

From Grid to Chip: Scalable Power Distribution for AI Data Centers

Data Bulletin

Executive Summary

Artificial Intelligence and expanding data technologies require computing resources that demand unprecedented amounts of power. This paper examines how Schneider Electric provides industry-leading innovations that meet the evolving data center power distribution needs from grid to chip.

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Introduction

Artificial intelligence (AI) is rapidly transforming how organizations operate, compete, and innovate. By enabling machines to analyze vast amounts of data, automate complex processes, and generate real-time insights, AI helps businesses improve efficiency, reduce costs, and make more informed decisions. For generative AI platforms to succeed, they must be “trained” – an iterative process where exceptionally large data-sets are fed into predictive AI algorithms. The output is then used to adjust and tweak the AI model to produce increasingly useful results. Instead of conventional servers that use Central Processing Units in servers, AI data centers require servers that use Graphical Processing Units to manage the volume and complexity of computations involved in this work.

This GPU-based IT processing equipment uses far more power than CPU-based computing, with commensurate increases in power needed for cooling. According to Goldman Sachs, data center power demand in 2030 could be 165% higher than in 2023 and AI could account for 19% of data center power demand by 2028.^{1, 2.}

Data center computing power today

In US and international data centers, two power system architectures presently deliver AC power to IT servers. The similarities and differences between the power systems used in enterprise and colocation data centers and those used in cloud service data centers are assessed in the following overview:

Conventional data center power architecture

In their normal operating mode, conventional enterprise and colocation data centers use one or more primary centralized power sources, typically derived from utility-supplied medium-voltage power (400/415 volts in IEC markets — in UL markets, 480 volts) and transformed to low-voltage current (**Figure 1**). Most also use engine-generators fueled by diesel or natural gas to supply backup power during extended utility outages. In IEC markets, 240-volt single phase power is provided to data center gray-space equipment; in UL markets, AC power is transformed down to 208 volts.

This power is distributed through data center rooms to “pods” of server racks, then to server racks and individual servers. Rectification to 5 or 12-volt direct current occurs at power supplies in each server. This scheme often powers hundreds or thousands of server racks, grouped up to 200 servers per pod, each demanding up to 10 kilowatts per rack. Total server load in a conventional data center can be 10 MW or more.

¹ [AI to drive 165% increase in data center power demand by 2030 | Goldman Sachs](#)

² [AI is poised to drive 160% increase in data center power demand | Goldman Sachs](#)

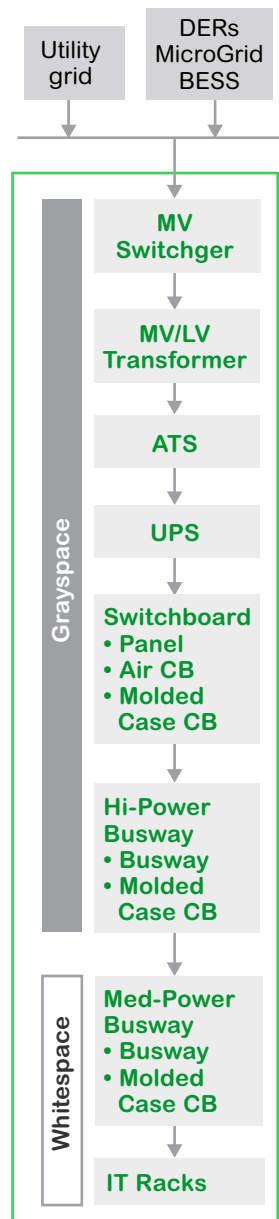


Figure 1
A generic grid-to-chip powertrain

Because conventional backup power sources require seconds to start and connect to load circuits, there is typically a short power interruption when a data center transitions from an unstable utility source to backup power. During this transition, server power needs are met by uninterruptible power supplies (UPS), which can respond to utility outages in sub-cycle timeframes, until generator-derived power comes online.

Open Compute Project power architecture

Data centers operated by large cloud service providers often use power architecture developed by the Open Compute Project (OCP). In this model, AC to DC conversion happens at the rack, not at the server.

In the rack, AC may be rectified at 48 volts DC. 48-volt battery arrangements within each server rack provide interim power until generator-supplied power becomes available. Power efficiency gains are on the order of two to three percent compared to conventional power distribution models. In large data centers, this efficiency gain delivers appreciable energy cost savings.

OCP data centers use server racks that are optimized for cloud service providers who may operate thousands of racks in one data center. Consequently, total IT power demand in such a facility can exceed 50 megawatts. The equipment is often modular in design, thus enabling quicker deployment to meet rapidly changing technologies and market demands.

Emerging Sidecar configurations

Sidecar architecture is particularly relevant for high-density AI data centers. With Sidecar designs, the AC to DC conversion components and batteries are moved out of the rack to an adjoining electrical panel that converts incoming AC power to direct current at up to 800 volts. This enables the use of large server racks by avoiding (1) impractical amounts of rack space devoted to the array of corresponding

batteries needed for high-voltage DC operation, and (2) excessive amounts of cabling that would otherwise be needed to deliver that power using remote power distribution units (PDUs) and their terminal strips. Benefits include:

- **Increased server density:** More IT equipment can fit in a given space
- **Improved cooling:** Server airflow encounters fewer obstructions
- **Simplified maintenance:** Power equipment can be serviced independently of servers
- **Better scalability:** Power capacity can be managed separately from computing capacity
- **Greater power handling:** Power sidecars can provide higher power densities

Other notable differences between enterprise data centers and OCP

Change to the following to shorten: Conventional enterprise and colocation data centers are typically operated by providers that lease space and services to multiple customers, whereas OCP data centers are usually owned and run by a single cloud provider. Because conventional facilities are smaller and costs are shared, efficiency gains have limited impact on individual bills, leading operators to prioritize reducing power infrastructure.

In contrast, cloud data centers are owned by a single entity that bears the full operating cost, so efficiency improvements have a much greater impact on overall expenses. As a result, these operators place higher value on the energy efficiency benefits of OCP designs. AI training data centers are more likely to follow this OCP ownership model.

AI is driving unprecedented increases in data center power demand

Multiple factors are driving a rapidly increasing data center power demand. Ongoing digitalization of every part of the world economy has led to an accelerating deployment of AI technologies and applications. In turn, AI applications require far greater computing resources than prior data processing technologies.

To enable data centers to process the necessary amount of data, three things must happen. First, individual servers must be able to access far greater amounts of power to meet the demand of GPUs and other IT computing equipment. Second, a far greater quantity of servers must be used to effectively accommodate the data processing demands that AI brings. Third, because the repetitive training iterations present a consistently high server workload, maximal amounts of power must be continually delivered to each server.

IT-related power needs will expand to remarkable levels. Demand could reach beyond 1 GW for OCP AI training data centers. For context, power demand for a single AI training data center could exceed that of an entire small country. In practice, colocation data centers may deploy a mix of AI and non-AI technologies, adapting to power needs that correspond to their technology mix and overall compute capacity.

Delivering these amounts of power will require distribution systems that operate at higher voltages. Doing so reduces the corresponding amperage flowing through the system and reduces electrical losses for greater efficiency. Still, the need to deliver all this power into just one facility is impacted by the same issues that impact conventional data centers, including preventing downtime and improving sustainability.

Changing cooling power demands

Cooling loads from IT equipment could increase 5 to 10 times, from 12 to 16 kW/ft² data in today's cloud data centers to 80 to 120 kW/ft² in AI training centers. Challenges include:

- Developing effective cooling strategies to move the resulting heat
- Finding greater amounts of power to operate higher capacity cooling systems
- Distributing the needed power to cooling equipment locations

Regarding downtime, the impacts of power outages increase not only with the scale of power demand, but also with the need to complete huge batch computing processes without disruption. If an outage occurs before a large data set is fully processed, a power failure could require repeating all of the corresponding computations.

Regarding sustainability, consuming and managing all this power presents a range of issues. Typically, greater power consumption increases environmental impact by a corresponding amount. Given the scale of power increases needed for AI training applications, environmental impacts from these data centers could be set to increase at a similar scale just when sustainability initiatives have risen to the forefront of data center operating challenges. This tension between power demand and sustainability goals makes the achievement of efficiency gains more important – and beneficial – than ever before.



In 2022, The Uptime Institute identified staffing as the leading challenge for data center operators.

Learn more in its article, [Data center staffing — an ongoing struggle](#)

Schneider Electric's response

AI data center stakeholders require fresh solutions for distributing the amount of power that AI servers will require. Solutions are needed for:

- Providing 10 to 30 times present power amounts to server racks, up to 1 MW per rack
- Increasing distribution and equipment voltages to enhance power density of IT equipment
- Overcoming the industry's lack of experience with deploying viable, optimized, DC power outside of server racks
- Streamlining equipment care and repair to increase reliability, reduce downtime, optimize maintenance and bridge widening workforce skill gaps

To meet these challenges, Schneider Electric offers best-in-class end-to-end power distribution solutions. Our products optimize power distribution through a data center's gray-space power equipment, to server pods in the white-space, and on to the high-performance servers that make AI happen.

Innovating best-in-class approaches for AI power

Schneider Electric maintains an unmatched breadth and depth of resources for innovating industry-changing IT power solutions. To support the specifiers and installers who make AI possible, we'll innovate by:

- Expanding existing offers
- Partnering with industry leaders to integrate best-in-class technologies
- Sharing new IT power distribution architectures
- Accelerating design and buildout
- Improving intelligence to drive reliability
- Reducing equipment footprints
- Improving energy efficiency
- Enhancing support throughout equipment lifecycles

Expanding existing offers

Many Schneider Electric products already provide a robust platform for building successful distribution solutions. We offer some of the most advanced features and highest ratings available today, and we will continue to introduce models with higher ratings and capacities.

Here are three examples:

- **BlokSeT Lean** builds on Schneider Electric’s BlokSeT switchgear by offering low voltage ratings to 5000 Amps in a smaller and greener solution
- **I-Line Track**, our modular whitespace busway offering, can now carry 1250 Amps, up from the former 630 A rating for I-Line busway
- **PowerLogic E-Dock** monitors busway temperature and water intrusion for 24 x 365 peace-of-mind

Sharing new architectures

Designers and specifiers benefit when industry leaders share their newest ideas. Schneider Electric experts shorten learning curves by developing [reference designs](#) that show how infrastructure can be configured, then specifying which components serve each function. These reference designs cover electrical, mechanical, and IT concepts that meet power demand, speed build outs, and enhance sustainability.

Figure 2

Schneider Electric and ASCO Power Technologies grayspace equipment in a GB300 powertrain



A recent example is [Reference Design 111](#) that Schneider Electric developed in partnership with [NVIDIA](#), using its new GB300 architecture (**Figure 2**). This design supports high-density, liquid-cooled data clusters, key components of AI computing strategies, enabling users to meet power demand challenges more sustainably. In this concurrently maintainable system, power to the IT space is supplied through four 3 MW powertrains that provide 3+1 distributed redundant UPS power, backed up by diesel generators. Each powertrain consists of a 4000-amp QED-2 main switchboard feeding two 1500 kW Galaxy VX UPS, each with a 4000-amp QED-2 distribution section. At this loading, the Galaxy VX UPSs’ overload capacity can manage NVIDIA GB300 NVL72 racks’ power peak.

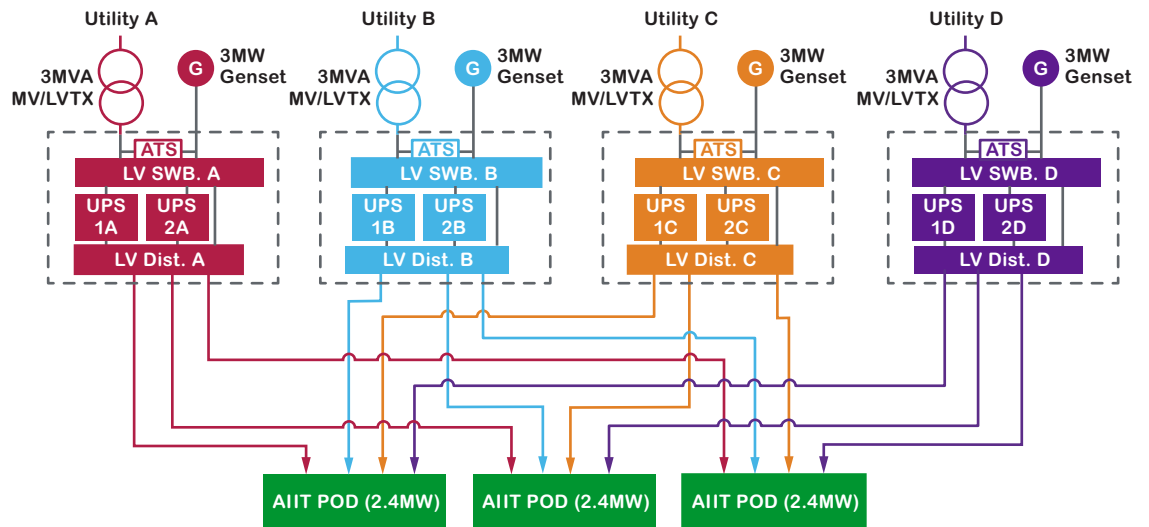
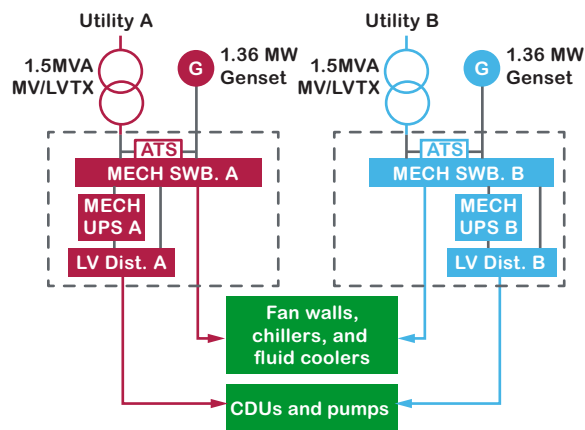


Figure 3

Arrangement of GB300 power train components



Downstream, these powertrains feed Hyper 1.3 MVA 480V:415V/240V PDUs that power the IT racks with 3+1 redundancy. Separately, two 1.5 MW powertrains feed the fan walls, chillers, and fluid coolers with 2N redundant power (**Figure 3**). They also feed a 200 kW Galaxy VL UPS that provides critical power to the liquid-to-liquid coolant distribution units (CDUs) and facility water system pumps. With corresponding powertrains for cooling, including critical power to the liquid-to-liquid coolant distribution units, the design supports integrated peripheral devices like fire panels, access control systems, and environmental monitoring and control devices. Placing power meters in the electrical path enables data centers to monitor power quality, benefit from predictive maintenance and system diagnostics, and access Schneider Electric's EcoStruxure™ Power Monitoring Expert.³ [This solution is just one of the reference designs](#) Schneider has published for full-site, prefab, pod-based AI data center computing.

³ 7,536 kW, Tier III, ANSI, Chilled Water, Liquid-cooled AI Clusters (NVIDIA GB300)

Partnering with industry leaders

Data center designers know that changing the parameters of one system requires corresponding adjustments to others. For instance, increasing computing power requires deploying new cooling innovations, and the NVIDIA reference design is one such example.

Increasing computing capacity requires not only novel approaches to electrical power delivery, but also power for cooling. That is why Schneider Electric collaborated with (and acquired) [Motivair](#) to bring advanced cooling solutions for AI applications. This collaboration led to chilled water systems optimized for high water temperatures using [Uniflair FWCV Fan Walls](#) and [Uniflair XRAF Air-Cooled Packaged Chillers](#). The design provides both the power capacity and the redundancy needed to cool the computing power densities required for AI training.

Innovating novel solutions

Moving DC conversion closer to power sources will require new products, tools, and expertise to meet AI power needs. From new equipment to power management solutions to codes that guide implementation, Schneider can and will support data center stakeholders at every phase of deployment.

For medium voltage gray-space power, SureSeT is our latest medium voltage switchgear for ANSI Metal-Clad applications. Mostly air insulated, metal-clad switchgear with vacuum circuit breakers for large and complex medium voltage power distribution and control, SureSeT provides new levels of integrated connectivity, space savings and innovative digital control that enhance data center energy and operational efficiency.

With 24x365 monitoring of equipment health, a footprint 25% smaller than conventional solutions, and testing that exceeds duty-cycle requirements by 200%, SureSeT helps AI Training data centers build smarter, stronger, and smaller.

Figure 4

SureSeT provides the latest innovations for applications up to 15kV and 2000 Amps.

Integrated electric racking

Circuit Breakers, Auxiliary Devices (VT, CPT).

Nearby control

Operate Circuit Breakers and Auxiliary Devices from a smart device or HMI, allowing operators to maintain appropriate distance.

Thermal monitoring

Wireless thermal sensors help detect temperature anomalies; prompting diagnosis of potential issues, reducing downtime and fire risks.

Environmental monitoring

Wireless humidity sensors monitor environmental impacts, helping detect accelerated aging and optimizing maintenance costs.



Circuit breaker monitoring

Circuit breaker's wear and tear through embedded sensors for preventive maintenance.

Stackable breakers:

2-High breaker configurations available up to 15 kV 2000A 40kA.

QR codes

Quickly connect to SureSeT and get access to the digital logbook, manuals, and support saving operational time and effort.

Internal arc detection

Optical sensors allowing the relay to provide fast internal arc clearance decreasing operator and equipment risk, while reducing equipment damage in case of internal arcs.

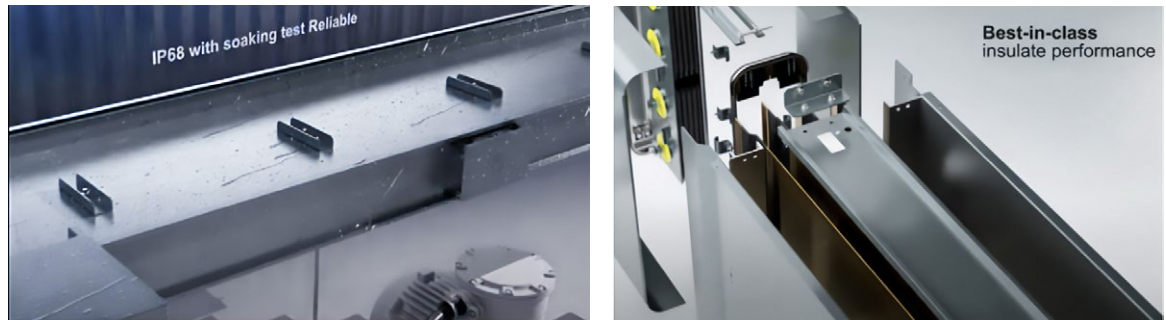
Accelerating design and build-out

Modular solutions make power distribution systems easier to specify and install across a range of data center facilities. Standardizing modularized products that mount and interconnect quickly in a wide range of configurations simplifies design, eases installation, and speeds up deployment. By offering prefabricated power and IT infrastructure pods, then educating data center stakeholders about them, Schneider Electric can help stakeholders accelerate AI data center deployment.

Busway installation is an area where forward design thinking has increased the modularity of products to speed build outs. Schneider Electric's [I-Line H](#) is one example (**Figure 5**). It's patented [EZ Joint Pak and VISI-TITE bolt](#) connection from busway to switchboard speeds buildouts with "plug-and-play" functionality, so that installers spend less time bolting equipment. By making connections faster and easier to execute, Schneider customers gain integrated, modular, end-to-end solutions from a single supplier.

Figure 5

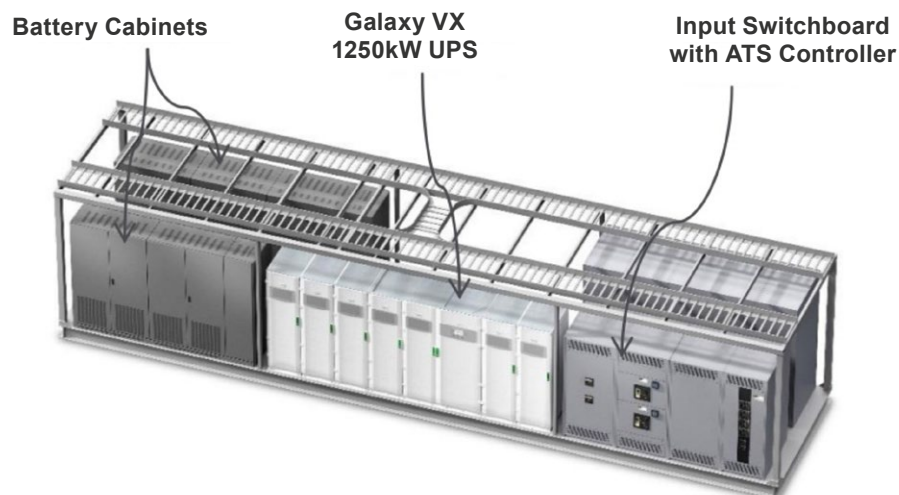
I-Line H brings flexibility and protection for large MV loads.



Modularizing powertrains can accelerate data center buildouts by packaging compatible equipment into transportable, pre-engineered frames that simplify sourcing, delivery, and installation. These assemblies connect quickly to each module's IT power infrastructure, while factory assembly and testing reduce quality issues, speeding commissioning and turnover.

Figure 6

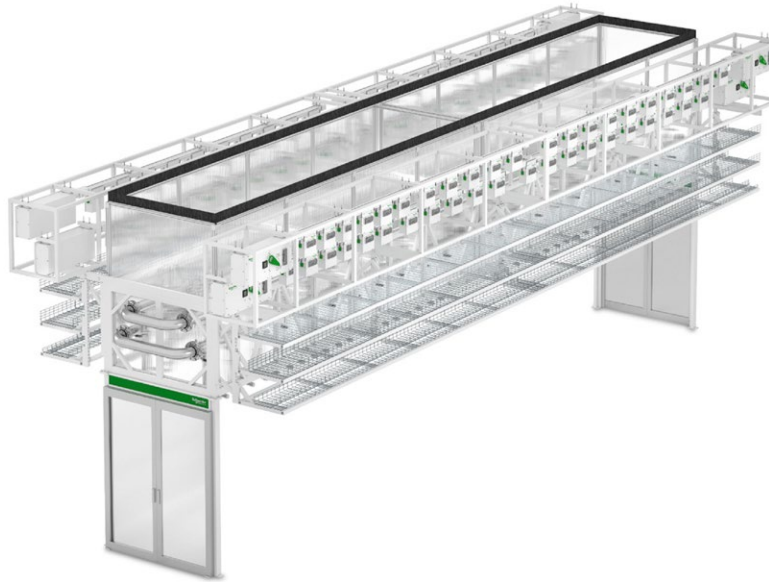
A 1250kW Prefabricated Data Center Power Skid



One example of this approach is Schneider Electric's [1250kW Prefabricated Data Center Power Skid](#) (**Figure 6**). This unit prepackages compatible UPS, transfer switch, and battery equipment to deliver 1.25 MW of 480-volt power in a single steel frame. Engineered to order, these units offer all the functionality IT powertrains need to stay running until backup power systems come online, in a form factor that can be trucked to a data center site and quickly replicated across many IT modules.

Figure 7

Pods include trusses, shelves, power busways, cooling equipment, containment, technical water for new liquid-cooled server racks, and network infrastructure.



At Schneider Electric, modularization is not just limited to powertrains. Schneiders' [EcoStruxure™ Pod Data Center for AI and Accelerated Compute](#) modularizes the deployment of whitespace infrastructure needed to build data centers quickly (**Figure 7**). With this solution, stakeholders can:

- Accelerate deployments
- Future-proof their installations
- Gain timeline predictability with reliable, repeatable setups
- Minimize delays with standardized processes
- Reduce design, build, and installation expenses
- Ensure quality with factory-built precision

The benefits? Single-day assembly for up to 42 racks. Rack capacity up to 132 kW with liquid cooling. Thirty percent or more deployment timeline reduction over traditional approaches. Cost savings of more than fifteen percent.

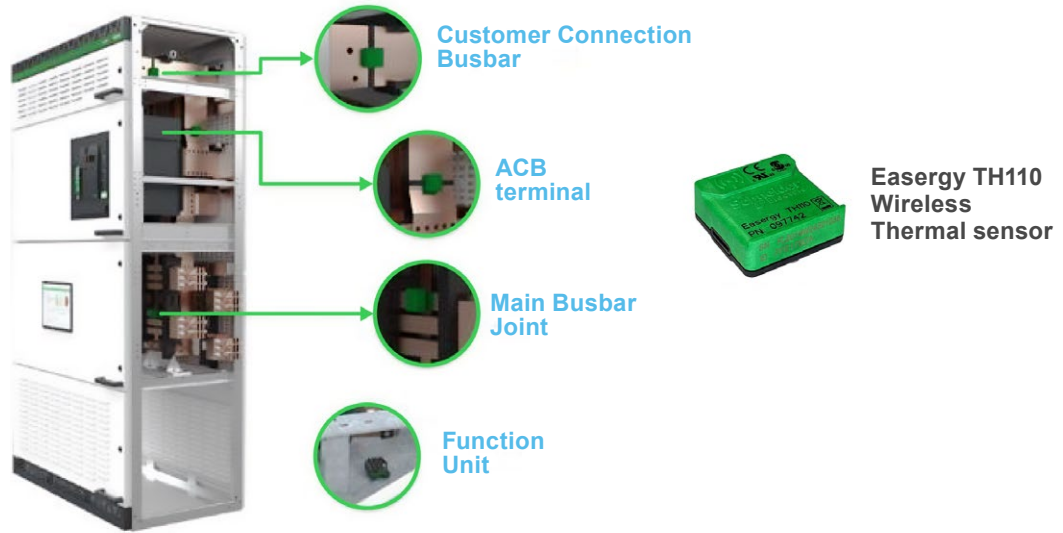
Improving intelligence to enhance reliability

Hyperscalers are not the only ones who can apply AI. Today's emerging technologies offer significant opportunities for capitalizing on sensing and analytics to detect equipment conditions and automate responses that improve user experiences.

On many products, Schneider Electric offers AI-enhanced thermal and power circuit monitoring that identifies powertrain issues before they result in downtime and optimizes maintenance based on actual real-time equipment condition. For example, our I-Line busway and BlokSet switchboards integrate wireless sensors for monitoring real-time electrical and thermal performance. These provide data to Schneider Electric's AI-enhanced EcoStruxure platform, which can proactively identify issues that would otherwise decrease reliability and power efficiency. It is the smarter way to maintain operational uptime and business continuity, reduce operational expenses and total cost of ownership, and protect building occupants and electrical distribution equipment.

Thermal sensors like the Easergy TH110 track operating temperatures at key points in data center powertrains 24x365, providing continuous insight that periodic thermal scans cannot deliver and eliminating the need for periodic thermal surveys (**Figure 8**). Monitored by AI in Schneider Electric’s EcoStruxure platform, BlokSeT Lean Thermal Monitoring not only detects potential hazards, but it also immediately alerts operation and maintenance teams to aberrant conditions, enabling them to respond before unsafe or damaging conditions occur. The newest I-Line H products offer up to IP54 protection that exceeds legacy IP20 ratings, further securing power distribution systems from water and soil impacts.

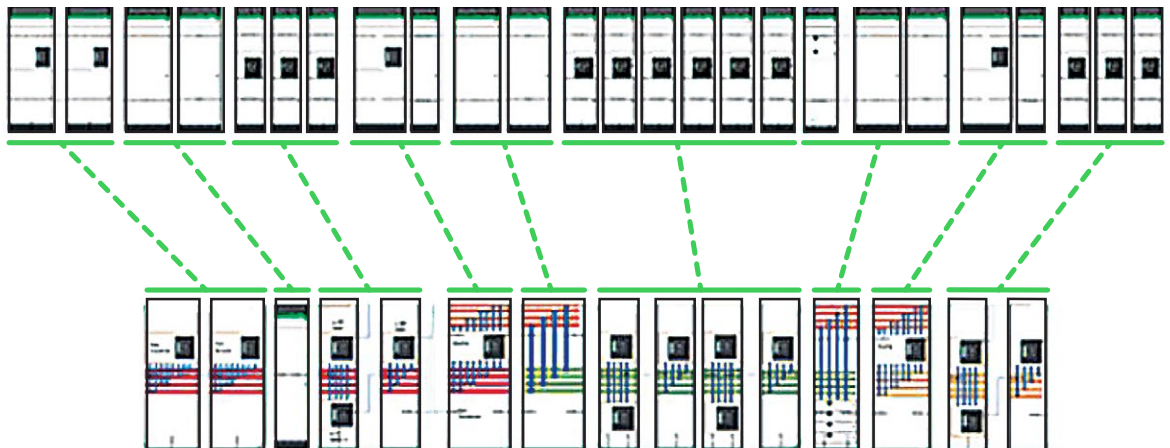
Figure 8
Wireless BlokSeT Thermal Monitoring Solution



Reducing footprints

Compact designs reduce material use, improve electrical efficiency, and reduce both floorspace and carbon footprints. For example, Schneider Electric GHA gas-insulated medium-voltage switchgear reduces footprint area by 25 percent when compared to air-insulated equipment. It offers a core breaker mechanism that is sealed for life, thus needing no maintenance. [BlokSeT Lean](#), our newest low voltage switchboard, uses a unique mid-level busway architecture to reduce both footprint and CO₂ contribution by up to 30 percent through material and power loss reduction (**Figure 9**).

Figure 9
In this example, a 15-section BlokSeT Lean switchboard lineup met the same application needs as the existing 25-section BlokSeT offering.



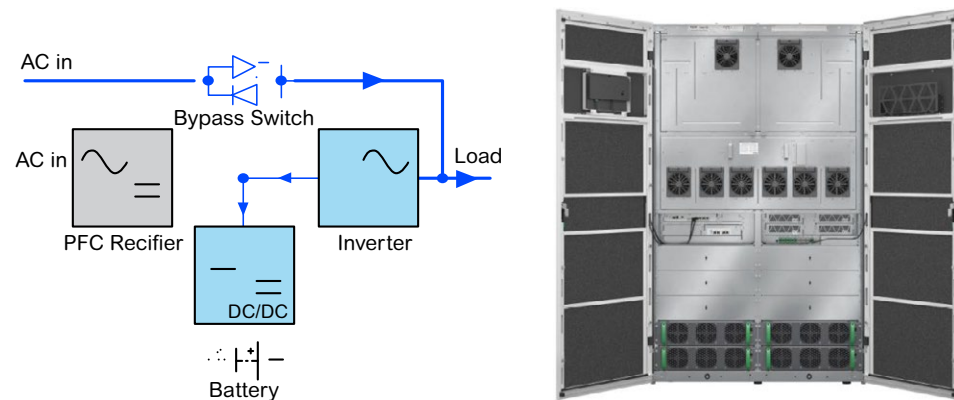
Enhance efficiency of power distribution systems

In addition to supporting energy-saving power architectures, power distribution hardware such as medium and low-power busway benefits from improvements that increase energy efficiencies. These can result from overall design changes such as delivering power to servers at 400 or even 800 VDC — doing so decreases energy losses across power distribution circuits.

Another approach is to use equipment with energy saving features. For example, in normal operating modes, a typical UPS continuously regenerates output voltage to loads. Select Schneider Electric Galaxy VX UPSs can provide 500 to 1500 kW (400V/480V) and can be operated in eConversion Mode (**Figure 10**). In this mode, the load is normally powered by the bypass path, allowing raw mains power to supply the load, and the UPS inverter is engaged only when utility power fails. The benefit of eco-mode is that the efficiency of the bypass path is typically between 98.0% and 99%, compared to the base UPS efficiency of 94% to 97%.⁴

Figure 10

In eConversion Mode, the Schneider Electric Galaxy UPS avoids unnecessary electrical power conversions to improve efficiency and avoid heat rise.



Enhancing full lifecycle support

In addition to providing resources for deploying data center power, Schneider Electric can deliver the monitoring, service and repair solutions that streamline data center operation throughout a facility's lifecycle. Schneider Electric's [EcoCare](#) service offers new monitoring technologies connected to the EcoStruxure platform along with enhanced service solutions.

EcoCare services help stakeholders get the most out of their data center powertrain through next-level predictive, preventive, and onsite maintenance to keep operations running at peak performance while minimizing downtime and related costs. Benefits can include:

- Reducing electrical failure and unplanned downtime by up to 75%
- Reducing on-site activities and planned downtime costs by up to 40%
- Extending electrical equipment lifespan
- Reducing carbon emissions
- Empowering teams through specialized training

With Schneider Electric, data center optimization goes beyond selling equipment—it's about delivering end-to-end support across every operational challenge. By managing power, cooling, and infrastructure complexity, stakeholders can stay focused on what matters most: maximizing performance and revenue from their advanced data processing environments.

⁴ [Eco-mode: Benefits and Risks of Energy-saving Modes of UPS Operation. Schneider Electric.](#)

Examples for today and tomorrow

Source power

Noted earlier, delivering adequate amounts of power to AI servers will require the use of higher voltages in the power distribution systems of data center facilities. Schneider Electric medium-voltage offerings include a broad selection of switchgear, transformers, and circuit breakers. One new solution is Schneider Electric's [EvoPacT HVX](#) line of digital vacuum circuit breakers.

Developed from more than 45 years of medium-voltage experience, [EvoPacT HVX circuit breakers](#) are proven to last three times longer than the industry standard. They are tested against all major international standards, including IEC, ANSI/ IEEE and GB/T. Their longevity is further enhanced by EcoCare condition-based maintenance plans that optimize costs across equipment service life.

Using this solution, IoT-enabled sensors continuously monitor EvoPacT HVX health in real time, alerting staff to exceptional conditions as soon as they develop. Data-driven condition-based maintenance helps avoid unplanned downtime by detecting potential issues early and facilitating planning to avoid loss of revenue. And EvoPacT HVX helps reduce hazards by automating operation so staff can remain beyond the arc flash zone, and by providing operating recommendations.

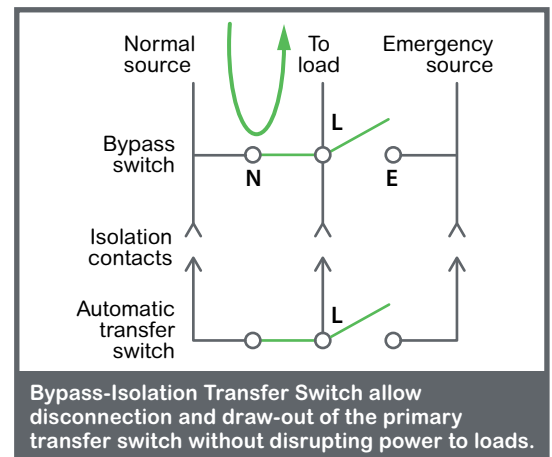
Power source switching and control

At the heart of power resilience is the capability to connect to a secondary power source when outages occur on the primary source, and transfer switches are at the heart of Power Source Switching and Control. ASCO Power Technologies (a Schneider Electric brand) commercialized the first automatic transfer switch in 1925 and has led the [industry for 100 years](#) since, building an unmatched reputation of reliability, quality and trust.

For data centers, a key attribute for power resilience is *concurrent maintainability*, and ASCO has spent decades delivering it through its Isolation-Bypass transfer switches (**Figure 11**). Consisting of two transfer switches in a single enclosure, these models enable facilities to route power through a secondary switch to isolate the primary switch for service. Isolation-Bypass models are used in the most demanding and critical applications, including high-value data centers.

Figure 11

An ASCO Bypass Isolation Transfer Switch places the primary transfer switch in the low bay, and the secondary transfer switch in the upper bay.



Based on their sheer size, an AI data center can require hundreds or thousands of transfer switches to meet its power resilience goals whenever generator sets are used for backup power. In its history, ASCO has produced more automatic transfer switches than all its competitors combined. The firm has the experience and technical depth needed to design transfer switches for specific applications, such as those that require replication across a data center floor. In addition, ASCO's advanced manufacturing capabilities enable it to deliver transfer switches at the scale needed for large multi-facility buildouts on-time.

Power delivery

Three product families showcase Schneider Electric best-in-class innovations that are leading data center power build outs.

BlokSeT Lean switchboards are a notable example of Schneider Electric innovation. Located in the gray space, these distribute power to pods of server lineups. They feature:

- A unique architecture where the main busbar passes mid-height through the rear of the lineup. Its unique front-accessible design enhances technician accessibility while increasing flexibility for connecting customer equipment.
- A single run of main busbar rated up to 5000 Amps, meeting or beating every competing solution.

With [BlokSeT Lean](#), customers get a solution that [helps data centers decarbonize](#). This product offers a 30% smaller footprint and reduces bus resistance to improve energy efficiency, resulting in a 30% CO₂ Scope 3 emissions reduction.

The **I-Line H** busbar tracking system offers the capacity, efficiency, and modularity that data centers need to get up to 5000 Amps at up to 1000 volts to white space server pods (**Figure 12**). High-purity copper bus that is entirely silver-plated offers low voltage drop and low resistance while protecting against surface corrosion that could impact energy efficiency and equipment condition over time. Integral plug-in circuit breakers provide complete electrical overload and short circuit protection, and spring jaws ensure constant tight contact of plug-in units with busbars. Shutters ensure finger-proof connections that enable hot swapping of plug-in units, and pre-installed polyester films insulate each busbar. Build-outs become faster, safer, and easier with I-Line H.

[View a product overview here.](#)



Figure 12
I-Line H Busway

With I-Line Track data center operators can deliver more power to servers with a configurable product that easily scales to exceptionally large applications. (**Figure 13**). Mounted above lineups of server racks in the white space, this product offers:

- Ratings up to 1000 Amps, with an industry-leading 1250-Amp rating coming soon
- Modular components that extend configurability and install quickly
- Tap-off boxes that slide on track to speed installation and provide flexibility for locating power drops.

[View a product overview here.](#)



Figure 13
I-Line Track Busway

SureSet

The goals? Zero electrical safety incidents, zero unplanned downtime, zero energy waste, and zero cybersecurity issues. Here’s how SureSet advances these goals for AI Data Centers.

Figure 14
Over 25% smaller footprint savings compared to most conventional metal-clad switchgear

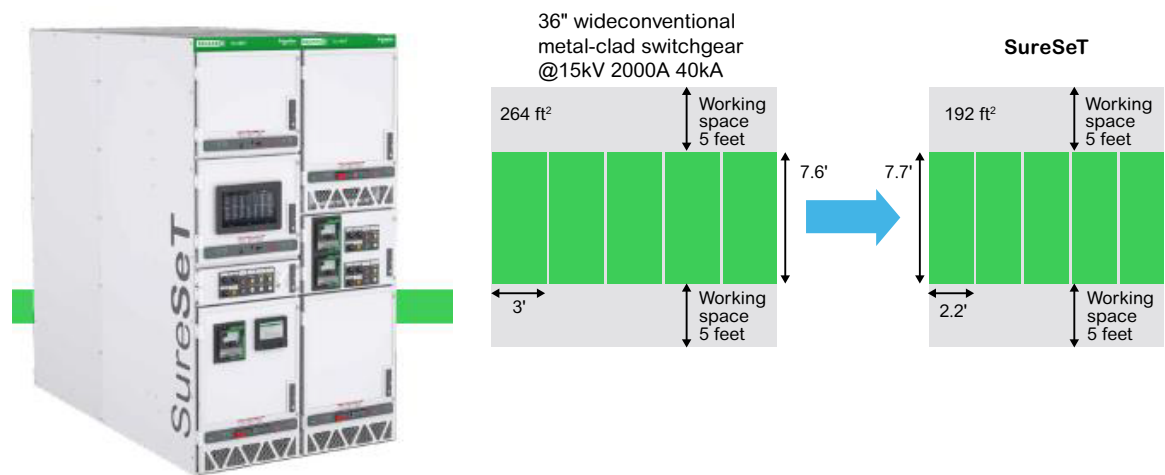
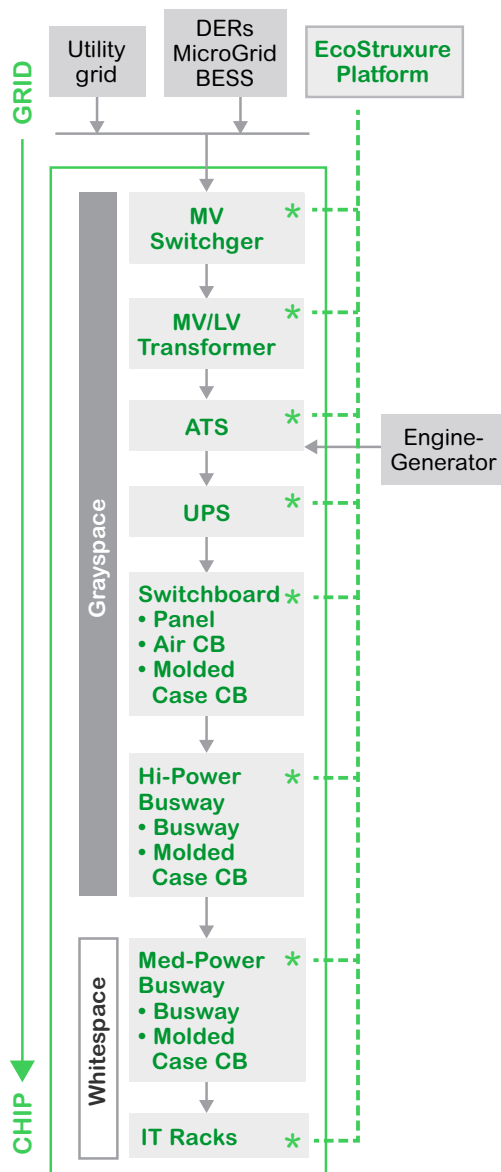


Figure 15
Sensing and metering can enable the EcoStruxure platform to monitor and optimize operations, performance and predictive maintenance at every level of the AI powertrain.



SureSeT provides legacy electrical ratings in a more compact package, using less space for electrical rooms and leaving more room for IT equipment. SureSeT enables around-the-clock access to equipment information and the ability to perform actions from anywhere. Paperless asset management brings access to drawings, operation manuals, and more. Any place, any time. Integrated health monitoring moves from time-based maintenance towards condition based predictive service that leads to better maintained equipment that lasts longer, dramatically reducing total ownership costs. Designed to the latest cybersecurity standard, SureSeT improves data security. Remote access enables operation from a distance, reducing safety risks.

Metering

On average, a one-hour power loss event costs a data center \$1 million and a compromised reputation.⁵ The increasing size and importance of AI data centers is sure to inflate that value, so it's important to monitor power use, power conditions, and equipment health across the powertrain, then increase the utility of the resulting data.

[Schneider Electric's advanced PM 8000 and ION 9000 power meters](#) can be installed at any level of the data center power train to provide the insight needed to prevent power problems, reduce power costs, and enhance efficiency and sustainability. These power meters provide precision accuracy, the ability to quickly locate disturbances, help predict maintenance needs, and aid in monitoring

ongoing operations like battery health and runtime variations. Importantly, these meters feed essential information to Schneider Electric's EcoStruxure platform and other leading control platforms to enable comprehensive insight to the most critical data center power capabilities.

Surmounting simultaneous challenges

The range of power challenges pressing AI training data center designers is extensive. Beyond those already explored, these emerging issues require novel approaches:

- **The nature of GPU operation** – Power delivery systems need to handle massive transient loads without voltage drop
- **Power losses** – Inefficiencies of AC-DC and DC-DC conversions can significantly impact *Power Usage Effectiveness*

⁵ [ITIC 2021 Hourly Cost of Downtime Survey](#)

- **Power distribution changes** – Trends include deployment of DC power distribution at up to 800 volts
- **Power availability** – Training AI data centers are presenting new levels of power demand to aging infrastructure, requiring coordination with utility suppliers and on-site sources of power

Integrating modern technologies into new architectures requires astute manipulation of a range of variables, not only by engineers and contractors that build AI data centers, but also by hardware, infrastructure, and software providers as well as the code authorities that guide standardization and implementation. Piecemeal solutions from disparate parties with narrowly focused offerings could leave data center stakeholders with an difficult burden of integrating competing solutions.

Championing industry-leading solutions

One way to efficiently coordinate power solution deployment is to rely on suppliers with (1) a broad view of the technological options across the systems that optimize data center operations, and (2) an ability to commercialize solutions for each global marketplace. As the world’s largest electrical solutions innovator and supplier, Schneider Electric maintains a unique position to leverage existing and emerging technologies to solve AI power delivery challenges. We already offer products and services known and trusted the world over. Schneider’s worldwide presence facilitates commercialization of solutions that comply with codes and regulations for each major market. Our offers provide a strong base for advanced power delivery, including the only power distribution switchboards and busway expressly designed to ease data center build-outs. **Figure 16** shows how Schneider product families provide industry-leading products for every point in AI data center power delivery systems.

	Powertrain	North America	European Union	East Asia + International
Grayspace	MV Switchgear	GHA, DVCAS SureSet, PremSet	GHA, DVCAS AirSeT	GHA, DVCAS AirSeT
	MV/LV Transformer	Power-Cast II Power-Dry II	Trihal	Trihal
	ATS	ASCO 7000 ATS Dual Breaker ATS	ASCO 7000 ATS TransferPact Dual Breaker ATS	ASCO 300 ATS TransferPact Dual Breaker ATS
	UPS	Galaxy	Galaxy	Galaxy
	Switchboard • Panel • Air CB • Molded Case CB	QED2 MasterPacT PowerPacT	Okken MasterPacT ComPacT	BlokSeT MasterPacT ComPacT
	Hi-Power Busway • Molded Case CB	I-Line PowerPacT	Canalis ComPacT	Canalis ComPacT
Whitespace	Med-Power Busway • Miniature MCCB	I-Line Track	I-Line Track	I-Line Track
	IT Racks	NetShelter	NetShelter	NetShelter
	Power Meters	PowerLogic	PowerLogic	PowerLogic

Figure 16
Schneider Electric Solutions by Global Market

From grid to chip, these existing and forthcoming Schneider product lines address the power distribution and protection devices that AI data centers will need today and tomorrow. Through these brands, Schneider will continue to expand the capabilities and ratings of existing products and introduce the innovations that will enable AI Data Centers to compute more iterations than ever before. They will enhance efficiency and be the vehicles for commercializing the expanded power solutions AI data centers need. Here's how.

We'll lead on power architecture

Schneider Electric is privileged to collaborate with NVIDIA at the leading edge of AI data center design. We support their initiatives with products and services that turn theoretical innovations into functional realities. Our early visibility into the most viable solutions enables us to publish reference designs that streamline and accelerate adoption for everyone.

We'll lead on knowledge base

For decades, Schneider Electric has participated in a broad range of data center initiatives — from code-making and design support to innovating industry leading equipment and services. We have solved and delivered solutions to data centers across the globe. With experience gained by working with designers, integrators, and builders across data center disciplines and markets, Schneider Electric can share unparalleled insight to meet the most daunting data center challenges. By sharing knowledge on design, application, and equipment, we can help stakeholders build bigger, faster, and cleaner. By supporting industry-code making and sharing the results, we can help designers and installers understand what it takes to achieve data center objectives and why.

We'll lead on product

Schneider Electric's broad product portfolio provides a strong base for distributing medium-voltage, low-voltage primary and low-voltage secondary power. With products like SureSeT and AirSeT switchgear, BlokSeT Lean switchboards and I-Line busway, we're already the go-to source for power distribution products designed specifically for speeding IT deployment. We'll broaden options for data center power by offering existing equipment with even higher ratings and features that speed installation. We'll lead on integrating DC power sources and loads by developing best-in-class products for evolving applications.

By achieving these goals, Schneider Electric will show why we are the most accessible source of end-to-end power throughput solutions. In doing so, Schneider Electric will be:

- The one-stop source for power infrastructure solutions designed and tested for high-density AI workloads
- The leading provider of modular hardware and software that will bridge industry labor skill gaps, and accelerate the design and scaling of data center power systems
- The best source for design and maintenance expertise for evolving data center power systems
- The provider with the global footprint focused by local insights and enabled by key partnerships.

This is how Schneider Electric will give specifiers, installers, and users the “the power-to-power AI.”

Schneider Electric. Grid to chip AI power.