Data center solutions
Innovative, flexible substations for reliable, sustainable and fast-tracked data center power

Each data center has different challenging requirements, but innovative substation design can help you meet them
As a data center owner, you want to maximize the white space of your data center by minimizing the footprint of the infrastructure. There is a portfolio of system solutions that can help you achieve this.

Skid-mounted substation solutions are viable options for smaller, less energy intensive data centers. These solutions are designed to save time and money by minimizing upfront engineering hours as well as reducing civil works, electrical installation, testing, and commissioning at the project site. Skid-mounted substations are factory assembled on a single platform, tested and transported to site.

Larger data centers like those used by Facebook, Amazon or Google can also be limited by space constraints, but require a more robust substation solution. In this instance you should consider Gas Insulated Switchgear (GIS) or Digital Substation solutions. Substations with GIS are unmatched when it comes to compactness, reliability, efficiency and safety while still providing maximum power availability. The robust, low maintenance design minimizes the substation footprint allowing it to be installed indoors, in urban areas and in harsh environments.

With significantly reduced space requirements and enclosed substations sheltered from the elements, the GIS substation solution enables you to save on operation and maintenance costs throughout the life cycle of the substation. Digital substations bring additional, superior benefits such as reducing footprint, increasing reliability, safer operation and shorter lead times.

Lead time
Data centers make all of our favorite conveniences possible – streaming video, on-line banking, social media, virtual reality, etc. Use of these applications have exploded in recent years and as a result the number of data centers are growing at an unprecedented rate. This rate of growth becomes a problem when conventional power solutions can take more than two years to bring a data center on-line.

Modular substation solutions address this issue head on. These substations are designed with the need for short delivery and construction times in mind. They are engineered so that each of the major sub-systems of the substation can be assembled and tested in a factory environment before being transported to the project location for on-site erection with minimal assembly.

The Internet of Things (IOT), social media, smartness and digitalization everywhere drive the data center industry. As the use of technology grows, so does the need for larger and more sustainable data centers as well as the required electricity to power them. High availability, efficiency and flexibility of the grid connection and distribution system are of critical importance to a data center’s operation. Innovations in substation design and integration address these issues while saving time, decreasing cost and improving reliability.
Scalability
It is difficult to predict what a data center’s power needs will be five to ten years from the time that it is constructed. This is why many owners and operators opt to expand as they grow instead of building out their entire data center at the beginning. The problem is that when they are ready to grow, their power system can’t sustain that growth. This issue can be avoided by utilizing substation technical solutions so that your power system is ready to grow when you are.

Substation technical solutions and services can be used to assess your current substation, analyze the reliability and economic value of the system, and choose the optimal solution to increase its capacity. The solution could range from retrofitting or upgrading critical components to extending or refurbishing the existing substation. Whatever the solution, you can be assured that your data center’s power source will continue to be efficient and reliable no matter its growth.

Sustainability
Many data center companies have aggressive renewable or carbon neutral goals. The integration of renewable energy such as wind and solar can help companies meet these goals while reducing energy costs. When making the case for renewables, there are a number of questions that need to be addressed in planning, ranging from reliability and resiliency requirements to the role renewables can play as a primary, complimentary or backup energy provider. You can utilize technology such as battery energy storage systems or microgrids to meet requirements and to get the most out of your onsite assets regardless of the role renewables play in your power mix. To make things easier, this technology can be seamlessly integrated into the grid by any of the previously mentioned substation solutions.

Digital Substation and Automation
Until recently, data center substations have been challenging in terms of automation. The intelligent electronic devices (IEDs), that protect the substation and control its high-voltage power flow, each have had separate, isolated functions, which refuse to talk with each other if they’re from different “families”. Unless exacting procedures were employed, switchgear troubleshooting was exactly that – trouble. However, the implementation of the global IEC 61850 standard has made these problems a thing of the past. The value of IEC 61850 in substations has become so evident in substation automation that engineers are beginning to look for ways to bring this standard inside data centers to protect, control and automate medium-and-low voltage systems.

The benefits are:

• Interoperability – Previously, IEDs from a variety of manufacturers used protocols that did not work together. However, the interoperability of the 61850 open standard allows IEDs from other vendors to work together in the same system.

• Free allocation of functions – The 61850 standard offers more than just a protocol for communicating. It defines a complete architecture with protocol, data modeling and representation of standardized functions. These functions no longer are tied to dedicated IEDs. Each device will support a list of functions outlined by the vendor and designed to the same standards as those from every other vendor.

• Future-proofing – Since 61850 is a digital standard, it can be applied to any future method of transmitting digital information. Today data centers use Ethernet, but in the future communication could be carried out via wireless or cloud-based systems.

Going beyond, the IEC61850 standard can be applied down to the primary assets, by digitizing all control, measurement and condition monitoring information from the equipment till the Control and Protection panels and delivering a fully integrated Digital Substation solution that includes the use of Digital CTs, VTs, I/Os and sensors. This brings additional superior benefits such as: reduced civil works and overall footprint, increased safety by reducing electrical hazards and improved system reliability.

Design, execution and operation expertise
Data centers are the backbone of everyday life as human activity today depends on things like energy, telecommunications, internet, transport, security systems, and traffic control. With all of these critical segments depending upon data centers’ operation it is critical to have a reliable power system.

To ensure reliability, data center owners and operators need to seek a solutions partner whose team has a holistic view of substation and system assets that are also experts in substation design. You should require abilities such as project execution and installation support and site management, protection and control expertise, substation design and optimization, communication and automation expertise, as well as power systems analysis and studies.