantage is significant. Onsite generation models using "bring your own power" — fuel cells or gas turbines — can get a site energized in roughly 18 months, according to Bernstein Research. Traditional grid connections in constrained markets can take multiples of that. When delayed power means delayed revenue, the math speaks for itself.

Factory-built also changes the logistics math. Modular units can ship as fully assembled enclosures or as component kits; the latter roughly doubles container capacity and reduces tariff exposure on cross-border shipments. That doesn't exist with site-built infrastructure.

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4 Onsite Generation is Moving from Contingency to Strategy

There was a time when behind-the-meter and onsite generation were niche solutions for facilities that didn't have grid access.

Oracle's master services agreement with Bloom Energy for up to 2.8 GW of onsite fuel cell capacity is one of the clearest signals of where the industry is headed. The first 1.2 GW is already deploying. A fully operational system was delivered in 55 days.

2.8 GW is a production number for the OEMs supplying this hardware. Most internal capacity plans weren't built for orders at that scale.

Grid dependency is a project risk. The largest developers are engineering around it.

Battery energy storage is part of this shift, not just fuel cells and gas turbines. Behind-the-meter storage is scaling alongside onsite generation as part of the same architecture, with Virtual Power Plants built on this model projected to serve up to 20% of global peak demand by 2030.

Integrated power architectures — combining generation, storage, conversion, and distribution into a unified system — give operators direct control over energy availability. Self-sufficiency is now a design goal, not a contingency.

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5 Manufacturing Capacity Has Become as Important as Product Capability

U.S. data center power demand already accounts for roughly 5% of total electricity consumption. That number is projected to reach 9–12% before the end of the decade, according to the Electric Power Research Institute and Lawrence Berkeley National Laboratory. Per William Blair Research, global turbine orders reached 136 GW in 2025 — reflecting an 87% year-over-year growth in power infrastructure demand.

For OEMs building this infrastructure, the pipeline is growing faster than most production lines were designed to handle. Internal manufacturing capacity is the ceiling on market share.

Companies manufacturing at today's volumes are struggling to meet that demand. Those with fixed internal capacities have hard limitations with how they can respond. A company that outsources manufacturing and integration capabilities can scale faster, without making capital investments in production prior.

Manufacturing relationships have always been strategic assets. When transformer lead times run four years and gas turbine supply is half that of demand, those interdependences are paramount. OEMs who treat them as such have more options when constraints tighten. Those who don't? They're competing for the same capacity as everyone else at the same time as everyone else.

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Power is the Constraint. Deployment Strategy is the Response.

The infrastructure that powers the next decade of industrial growth is being designed and committed to now. Developers who treat power as a strategic variable are moving earlier in the project lifecycle, building around systems that reduce timeline risk and locking in manufacturing relationships before the market tightens further.

That last point is where most OEMs underinvest. Contract manufacturing capacity is finite, and it fills under demand pressure. Tapping a partner like Jabil with standardized system designs, pre-qualified supply chains, and global scale is how you respond when a 2.8 GW order lands.

In 2025, Jabil built and shipped approximately 30% of all U.S. BESS installations, enabling an estimated 8.7% of total U.S. grid growth through energy storage capacity. When customers needed supply chain continuity through demand volatility and policy shifts, Jabil's production infrastructure held the line.

How can Jabil support your next grid infrastructure project?

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