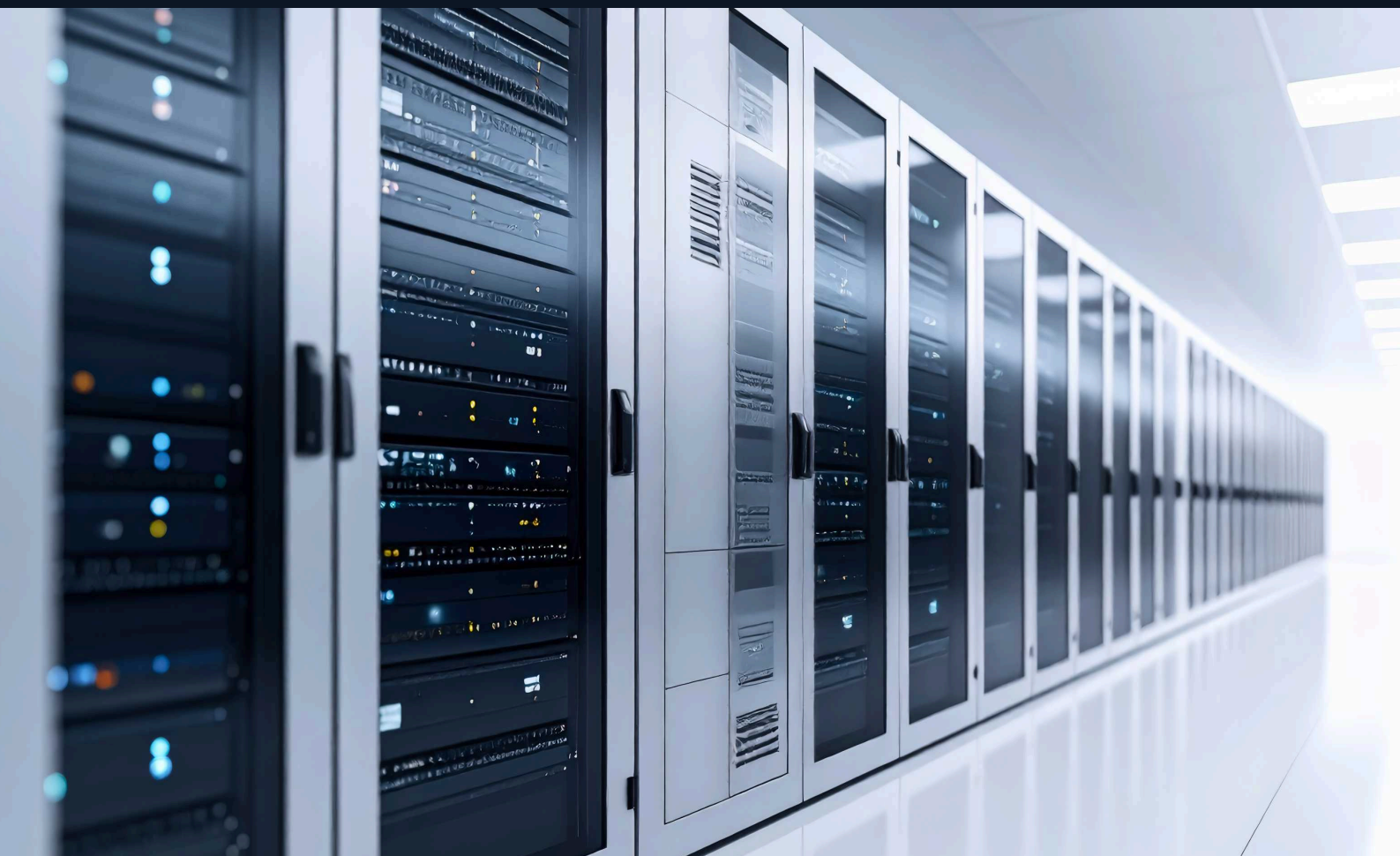
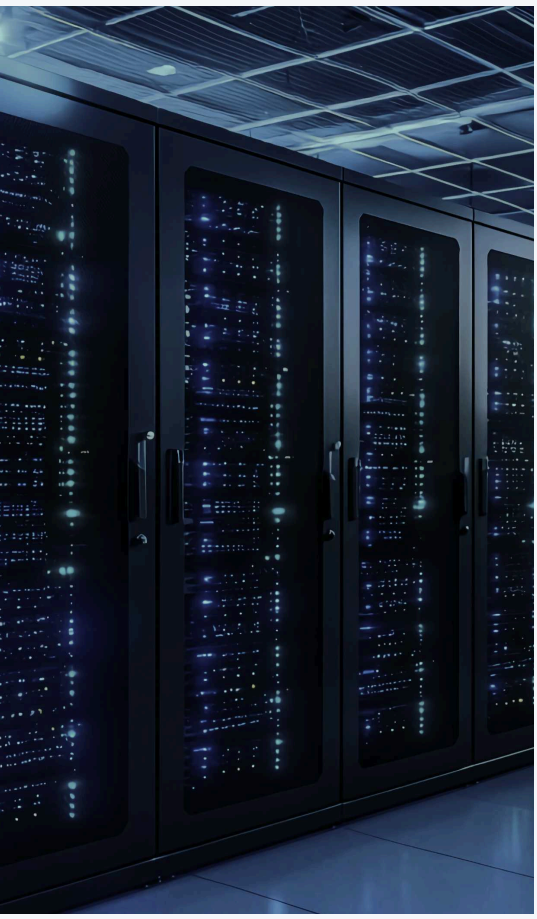
Accelerating Hyperscale and AI Data Center Power Infrastructure in North America

A Strategic Framework to Mitigate Global Supply Chain Bottlenecks, Manage Tight Timelines, and Navigate Evolving UL System-Level Validations via Single-Source Procurement



01

Introduction: Unprecedented Power Demand and Structural Supply Constraints

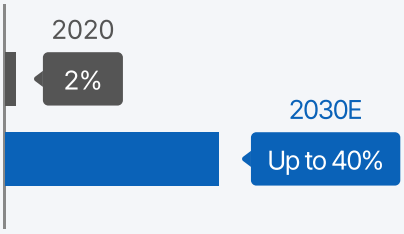


Across North America, data center developers face intense pressure to build AI-ready infrastructure at an unprecedented scale. The explosive growth of high-density artificial intelligence (AI) workloads, coupled with broader electrification, has placed enormous strain on the power equipment supply chain. High-density computing clusters require robust power systems that deliver scalability, reliability, and resilience in increasingly demanding AI environments.

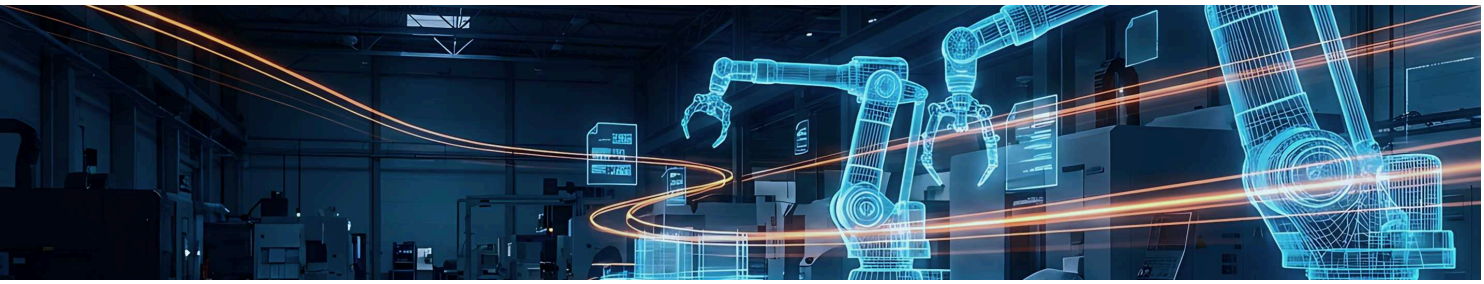
According to Wood Mackenzie, data centers are expected to account for an increasingly significant share of the U.S. electrical equipment market through 2030. This structural shift in demand is intensifying competition for critical electrical infrastructure, including transformers and switchgear.

U.S. Data Centers' Share of Total Electrical Equipment Market

From under 2% in 2020 to up to 40% by 2030 under an accelerated-growth scenario.



* Source: Wood Mackenzie (2026)
2030E reflects an accelerated-growth scenario.



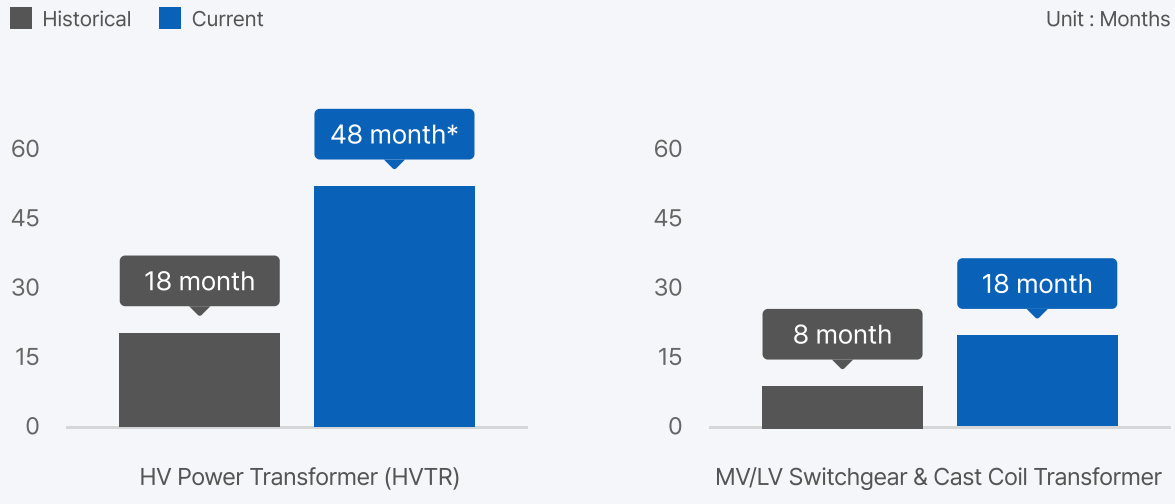
Q

What are the current average lead times for major pieces of electrical equipment and how do they impact North American data center timelines?

Historically, critical power equipment could be sourced within standard construction cycles. However, current market data reveals that the average lead time for high-voltage power transformers (HVTRs) has more than doubled from 18 months to 36 and even 60 months.

For medium-voltage and low-voltage (MV/LV) switchgear and cast coil transformers, lead times that used to average 30 to 40 weeks have now ballooned to 60 to 80 weeks. These extended lead times have become the single largest bottleneck for data center projects, forcing developers to adopt alternative procurement models to avoid prolonged asset underutilization.

Average Lead Time for Critical Electrical Equipment



* Representative midpoint of the reported market lead-time range (36–60 months)

02

The Limitations of Split-Procurement Models

In traditional data center engineering, procurement, and construction (EPC) frameworks, it has been common practice to order high-voltage and low-voltage equipment separately from multiple vendors.
While split procurement is often chosen due to the inability of most electrical equipment vendors to provide a complete, end-to-end product lineup, it introduces severe friction into complex data center designs. Hyperscalers prioritizing speed of execution frequently discover that mismatched delivery schedules, fragmented engineering approvals, and interface gaps between different manufacturers heavily inflate overall integration costs.

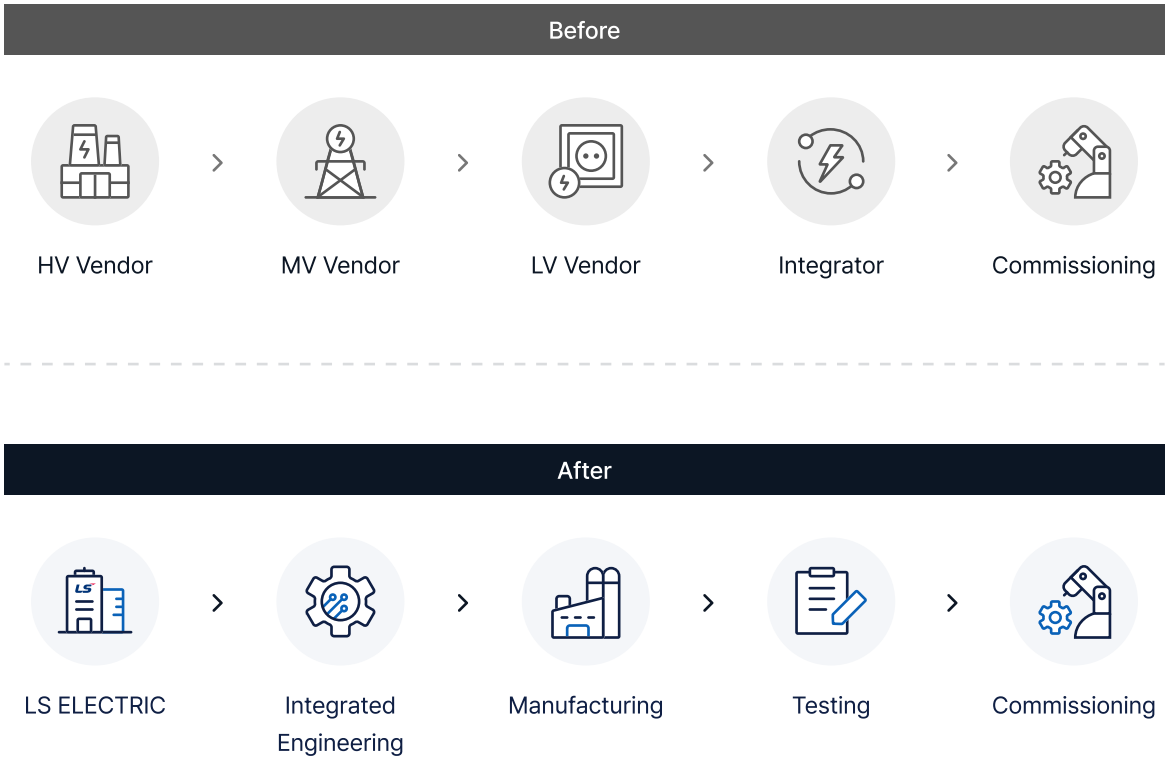
Q

How do high-density AI clusters alter the risk profile of North American data center power distribution systems?

AI workloads generate extreme, sudden step-changes in power demand, leading to high thermal stress and elevated fault currents. In this environment, a failure in one section can easily ripple through the system.

LS ELECTRIC addresses this by deploying advanced internal arc-classified technologies and systems designed to contain faults locally. Furthermore, as the industry transitions directly toward low-voltage direct current (LVDC) distribution grids to eliminate conversion losses, providing a fully integrated grid that satisfies strict regulatory baselines becomes mandatory.

Split Procurement vs Single Source



03

LS ELECTRIC's Core Solutions and Data-Driven Track Record

Single-Source Procurement and the 20-Week Fast-Track Execution

LS ELECTRIC resolves procurement fragmentation by providing a comprehensive, unified product lineup spanning from high-voltage substation integration down to low-voltage distribution boards and busways. Between 2021 and 2023, when the U.S. Inflation Reduction Act (IRA) spurred sudden investment in high-tech gigafactories, LS ELECTRIC successfully delivered multiple large-scale projects strictly on time. Leveraging this robust manufacturing capacity, LS ELECTRIC has achieved industry-leading delivery speeds, notably supplying a few hundred pieces of switchgear and transformers within an extremely short lead time of 20 weeks for a major project in Tennessee.

Overcoming the Moving Target of Evolving UL Certifications

Beyond hardware procurement, evolving UL compliance has become a critical threat to data center project budgets and schedules. Since the debut of UL 3223 in 2018, certification has aggressively shifted from individual component testing toward comprehensive system-level validation, focusing heavily on Concurrent Maintainability, Reliability, Security, Sustainability, Safety, and Commissioning.

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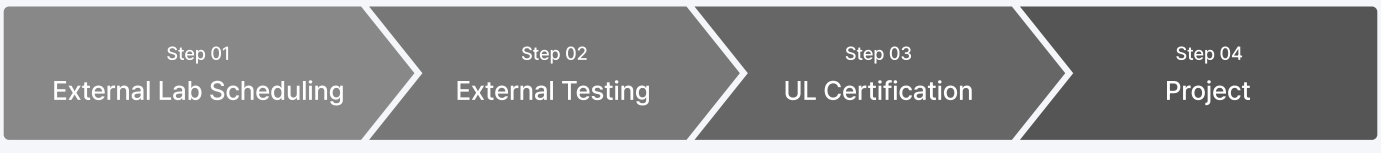
How does LS ELECTRIC accelerate the testing and certification timeline under rigorous UL system-level requirements?

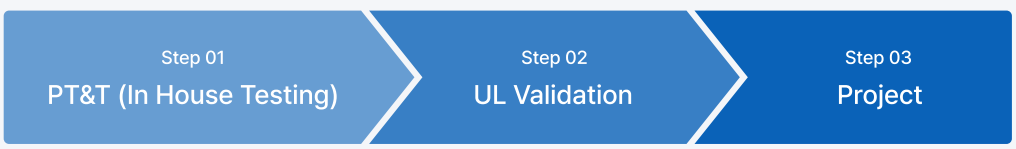
LS ELECTRIC operates its own world-class testing facility: the Power Testing & Technology (PT&T) center. PT&T holds the prestigious UL Client Test Data Program (CTDP) certification, allowing LS ELECTRIC to conduct witness testing and system-level validations in-house. This unique capability bypasses the typical months-long wait times at external commercial laboratories, accelerating the testing and certification timeline by up to 6 to 8 weeks. To support this, in 2025, LS ELECTRIC secured UL 1741 certification for its MSSP 2.0 solution and is establishing a 10MW-class BESS (PCS) test bed to guarantee seamless system-level integration.

UL Certification Process

External Testing Process



LS ELECTRIC Process



6-8
Weeks Faster

04

Technical Specifications and Regional Operations Summary

Grid Segment	Core Technical Specification	Proven Project Track Record / Capability
High-Voltage (HV)	High-Voltage Power Transformers (HVTR), Gas Insulated Switchgear (GIS)	Strategic production capacity expansion to secure long-term utility grid connections.
Medium & Low Voltage	ANSI/IEEE Switchgear, Cast Coil Transformers, UL 891/489 DC Switchboards	Supplied over 1,500 sections of LV gear and 300 sets of cast coil transformers to U.S. mega battery plants completely on schedule.
Digital Transformation (DX)	Condition Monitoring, Real-time Anomaly Detection, integrated DCIM/EMS/SCADA	Eliminates the 'black box' nature of power assets by providing comprehensive operational visibility.

Localized Field Support via the Bastrop Tech Campus

To ensure flawless execution for North American hyperscalers, LS ELECTRIC backs its hardware with a highly responsive localized support model. Through its Technology Campus in Bastrop, Texas, and strategic regional distribution centers in Los Angeles and Chicago, the company provides 24-hour response times, technical support, and on-site semi-assembly.

To minimize transit bottlenecks, equipment can be loose-shipped directly from automated manufacturing plants in South Korea (such as the automated circuit breaker factory in Cheongju) and fully assembled, integrated, and commissioned by local technicians directly on the job site.