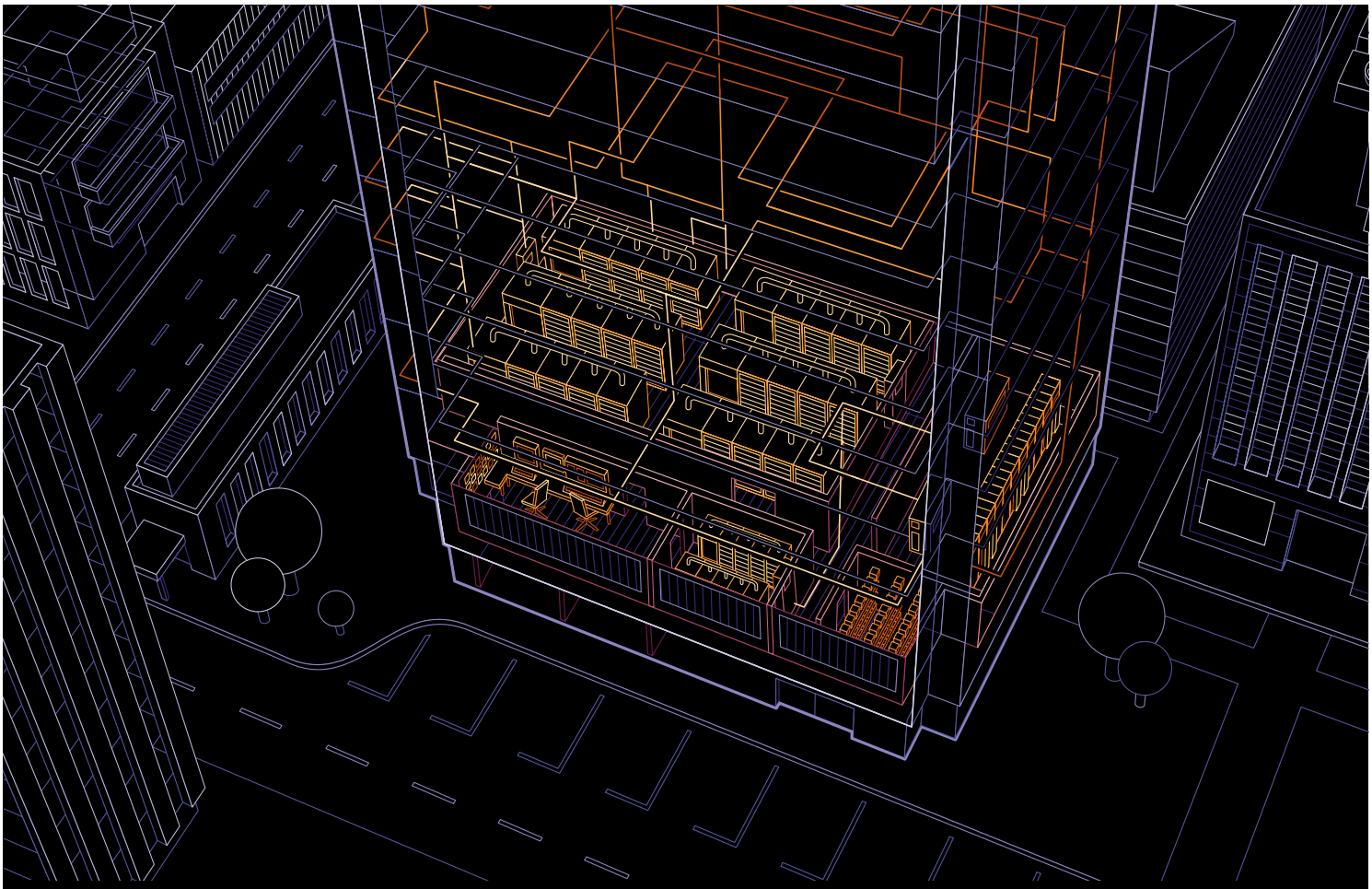


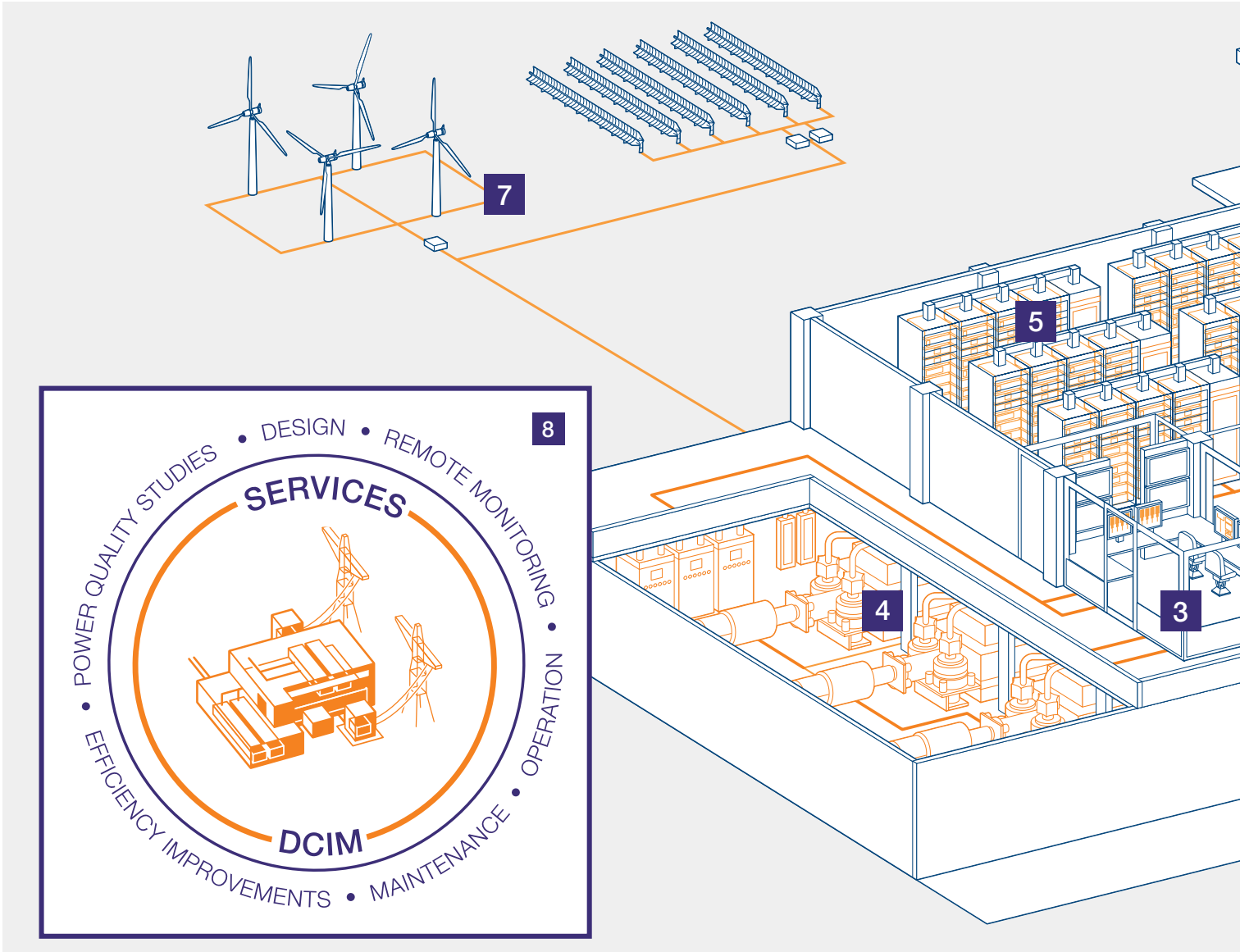
Increasing safety, reliability and efficiency for today’s data centers

Power and productivity
for a better world™

Products and expertise for data center success

Drawing upon vast experience in complex industries where uptime is critical, ABB provides a wealth of expertise, engineering, products and support to help today's data centers operate more safely, reliably and efficiently. ABB is committed to providing expertise in six areas vital to data center success:

- Availability and reliability
- Efficiency
- Ease of operations and maintenance
- Flexibility
- Safety
- Risk management



[1]
- Substations
- Transformers
- Medium-voltage switchboards/switchgear
- Generators
- Power quality assessments
- HV UPS

[2]
- Low-voltage switchboards/switchgear
- Circuit breakers

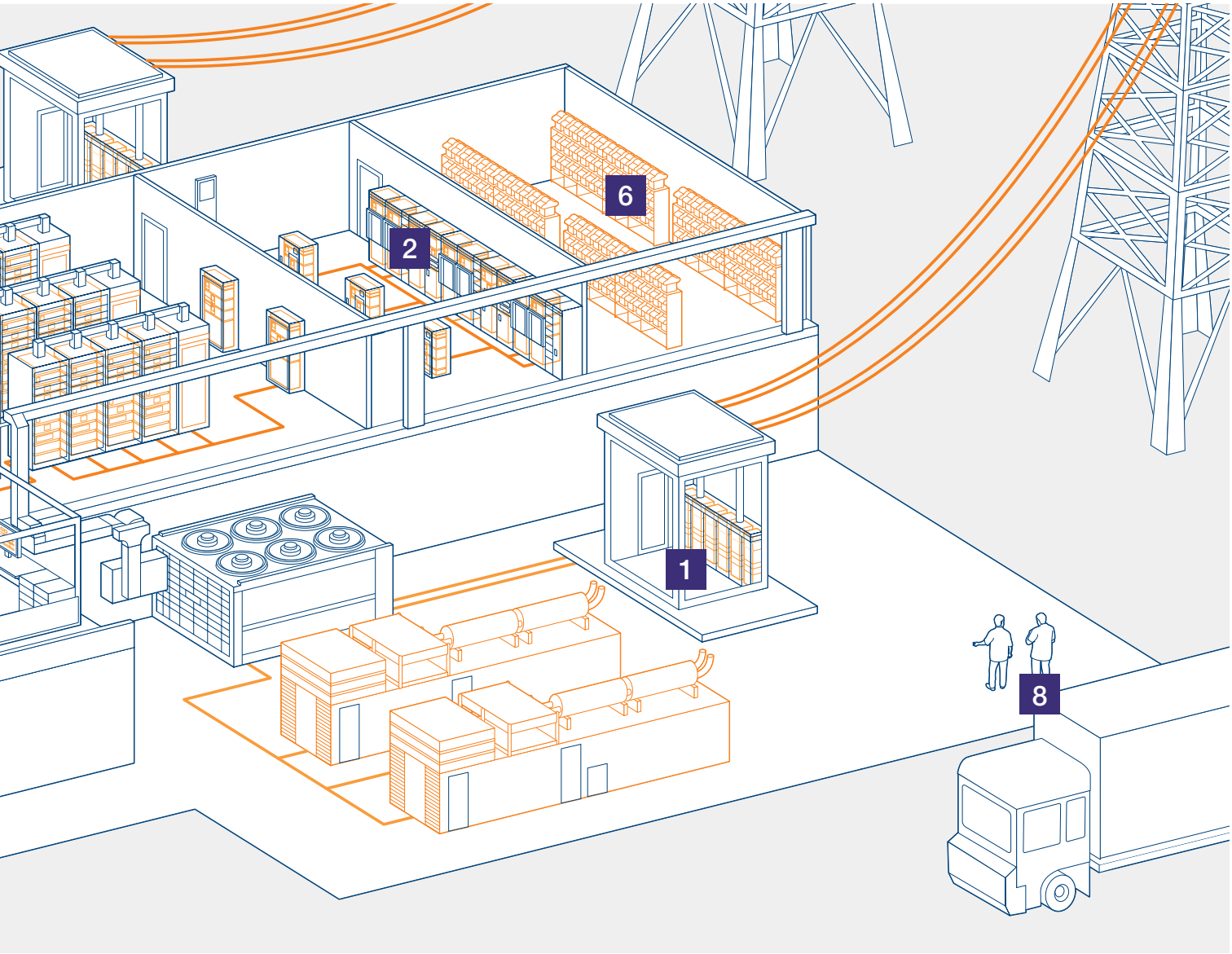
[3]
- Active filters
- Power factor correction
- Rectifiers
- Uninterruptible Power Supplies

[4]
- Data center automation and power optimization
- Remote monitoring and diagnostics

[5]
- HVAC solutions

Backed by a history of innovation, a global presence and nearly 125,000 employees in more than 100 countries, ABB provides a cost-effective, single-vendor solution to the myriad needs of today's data centers.

ABB's approach for data centers is to provide alternating current and direct current systems, automation and services to build reliable and efficient solutions that meet diverse end user needs.



- High-efficiency motors
- Low-harmonic variable frequency drives / inverters
- Circuit breakers
- Cooling
- Automation and control
- Energy efficiency audits

[6]
- Intelligent power distribution units
- Remote power panels
- Branch circuit monitoring
- Strategic partner to leading OEMs
- AC or DC battery chargers

[7]
- Microgrid connectivity
- Strategic partner to leading wind and solar OEMs

[8]
- Data Center services and Data Center Infrastructure Management (DCIM)

Availability and reliability

Outages can damage more than just a reputation. At a reported cost of $1 million or more per hour, outages exact a painful toll on the bottom line. With more than a century of experience providing equipment, systems and expertise to data centers and industries where uptime is critical—such as chemicals, refining, banking and financial institutions—ABB can help reduce unplanned outages and improve quality of service. ABB's products and integrated systems are designed for heavy duty industrial applications and extensively tested to withstand the rigors of data center use, helping ensure maximum reliability and uptime.

Products that are built to make the grade

Power transformers are the backbone of today's data centers. But they're also one of the leading causes of data center shutdowns. When they short-circuit, they can represent a single point of failure for an entire data center. ABB transformers are engineered and built for maximum reliability. They performed 400% better than all other transformers in recent short-circuit tests conducted by the KEMA Testing and Certification Lab.

ABB low voltage (LV) switchgear and motor control center (MCC) global installed base reaches an operational availability of nearly 100%. The products' unique design exceeds safety requirements set forth inside the relevant standards and is backed by more than 400 successful arc tests to date.

To keep costs under control, many data centers are constructed using commercial-grade instrumentation. While cost-effective, these instruments are not engineered or built for long life in critical applications, such as those in today's data centers. ABB's industrial-grade instrumentation lasts two to three times longer than comparable commercial grade instruments in similar applications.

Tackling the big issue of cascading circuit breaker faults

During construction, many data centers are wired using residential "zero-crossing" mini circuit breakers (MCBs). In strenuous applications, these breakers can easily let through enough energy to trip the main, failing hundreds of servers instead of just a few. At ABB, we believe that customers' data—and a data center's business success and reputation—are too important to trust to residential breakers.

That's why our industrial-grade ABB coordinated current-limiting main and branch breakers deliver 30kAIC with only a 10kAIC MCB, which virtually eliminate nuisance main tripping.

5x

AC↔DC

Standby power batteries, microchips and many other components inside IT equipment run on DC power. Since today's data centers have AC power infrastructures (like your home or office) power has to be converted at 5 different stages within the data center.

Efficiency

Today's data centers consume 30 or more times the power per square foot than the average office building. And with electricity costs skyrocketing, it makes sound fiscal sense to ensure that data centers are as energy efficient as possible. Through outstanding engineering, timely advice and such innovations as smart grids and new DC technologies, ABB provides the systems and expertise to help data center developers minimize costs through improved electrical efficiencies.

Smart grids: The intelligent way to reduce energy costs

Utilities employ several different strategies to maximize the amount they charge data centers for energy usage. These include billing based on peak demand, based usage at a specific location or based on a specific demand-response agreement. ABB's expertise and smart grid technology help data centers actively monitor energy usage and respond quickly to potential increased charges by reducing load to avoid establishing a new peak, shifting load to other locations where rates are less expensive or complying with demand-response requests.

Direct current designs reduce total cost of ownership

For years, decision makers have debated the merits of alternating current versus direct current. But one thing is certain, when it comes to energy consumptions, AC data centers have more conversions and emit much more heat then their comparable DC brethren, which leads to higher HVAC costs.

ABB's engineers are experts in designing AC and DC data centers that are energy efficient and provide return on investment. In particular, ABB's power electronics designs are advanced, and for DC centers this results in the use of fewer components, thus a smaller footprint and less equipment and cost to install and maintain.

Cooling systems: Many options… what is best for you?

Cooling system design is one of the most important factors to data center efficiency. The challenge is there are many different ways to cost effectively cool your servers depending on the size and location of your center. ABB offers cooling systems that are optimized for each type of environment and cooling method. Whether you are using traditional HVAC or the latest designs that use naturally cool water from lakes or rivers, ABB works with data center operators to design and implement cost effective and reliable solutions, including redundant cooling systems to help achieve the highest possible availability.

Ease of operations and maintenance

80%

Outages Unplanned

Data centers are some of the most complex structures on earth, full of intricate and interrelated equipment and systems: fans, pumps, chillers, valves, switchgear, control systems, transformers, PDUs, RPPs, UPSs—the list goes on and on. Like all mission-critical equipment, it needs regular monitoring and maintenance to ensure maximum reliability. Sometimes that doesn't happen, which is why an estimated 80% of all unplanned outages can be prevented. ABB's data center products and systems are engineered for long life and reduced maintenance, helping increase uptime and control costs.

Monitoring made easy

A data center's mission-critical systems need to be monitored closely to ensure maximum uptime. However, monitoring the status of a complex facility from multiple workstations is cumbersome and inefficient, often leading to errors or oversights.

ABB's automation and power optimization enables comprehensive monitoring through a single window into all areas of the facility: electrical, server, asset, building, power and network management. The system alerts operators to all alarms or pending issues, automates data center maintenance with information directly from the Data Center Infrastructure Management (DCIM) system and allows operators to quickly drill into problems associated with any electrical or facility asset.

In conjunction with our automation and power optimization system, other ABB components, such as instruments, provide extensive asset condition diagnostics, providing improved visibility into problems, probable causes, suggested maintenance actions and fault severity.

Overcoming the switchgear maintenance challenge

In the rush of day-to-day operations, switchgear maintenance is often a low priority, despite the fact that even the smallest repair to a single component can cause a significant downtime. ABB LV switchgear/ MCC platform delivers a maintenance-free mechanical structure and bus bar system designed to save hours of maintenance each year. This platform allows for safe withdrawal of functional units while the gear is on line, which enables easy and cost effective maintenance. ABB integrated switchgear platform also offers online temperature measurement at the power contacts of outgoing external cable connections, providing proactive condition monitoring and predictive maintenance.

In addition, ABB medium voltage magnetically actuated circuit breaker nearly eliminates ongoing maintenance and is rated for a minimum of 10,000 "at load" operations. ABB LV MCC buckets can be safely removed and replaced without the need for tools—and in about 10 seconds, compared with 10 to 20 minutes with legacy MCCs.

Flexibility

Today's successful data centers must be flexible and readily adaptable to industry changes, especially the ever-growing appetite for increased storage. In many cases, data centers address this need by adding servers, which in turn requires more power and HVAC. ABB solutions readily provide the flexibility data center managers require to address operational changes that result from the need to provide additional storage.

Racking up without powering down

Installing additional server racks to address additional storage needs requires data centers to install additional supporting electrical gear and HVAC equipment, which often requires a costly shutdown. ABB's LV switchgear and MCCs help ensure vital uptime by allowing data center operators to safely install new feeders and HVAC equipment without the need to power down.

A single view into added capacity

Adding new server racks often require costly and time-consuming changes to two, three or more disparate monitoring and control applications. ABB automation and power optimization system provides a single window into facility status and server allocation, allowing data center operators to quickly and easily add server capacity, cooling capacity and other critical hardware. By networking all field instruments and control devices to the DCIM, data centers can easily add more field devices while greatly reducing the wiring required.

Safety

As multi-megawatt facilities, data centers are prime candidates for arc-flash events. In fact, arc flashes strike from five to 10 times a day in the U.S., with about 20% occurring in MCCs and switchgear and another 18% in custom control panels. ABB shares every data center operator's commitment to making employee safety a top priority.

Eliminating arc flashes

The immense amount of power available at the switchgear and MCCs poses an ideal opportunity for arc flash occurrences. ABB's LV switchgear and motor control centers' unique multi-function wall provides isolation and insulation between functional compartments, phases and bucket stabs. This provides active protection and virtually eliminates the chances of an arc flash event. If an arc should occur, additional passive protection would limit it to its area of occurrence, thus minimizing damage. ABB switchgear breakers and MCC buckets can be removed and replaced without opening a door, delivering a dead front barrier between the operator and the live components.

Coordinated visibility into operations

Many data centers rely on multiple monitoring and control software systems to keep a watchful eye on operations. However, this makes it difficult to coordinate and manage alarms, maintenance procedures and security access, often creating safety issues. ABB automation and power optimization system provides a single pane of glass that alerts operators to all alarms—everything from the utility to the servers—enabling operators to react to situations quickly.

Each operator enjoys a personalized view of the data center and is able to control the systems for which he or she has been trained. The system also enables set-up of built-in startup and shutdown procedures to help keep people and equipment safe.

Contact us

North America, South America
Mr. Mark Reed
mark.reed@us.abb.com
www.abb.com/datacenters

Europe, Middle East, Africa
Mr. Ciarán Flanagan
ciaran.flanagan@ie.abb.com
www.abb.com/datacenters

Asia, Australia, Antarctica, India
Ms. Valerie Richardson
valerie.e.richardson@us.abb.com
www.abb.com/datacenters