

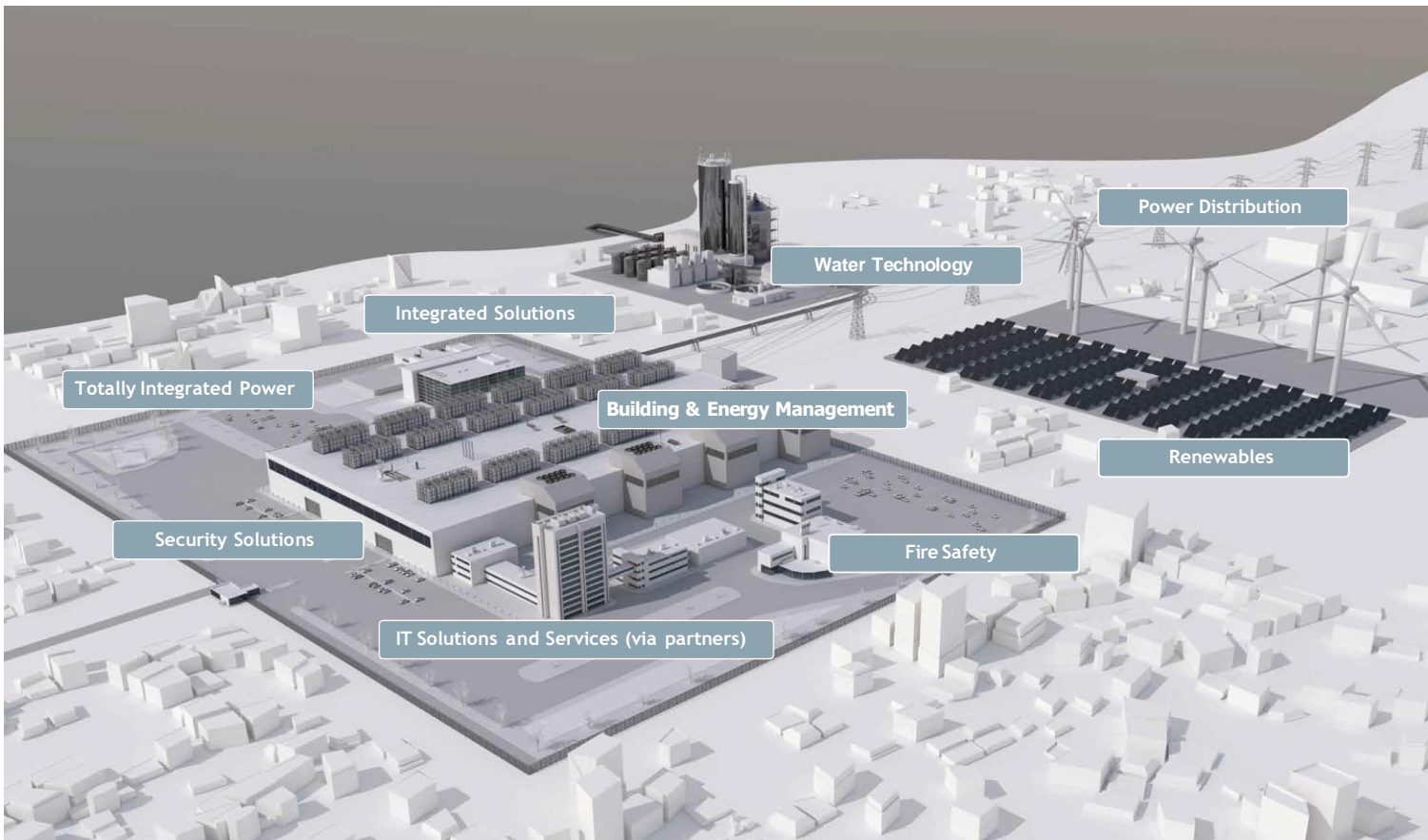


**SIEMENS**

Maximum uptime thanks to integrated  
data center solutions from Siemens

Solutions for Data Centers

*Incoteq*



## Tailored solutions for maximum uptime and increased efficiency

Data centers are among the world's largest users of electricity, with servers running 24 hours per day, seven days a week, under tightly controlled environmental conditions and often not at full capacity. With the huge growth of social networking, Internet usage, electronic banking, paperless storage and modern IT services such as virtualization and cloud computing, the requirement for safe, resilient and energy-efficient data centers is growing.

Combined with the effects of globalization and compliance with local codes and regulations, companies face many challenges in their data center facility, to keep it competitive, efficient and productive. There are also a number of key issues that impact the infrastructure design of data centers; including higher levels of security, increased power availability, safe and secure operation, limiting energy usage and environmental impact.

As the world's largest electrical engineering company, Siemens has a global portfolio of products and solutions for data centers and engineering teams around the world. We can assist you with all aspects of your data center, starting with consulting, planning, designing and site selection, to engineering, commissioning, full documentation, training, maintenance and expansion planning.

# Siemens meets the growing demand for safe and secure IT processing

## The expertise of a global company for your entire business

Siemens provides the most comprehensive solutions for data centers, by combining innovative development and manufacturing expertise, with project management experience and know-how. Whether for new construction or modernization, be it for an enterprise, Internet or co-location facility, with us you benefit from our expertise from projects made all over the world, with some of the biggest data centers and corporations.

## Green data centers

As the world's largest provider of green technologies, Siemens is at the forefront of reducing the global carbon footprint. Our environmental portfolio helps our customers reduce carbon emissions by over 300 million tons annually. Siemens' integrated building automation and control systems, power monitoring solutions and energy services will help your data centers to save energy and reduce PUE.

## Security

By offering fully integrated security solutions, Siemens ensures the security of the data, the building and its assets. From the perimeter to the rack, we provide security solutions that reduce the risk of security breaches, thereby reducing reputational losses and safeguarding your business' bottom line.

## Cooling, BMS and HVAC

Siemens understands the importance of cooling in data centers. Our integrated building management and monitoring systems help maintain the computer room areas within precise environmental conditions, with the optimal use of free cooling and alternative energy applications.

## Power

The medium- and low-voltage portfolio from Siemens has been specifically designed to meet the demanding requirements in data centers, providing data centers with tailored, reliable and consistent end-to-end power distribution solutions.

## Firesafety

Fire detection and protection solutions from Siemens are tailored to the specific data center environment and fire risk profile. Our solutions reduce the risk of wide-spread fire, utilizing the highest detection speed and accuracy, matched with preventive maintenance, improving the response effectiveness.

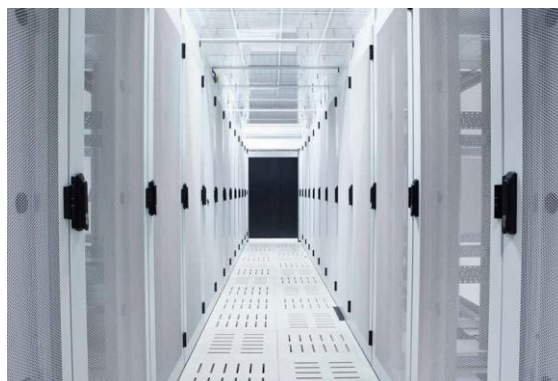
## Data center infrastructure management

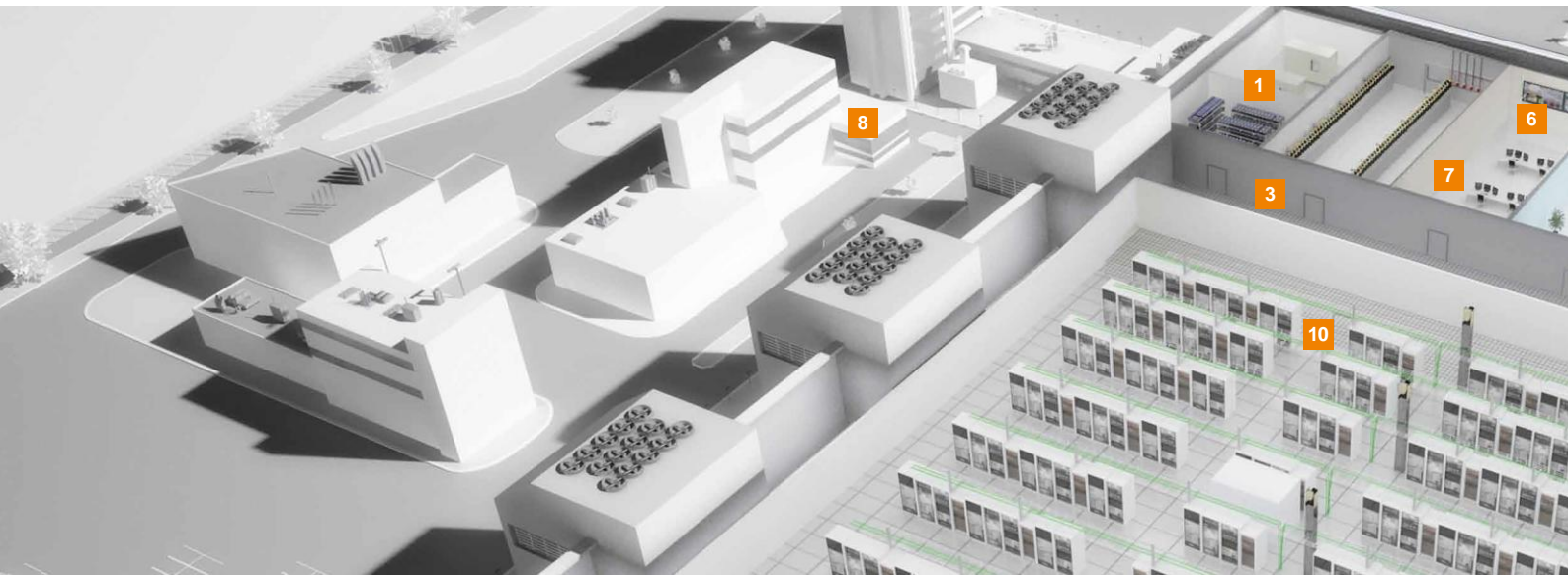
Bridging the gap between IT and facility management is an essential component to business success in a data center. Our advanced monitoring and management solutions ensure demand control and provide transparency for all mission critical facilities.

## Highlights

- Energy efficiency optimization with green portfolio offering
- Compliance with all codes and regulations
- Complete data center portfolio
- Project support for new build and modernization
- Ensuring maximum uptime and availability

Comprehensive data center solutions from Siemens





Overview showing energy efficiency, fire safety and security solutions from Siemens

# Reliable, green, safe and secure data centers

In the past decade, the number of worldwide Internet users has increased from 300 million to over 2 billion – that is a growth rate of more than 400%!

## Global growth

The huge increase in Internet usage is one of the key drivers for data center growth. Any business with an Internet presence now has a global reach ... and global competition. An estimated 1.2 billion mobile web-enabled users, new legislation on prolonged data storage and the impact of cloud computing on IT service business are just a few examples. Information technology and communications, and data centers in particular, are therefore becoming more and more important to all businesses.

## Services

Our comprehensive services give data centers the flexibility to strategically outsource competence and operational support based on financial and organizational constraints.

## Integrated solutions

With data center projects made all over the world, Siemens combines years of engineering expertise with a comprehensive portfolio of products, systems and

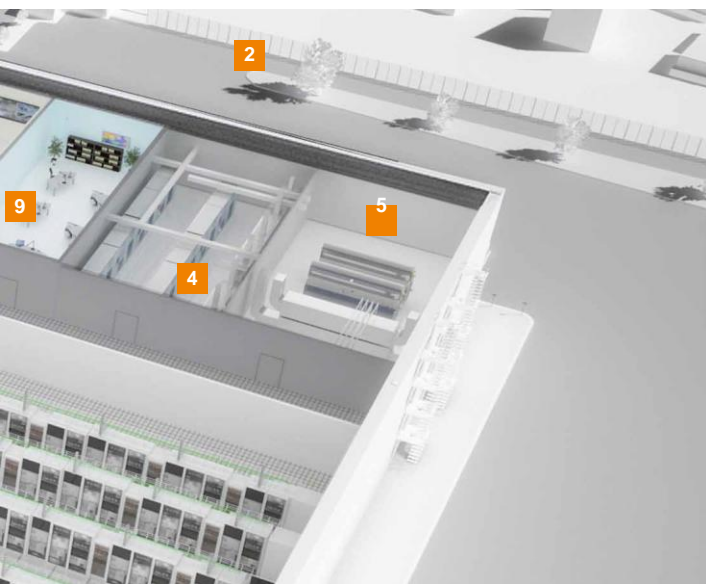
services, to provide integrated solutions designed for your data center.

From planning to implementation, our task is to ensure maximum system reliability and availability throughout the entire systems' life cycle, providing optimal return on investment.

## Legacy data centers

An estimated 75% of current data centers cannot support today's technology, forcing many companies to invest in significant upgrades. Technologies from Siemens can be employed to extend the capacity of ageing facilities with little or no disruption.

Today's new design guidelines allow higher internal temperature and humidity set-points without affecting IT equipment performance. Technologies from Siemens help to reduce thermal and electrical loads and maximize free cooling, whilst maintaining precise control of the computer room environment.



- 1 Fire & Life Safety
- 2 Physical Security
- 3 Electronic & IT Security
- 4 Totally Integrated Power Distribution
- 5 Cooling Controls and Monitoring
- 6 Energy Transparency
- 7 Managed Services
- 8 Energy Generation
- 9 Sustainability Audits
- 10 Lighting

### Transparency

If a meaningful approach to energy efficiency is to be realized, information and reporting are essential. Siemens has a proven portfolio of management and monitoring software, with dedicated tools to manage power usage, water & energy consumption and to safeguard the facility in case of failure of danger situations.

Siemens also provides advisory services, energy audits and remote energy monitoring services (benchmarking) to help data center owners to maximize their return on investment. Optimizing your energy utilization will not only reduce the environmental impact, it will save you money and increase profitability.

### Local regulations

With offices in more than 170 locations around the world, we understand the necessary regulations including BICSI, ISO, Sarbanes-Oxley, TIA naming just a few, to ensure that all national, regional and local data center codes and regulations are conformed to, ensuring you remain compliant and competitive.

### Challenges for data centers

The growth in IT services and server and storage capacity poses some technical challenges for data center operators: Namely, the availability of power, reduction of risk and the implications for higher energy consumption.

Every interruption of data, every temporary stoppage of data flow or a failure in a single element of the facility infrastructure can result in downtime. This often means serious consequences for a company's competitiveness. Long-term protection of data involves more than only IT infrastructure – it concerns the availability of your entire data center.

The trend towards finding green and sustainable ways to manage your data center is certainly here to stay. Reducing the operating costs of your data center infrastructure is the key to reducing your power usage effectiveness (PUE) and helps to achieve your corporate sustainability targets.

### Highlights

- Modernization strategy for legacy data centers
- Improve energy efficiency and reduce operating costs for long-term profitable operation
- Evaluate green and sustainable strategies and the latest designs and standards
- Owners maximize their return on investment



Renewable green data center solutions from Siemens

## Green data centers

### The challenge

Data centers are reported to account for around 2% of the world's total energy consumption and are expected to overtake the carbon emissions of the airline industry by 2020. Efficient use of energy is therefore more important today than ever before.

### Renewable energy

Natural resources are becoming increasingly rare and expensive, so to use them sensibly justifies our efforts to control data centers as economically as possible. By selecting innovative building control strategies, it is possible to make efficient use of energy while ensuring uptime. As the availability of fossil fuels reduces and their cost grows, the use of renewable resources becomes ever more important. With the world's largest environmental portfolio, Siemens can help to reduce energy costs and reduce your CO<sub>2</sub> footprint – and enhance your “green” reputation.

### Maximize efficiency

From sophisticated airflow management, hot aisle/cold aisle containment and efficient free cooling to proven and patented heat recovery schemes – with these solutions, you reduce both your operating and capital costs by ensuring precise equipment selection and precise control, of indoor space conditions according to actual

demand cooling such as heat recovery, night purging, geothermal heat rejection etc.

### Preserving the environment

Siemens believes in the importance of leaving behind an intact environment for future generations. With our innovative building technologies, we are helping to preserve the planet's natural resources and habitats in a process that unites environmental protection with advanced technology and business success. Our environmentally focused products and solutions for data centers help to conserve resources in power generation and preserve air and water quality.

### Energy management solutions

Benchmarking of your data center will provide valuable information for its performance and PUE.

Siemens enables you to measure the exact amount of energy consumed in your facility, you can track trends, compare with other locations and optimize equipment. By monitoring the consumption, particularly in the partial load range which is usually the most common mode of operation, you can immediately see any power losses of the installed equipment, particularly useful in legacy data centers which are often characteristically inefficient.

### Highlights

- Improve your green reputation with energy-efficient technologies
- Optimized building design improving energy performance
- Minimized operational costs (OPEX)
- Complete energy usage reporting and transparency

### Did you know ...

**A data center consumes more energy than any other building in the world.**



Totally Integrated Power from Siemens



## Power

### The challenge

In order to meet their critical power requirements and mitigate the risk of power outage, data center operators require high-quality power distribution equipment.

### Maximum uptime

To ensure a professionally designed power system for your facility, Siemens offers Totally Integrated Power providing support in all life cycle stages of the data center; from maintenance-free gas-insulated medium-voltage switchgear, to energy-efficient transformers and a complete range of low-voltage switchgear. Siemens' protective devices can even communicate with power monitoring systems.

### Flexible power distribution

Modern data centers require space-saving, reliable and high-quality power distribution systems that can be easily expanded and support high plug densities. The Siemens' EMC-friendly (electromagnetic compatibility) busbar trunking systems are renowned for their outstanding performance in data centers, reducing electrical losses and providing modular power distribution.

### Power monitoring

To sustainably run a data center it is crucial to understand the power consumption. It is important to know where and how much

energy is used. Our power monitoring devices and communication-capable circuit breakers precisely and reliably monitor power at strategic points throughout the data center. Our measuring devices and management software provide data center operators with the information needed for load management and reporting, to ensure continued energy-efficient operation of their facility.

With these tools, power usage effectiveness, the most prominent data center energy efficiency metric, can be monitored in real time so that strategies can be shifted and corrective actions taken as weaknesses are revealed. Trends can be established from a number of different reports including energy consumption, energy costs, CO<sub>2</sub> emissions and demand requirements to allow further energy optimization.

### Resilience

Siemens will help to protect your mission critical facility against disruption or power outage, many other factors such as power surges, lightning strikes or the ignition from static electricity will be considered during design stages. Our high-quality components ensure physical integrity from the main switchboard to the racks and that all zones and equipment rooms (including your personnel) are protected.

### Highlights

- Siemens' expertise in value engineering and system design helps reduce complex interfacing risks in your facility
- Complete portfolio of medium- to low-voltage power distribution equipment
- Expandable systems to support high plug densities
- Power metering and monitoring devices to detect problems and reduce energy consumption
- Management and reporting tools with trend diagnostics for the entire power infrastructure

### Did you know ...

**A 10 millisecond interruption of the power supply can disrupt the entire IT operation of a data center.**



Security solutions

# Security

## The challenge

Threats to data centers in this modern day and age come in many forms, from the intruder trying to gain physical access to the facility and ultimately the servers, to cyber attacks and hackers trying to gain access to the network and the data stored.

## Tailored security solution

Siemens provides a layered approach to data center security, identifying all possible threats and their impact on a data center's infrastructure and assets. By adopting an integrated security approach that protects all operational processes, Siemens ensures maximum uptime and business continuity.

## Flexible yet secure access control

Due to the sensitive and around the clock nature of data centers, identity and access control to the various zones is of primary importance. From badge or smart card access to "standard" zones to biometric access using iris, vein or facial recognition for high security areas, it is possible to ensure that only the right people gain access, at all times. Further security can be achieved through integration with human resource and IT systems.

## Intrusion detection systems

An intrusion detection system from Siemens secures all fences, walls, windows,

doors, corridors, even detecting water ingress or flooding. All detectors deliver the highest detection rates and false alarm immunity, including environments with fast changing light or temperature conditions.

## Intelligent video surveillance

Siemens provides an intelligent video surveillance solution that shows you exactly what is happening throughout your facility and displays all surveillance inputs on a single screen. Using intelligent video analytics, policy zones and virtual barriers, all areas are secured using cameras to both ensure the highest protection and help with event investigation, audit trails and forensic analysis, should an incident occur.

## Security management system

Siemens provides central management of all integrated security disciplines for:

- increased visibility – of risks, events and corrective measures in place or conducted following an event
- increased response agility – of policy deployment and enforcement and automated prioritization of events for speed of response
- increased control – for central reporting

It is a proactive and preventative security management system that ensures your facility remains secure around the clock.

## Highlights

- Tailored security solutions for each facility
- Intelligent video surveillance using latest analytics
- Security management system integrates all security elements
- Complete service offering
- Facility and data remain secure around the clock

## Did you know ...

Siemens has supplied more than 125,000 security systems all over the world.





Fire detection and extinguishing solutions

## Fire safety

### The challenge

A data center should have the highest level of fire safety as it involves a great level of risk, particularly in the raised floor area, due to the presence of both a constant ignition source of electricity and a plentiful supply of combustible materials. Therefore, an integral fire safety concept is critical to protect data and to ensure uptime.

### Sophisticated fire safety solutions

Siemens understands the specific requirements of data centers in terms of prevention, detection, response and recovery. Accompanying our solutions offering, we provide advice and support during every phase of a project – from the risk analysis of your data center to the specification and evaluation of our solution. Our service portfolio covers the entire spectrum throughout the life cycle – from alarm management to system maintenance, extensions and modernization.

### Fast and highly reliable fire detection

Fire detection in data centers can be challenging for traditional smoke detection systems: fires typically start slowly before erupting into flames; detecting smoke early is therefore essential to avoid the onset of flames. However, the high levels of ventilation necessary to prevent equipment overheating also disperse smoke,

making it more difficult to detect and enhancing the risk of a fast fire distribution. Our fire detection concept for data centers combines aspirating smoke detection with highly accurate smoke detectors.

### Avoid hard disk failures

Occasionally, gas extinguishing systems can interfere with data center hard disk drives and in rare cases, cause them to fail. Studies suggest that this is caused by the high noise level generated by conventional gas extinguishing systems, normally around 130 dB, during the extinguishing process when the agent is discharged into the flooding zone. To avoid this type of risk, Siemens has uniquely developed a “Silent Nozzle” designed to keep noise levels below 100 dB during extinguishing and does not pose a risk to hard drives – suitable for both new installations as well as for upgrading or modernizing existing systems.

### Reliable alarming and fast evacuation

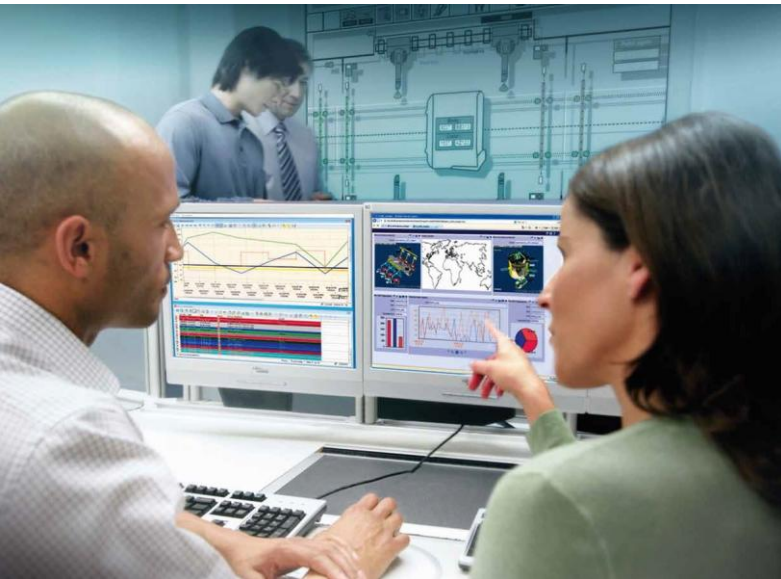
As in any fire situation, ensuring people are alerted immediately and know what to do is top priority. Alarm sounders and sounder beacons from Siemens provide immediate audible and visual alert to people in the danger area. The voice evacuation system provides clear and precise instructions to ensure personnel evacuate the danger area quickly and safely.

### Highlights

- Maximizing data center uptime with an integral safety concept
- Fast and highly reliable fire detection and extinguishing
- Safe evacuation when needed
- Complete service offering
- 150 years experience in fire safety

### Did you know ...

**70% of companies that suffer a major fire are no longer in business 3 years later.**



Energy monitoring and reporting



Cooling strategies

# Cooling, BMS and HVAC

## The challenge

The largest part of a data center’s energy consumption is associated with the HVAC and cooling equipment so it is important to have a proven and trusted partner. Energy-efficient building management systems (BMS) and heating, ventilation and air conditioning (HVAC) products from Siemens help to optimize energy usage, avoid equipment malfunctions and interruptions, and ensure system uptime as well as the constant availability of service.

## Planning your data center

There are many differences in the design of a modern data center today. Some are designed around a raised floor, others use hot or cold aisle containment, some prefer computer room air conditioners (CRACs) to maintain room temperature, others are moving to free cooling. Whatever the final solution, careful planning must take place to fully optimize the air flows and ensure energy usage is optimized.

Starting from an existing building plan, Siemens can provide the optimal design of the server room and the associated data center infrastructure, to keep IT equipment at the right operating temperature, whilst minimizing energy costs.

## A trusted partner

Siemens has over 100 years of proven experience in the design and manufacture of world-leading building management systems. Our complete portfolio of products for data centers ranges from direct digital control hardware and data center management software, through to field level devices such as variable speed drives and CRAC controllers.

## Improve your PUE and DCiE

Optimizing the cooling will directly impact the bottom line in your facility. Siemens can help improve data center efficiency by monitoring equipment power, carrying out diagnostics and trend logs. In case of irregularities in temperature, humidity or pressure, our management system quickly and reliably detects them and provides instant alarms with visual verification, to ensure an energy-efficient operation is maintained.

## Integrate the whole data

Building management systems from Siemens also have the ability to visualize the whole data center on a single screen and our certified Total Building Solutions provide functional integration of all disciplines such as power distribution, fire safety and security. An investment for the future growth of your data center.

## Highlights

- Improve facility PUE value
- High-density design strategy
- Computational fluid dynamics visualization to optimize data center design

## Did you know ...

> 50% of the energy used in a data center is for cooling.

# Worldwide proven experience

KPN data center in the Netherlands



KPN is the Netherlands' leading telecommunications provider and the major information and communication technology (ICT) services provider in the Netherlands, Belgium and Germany. A key element of KPN's business is its data center services. Typically, clients are high-profile blue-chip companies; 80% of them are listed among the top 600 Dutch companies. KPN guarantees its customers ICT services that they are secure and available 99.98% of the time – that means a downtime of less than two hours a year.

At the KPN data center, power systems from Siemens offer the security of maximized uptime with power availability, yet reduced up to 30% of the overall facilities' power consumption and 70% of cooling power. The operational experience and innovative modular design from Siemens allows for future expansion with minimal disruption.

#### Project portfolio overview

- SIVACON 8PV low-voltage switchgear
- SIVACON 8PS busbar trunking systems
- GEAFOL transformers
- NXPlus medium-voltage distribution
- Desigo™ building automation and control system
- Power monitoring system from Siemens

Safe Host data center in Geneva



Geneva-based Safe Host SA provides a complete range of data center infrastructure services including four service lines – Colocation, Connectivity & Security, Business Continuity and Managed IT Services – these provide industry-leading banks, multinationals, international organizations and retail customers a secure, reliable and cost-effective way to ensure the continuous availability of business systems and applications.

At the Safe Host data center, Siemens has supplied solutions to meet their infrastructure needs, protecting against power supply interruptions, security and fire safety threats, and ensuring servers operate at the correct temperature, protecting the data of its customers around the clock.

#### Project portfolio overview

- Central management system
- 2,800 data points
- 30 aspirating smoke detectors
- 50 manual call points
- 4 fire control panels
- 830 smoke detectors
- 4 floor repeater displays
- Sinorix N<sub>2</sub> extinguishing solution
- Intrusion detection system
- Video surveillance cameras at all major entrances

Siemens data center in Beijing



The largest data center in Asia is equipped with integrated security, fire safety, building automation, electrical supply and distribution, lighting control and energy monitoring. Integrated solutions helped win the "New Generation Data Center Award" for Siemens in Beijing with categories of green energy, security, stability and availability. Energy savings of 28%, over 600,000 kWh per year are now achieved.

#### Project portfolio overview

- MM8000 danger management system
- 63 Sinteso heat and 57 smoke detectors
- Video fire controllers
- Gas extinguishing
- Evacuation system
- SiPass™ access control system
- 25 day/night cameras
- Digital recording systems
- Intrusion detection systems
- Building management system