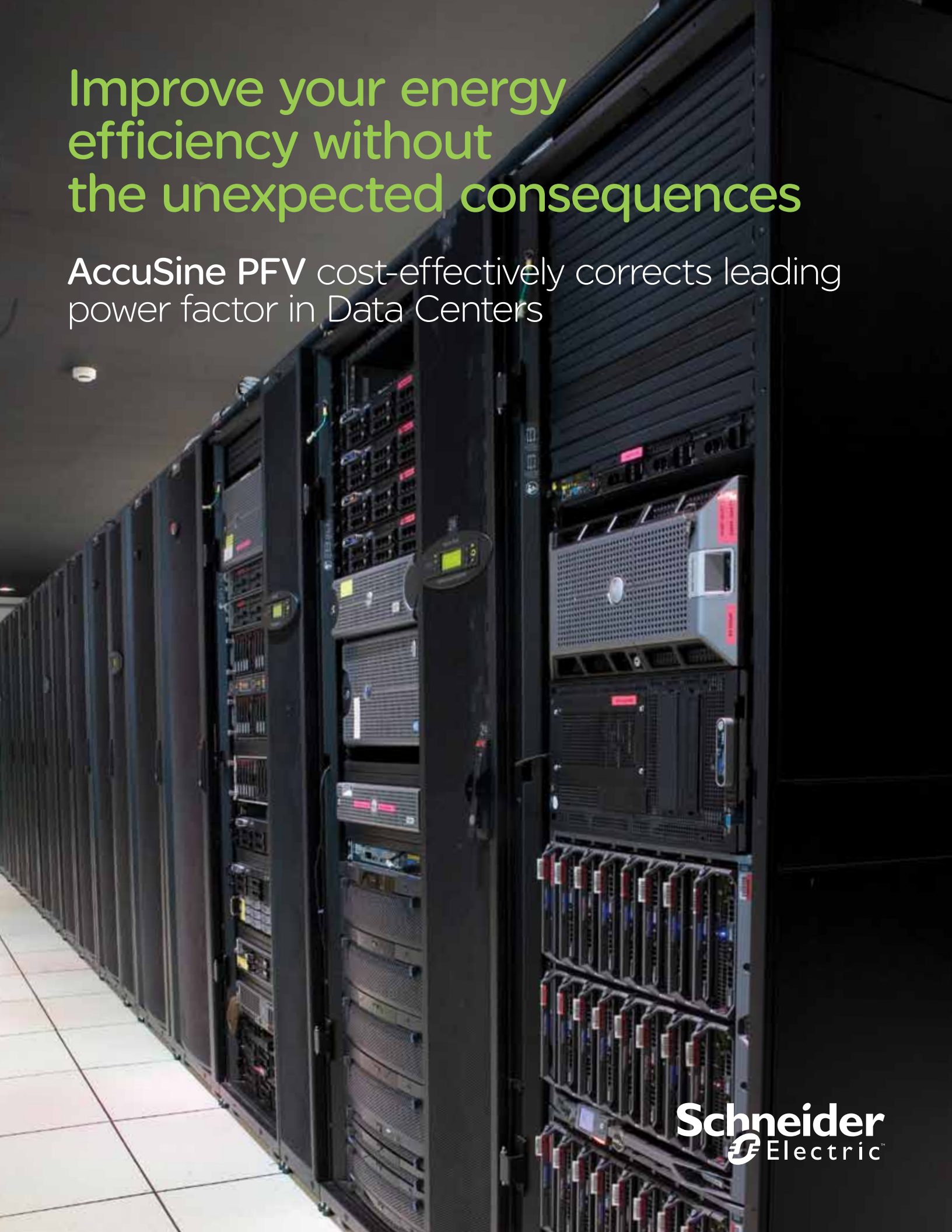
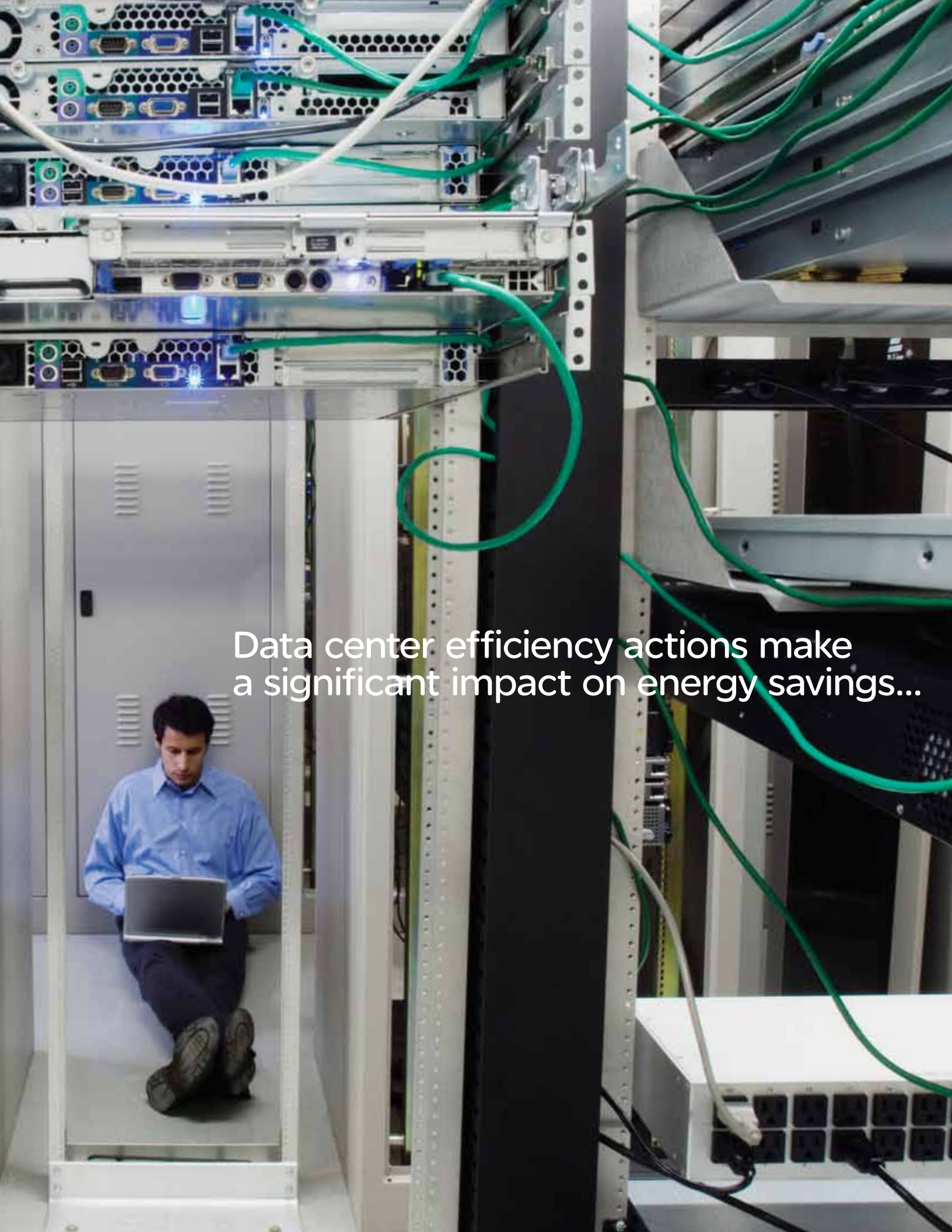


Improve your energy efficiency without the unexpected consequences

AccuSine PFV cost-effectively corrects leading power factor in Data Centers

Schneider Electric


Data center efficiency actions make
a significant impact on energy savings...

...however, these same technologies can cause unexpected power quality issues.

As your operations have become more energy efficient, some conservation measures you may have installed may incur unanticipated side effects and produce a negative impact on your data center operations. Originally designed to lower energy costs, new server and other IT equipment technologies can cause power factor issues across your electrical distribution network.

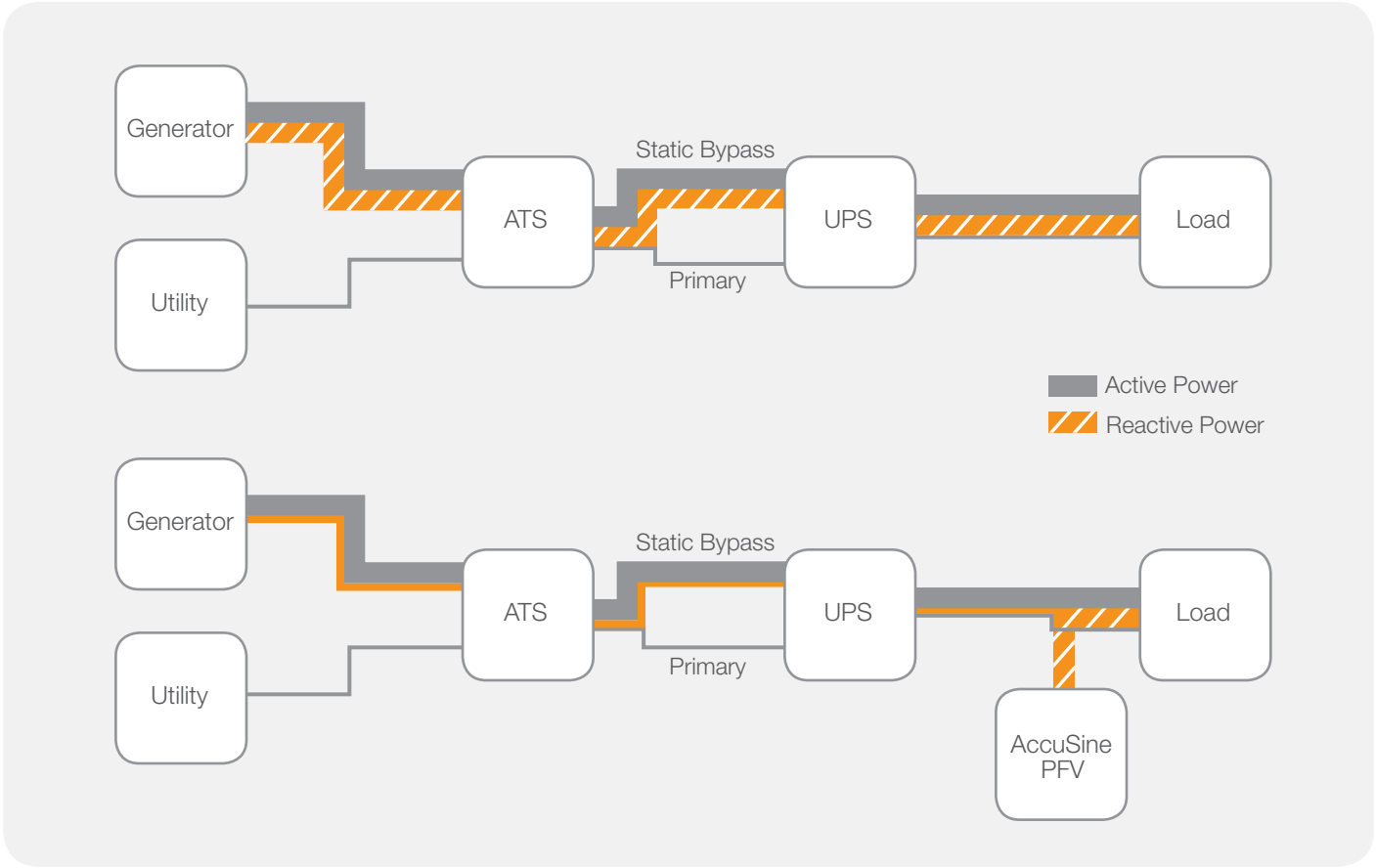
Complications from leading displacement power factor:

- Back-up generators fail to start or shutting down
- Capacity de-rating for older UPS modes
- Call-backs and other nuisance service calls
- Power factor penalties imposed by utilities

With available power capacity as a major operating concern and downtime being unacceptable, Schneider Electric provides peace of mind with a proven power quality solution to help you improve energy efficiency – without the unwanted side effects.

Understanding power factor...

In simple terms, power factor is the standard measure of an electrical system's efficiency. It describes the ratio between active power (kW), the electrical current in watts, and reactive power (kvar), the apparent power of capacitive loads in volt-amperes. Created in capacitive loads, leading power factor means that the current builds up faster than the voltage and can produce resonance back onto the main power line. This can create performance interference in connected electrical equipment and operational issues for your Uninterruptible Power Supply (UPS) system, as well as the potential for increased energy rates and power factor penalty charges from your utility.



...in your data center operations.

In your data center's AC electrical distribution system, the use of higher efficiency power supplies creates leading power factor as a by-product of your energy conservation efforts.

- **Switch Mode Power Supplies (SMPS)** – updated server SMPS that employ boost convert technology provide much greater efficiency at a smaller size with lower heat generation, while helping reduce both energy costs and your carbon footprint. The SMPS' boost convert technology uses single-phase inverters that draw current almost sinusoidal from the power supply. When operating close to full current capacity, the SMPS operates very close to unity power factor (slightly leading). When the demand on the SMPS is reduced, the leading power factor is actually increased and can produce electrical switching noise back onto the mains power line, causing equipment performance issues.
- **"Blade" Server Systems** – used to replace legacy servers, these solutions typically generate a 20 percent reduction in power consumption through higher efficiency power supplies and allow for higher density data centers with improved operating efficiency and more flexible management functions. Their "low harmonic" redundant power supplies have input capacitors that produce a leading power factor to balance loads. When their supply load is reduced, the capacitors remain optimized for 100 percent loading, causing an increase in leading power. This requires the UPS to use more of its kVA capacity to overcome this capacitive reactance.

Uninterruptible Power Supply Performance

Leading power factor can create significant challenges for data center UPS systems.

- For distribution systems with older UPS designs, leading displacement power factor can result in insufficient capacity, nuisance alarms, or even downtime due to overloading the UPS module and requires a significant de-rating or retrofitting to deliver their full capability.
- For modern UPS modules, the energy saving "eco-mode" disengages the double conversion, creating the potential to have dirty, raw utility power flowing directly to your sensitive IT equipment. If the Utility is acting as the backup generator system, this equipment will be exposed to a leading power factor. With a leading power factor greater than ~0.98, the running generators will de-stabilize and shut down.

An affordable, straightforward, and uncomplicated solution...

Power Factor Correction (PFC)

An electrical system's power factor can be improved by increasing the active power component or by reducing the reactive component in the system. Since increasing the active power component for the sole purpose of power factor correction is not economically feasible, the best method for improving a system's power factor is to reduce the reactive power component using Schneider Electric's proven AccuSine PFV solution.

Power factor correction offers a quick return on investment with multiple benefits:

Reduce your capital expenses
up to 30%

Optimize the size of your electrical system, avoid oversizing, and limit redundant capacity.

Reduce utility billing penalties and lower operating expenses
up to 10%

Good power factor can lower power bills and reduce power losses.

Reduce energy losses by
up to 30%

Optimize your power consumption and reduce total process energy consumption.

Increase equipment reliability
up to 18%

Boost power quality to improve business performance by improving power infrastructure reliability and reducing unplanned outages.

...to correct leading displacement power factor.

Electronic reactive current compensation for data centers

AccuSine PFV provides active power compensation by measuring the amplitude of the reactive current and the phase relationship to the mains voltage. A logic program then calculates the required amplitude and steplessly injects reactive current at the opposite phase angle to precisely cancel the displacement power factor and maintain a selected set point or unity power factor for the electrical distribution system.

When compared to the alternatives, AccuSine PFV provides the most cost effective and accurate solution for leading power factor correction. The only other corrective process functions by switching large inductors (thyristors) across the phases. These systems are physically very large and expensive to operate. The amount of correction applied is provided in large kvar amounts, so it frequently creates situations of over and under correction. AccuSine PFV provides the precise correction needed without these issues.

With a small footprint and no load complications, AccuSine PFV is a very simple and effective means to eliminate leading power factor, reduce voltage fluctuations, enhance equipment operating life and improve system power capacity.

Key Features

- Three wire connection.
- From 208 V to 690 V supply (higher voltages with transformers).
- Units from 33 A to 300 A, parallel up to 99 units.
- Displacement PF correction to set point.
- Load balancing of input current.
- Rapid VAR injection in <1 cycle.
- Modbus TCP/IP and Ethernet IP communications.

A strategic power factor approach for your data center operations.

A complete solution, when, where, and how you want it

Schneider Electric power factor correction solution includes everything needed to ensure your power system is operating at its best. Our expertise ranges from power system monitoring and problem diagnosis, to engineering, installing, and supporting the precise power factor control solution your facility needs to run at optimal efficiency and cost.

The quality and performance you expect

All our power factor correction solutions provide an excellent return on investment because they are designed and manufactured by Schneider Electric, using advanced manufacturing methods and premium materials. They are optimized to match your application needs and are engineered to provide superior performance.

Support when you need it

Schneider Electric is the global partner you can count on to deliver the service, support, and access you need to be most efficient. Our highly skilled sales, engineering, and after-sales support professionals are there when you need them.

Put our experience to work for you.

Find out how AccuSine PFV can make a difference for correcting power factor issues in your data center. To learn more, visit us at **www.schneider-electric.us**

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