



Smart Electrification

The central nervous system for the most resilient hospitals

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ABB

Agenda



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The central nervous system
for the most resilient hospitals



**2. Today's healthcare providers
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Smart Electrification

The central nervous system for the most resilient hospitals

Everyone involved in designing or managing modern healthcare facilities faces intense pressure, from increasing resource efficiency to delivering more effective patient outcomes.



1

The central nervous system for the most resilient hospitals

Smart electrification delivers the resilience that is urgently needed to power resource-intensive medical treatments, care for vulnerable patients and meet sustainability and return on investment (ROI) targets. Becoming smart is no longer optional, but a strategic imperative

Working as a hospital's central nervous system, ABB's systems deliver an intelligent power network for today's most efficient and effective hospitals. The flexibility of the systems enables rapid adaptation to changing conditions and challenges, reducing compliance risk and dramatically cutting operating costs.

The smart network powers all facility functions. This enables a dynamic response to the changing environment, protecting both systems and patients from the catastrophic consequences of power loss.



Smart Electrification



This guide unlocks the enormous potential of your healthcare facility with safe, smart, and sustainable electrification solutions.

Today's healthcare providers face exceptional challenges

Whether you are building or refurbishing a complex campus hospital, medical clinic, care home, veterinary clinic, or even a small suite of rooms, you're facing unprecedented challenges that will impact on facility design.



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Today's healthcare providers face exceptional challenges

Tackling the ailments of an aging population



The number of people aged 80+ will
triple by 2050

Healthcare facilities will need to adapt to provide treatment and longer-term care for this influx of patients.

The number of people aged over 65 is growing faster than any other group. By 2050, the United Nations (UN) estimates that one in six people globally will be 65+. The number of people aged 80+ is projected to triple from 143 million in 2019 to 426 million by 2050¹. In Australia, people aged 65 years and over will increase from 15% in 2017 to between 21% and 23% in 2066².

1. United Nations/World Population Prospects 2019
2. Australian Bureau of Statistics population projections 2018

Adapting to extraordinary circumstances



Emerging illness, such as covid-19,
create new restrictions

New illnesses and medical challenges are constantly emerging. Some are the result of an aging population; others come because of greater globalization, or simply evolve as natural mutations. More recent challenges, like COVID-19, place new restrictions on physical contact or face-to-face work. All of these changing factors put added pressure on resources and create demand for more adaptable medical services. Global healthcare spending has fallen as a result of the pandemic, due to canceled or postponed non-urgent treatments³. With an increased patient backlog, far-sighted healthcare managers need to plan for a wave of future admissions.

3. COVID-19. The Impact on Healthcare Expenditure. Economist Intelligence Unit, May 2020



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Today's healthcare providers face exceptional challenges

Doing more with less



Global **shortfall of 12.9 milion** healthcare professionals by 2035

The World Health Organization (WHO) estimates there will be a global shortfall of 12.9 million healthcare professionals by 2035. Current workers are retiring but without being replaced by a new generation of healthcare professionals⁴. Technology will increasingly be called upon to fill this resource gap.

4. A universal truth: No health without a workforce. WHO 2019

Being more sustainable



Hospitals account for **4.4 percent** of global greenhouse gas emissions

Hospitals and labs are responsible for 4.4 percent of the world's greenhouse gas emissions⁵. They're increasingly challenged by standards compliance and efficiency mandates as well as new budgetary constraints. The pressure to be greener competes with pressure to be cost-efficient.

5. Health Care's Climate Footprint, Health Care Without Harm, in collaboration with Arup, 2019.

The solution is to be smart

In order to deliver a positive patient experience, every one of these challenges demands more efficient power and resource use.



The solution is to be smart

Smart electrification can deliver the resilience and intelligence needed to meet these new demands. But success demands an understanding of a facility's individual needs, as well as the right mix of flexible technology working seamlessly to deliver on key objectives.

130-year
HISTORY OF INNOVATION



TEAM
OF EXPERTS



BROAD
SOLUTION PORTFOLIO

ABB's 130-year history of innovation within electrification means we have a proven history of maximizing uptime, efficiency and value within healthcare facilities.

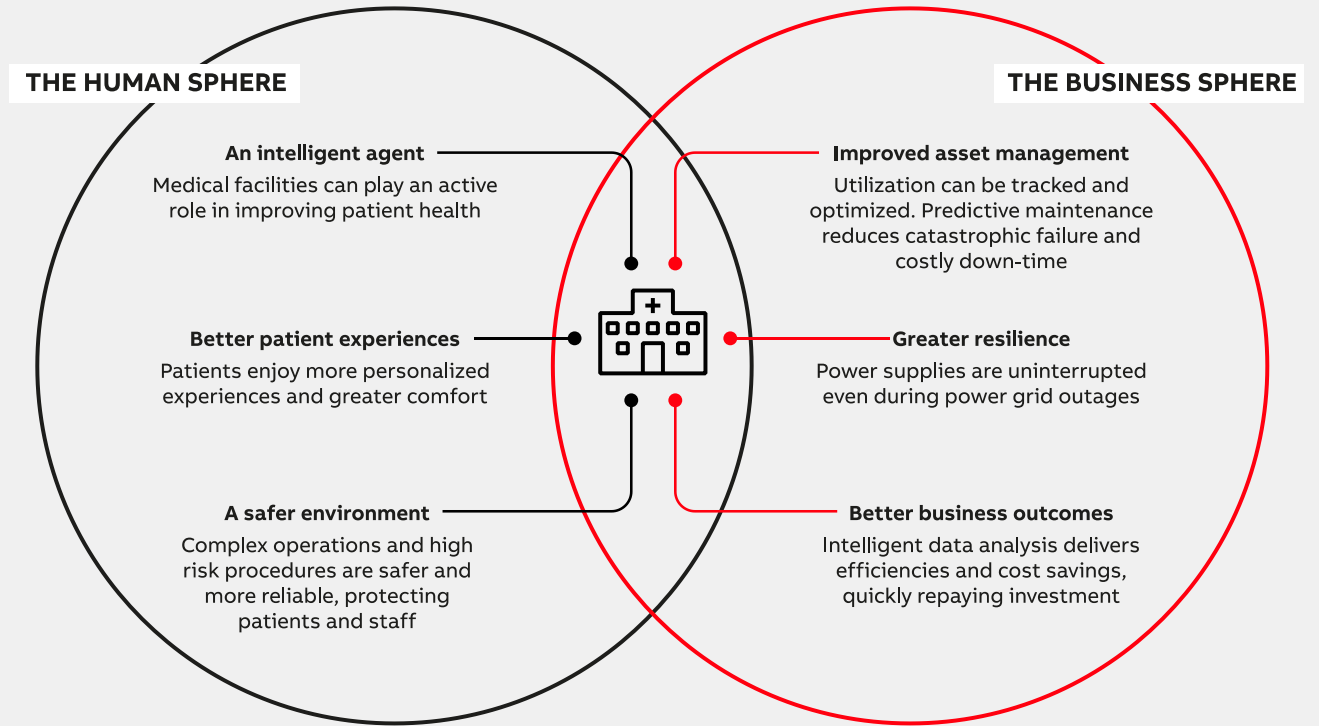
Our broad solution portfolio and expert team ensure we're the ideal partner to advise on the future of smart electrification.

Smart electrification is the nervous system of future-facing medical facilities

Like other smart buildings, smart hospitals are powered by a system of connected devices. These building-wide solutions, from medium-voltage switchgear to in-room sockets and sensors, reach deep into a facility. They distribute, monitor and manage the flow of power and loads to every major function and return data on how efficiently those resources are being deployed.

Simply put, they are the essential nervous system of a facility.

Six benefits of smart electrification



Improved medical team efficiency

Smart electrification helps make medical teams more efficient and effective.

The right automation infrastructure improves communication between staff teams and departments, patients and medical staff.



Improved medical team efficiency

Systems like ABB’s open-standard **i-bus® KNX** reduce staff workload by automating core building functions such as lighting, shutter control, heating, ventilation, security, and energy management. Patient rooms can be automatically configured to respond to individual needs, saving staff time while maintaining high-quality service.

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Automation also brings other efficiencies. For instance, staff and equipment can be tracked so mobile assets like crash carts can be quickly located in an emergency.



Tracking power usage can also help identify under-exploited resources, which can be brought back into circulation while poorly used facility space can be repurposed to better leverage value.

The use of specific equipment, such as ultrasound and electrocardiogram, and the need to activate and deactivate hands-free instrumentation led the Colleoni Foundation to choose the **ABB building automation system**, with fully integrated solutions. This allows staff to configure and manage scenarios: opening and closing shutters, varying light intensity, remotely communicating between terminals and the control room. This drastically improves patient safety by speeding up medical staff reaction times in a crisis.

CASE STUDY COLLEONI FOUNDATION

ABB improves management of services for outpatients at new Italian clinic



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Delivering better patient experiences

A smart facility can become an active player in optimizing the health of those in its care. The benefits for both the patient and the medical/financial performance of the facility are clear: improved patient experience, speedier recovery and minimized in-facility accidents.



Delivering better patient experiences

Lighting

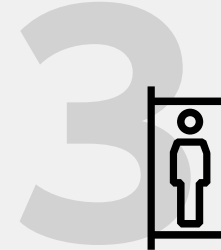
Lighting management is a key component of success, particularly for maintaining optimal safety and comfort.



By automatically adjusting lighting's phasing and intensity, staff working overnight stay more alert, which cuts down on errors. This is especially crucial for dispensaries, where pharmacists need optimized light for color discrimination⁶.



Emergency lighting luminaires and systems give clear instruction and help minimize injuries in high-risk and emergency evacuation situations.



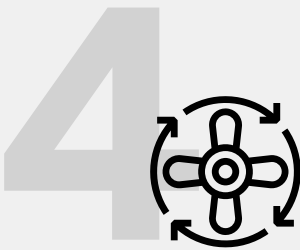
In non-emergency situations, lighting can also be used to practically designate use, reflecting room occupancy or the role of a specific treatment area. Post-operative care can also be optimized by adjusting lighting along with bed height and HVAC in individual patient rooms.

6. Impact of Light on Outcomes in Healthcare Settings. The Center for Health Design. 2006

Delivering better patient experiences

Ventilation

Automation control solutions



Automation control solutions even allow greater control over the air we breathe, keeping the air in rooms clean and safe — especially important in a pandemic environment. Fine-tuned ventilation can manage CO₂ in the atmosphere or create positive-pressure rooms for immunocompromised patients.

Accident prevention

Minimizing accidents has obvious benefits both for patient experience and the facility’s medical and financial performance.



Falls are amongst the most frequently reported safety incidents in hospitals and 30-50 percent of them result in injury and even fractures.⁷ Accidents like this mean delayed recovery and prolonged hospitalization, adding to facility costs.

7. Royal College of Physicians. Journal of Clinical Medicine. Prevention of Falls in Hospital. 2017



Networked presence detectors and movement sensors can be used to effectively monitor patient activity. This allows staff to be alerted when a patient leaves a pre-defined area or has a fall in their room.

A safer environment

Some medical locations carry a greater electrical risk than others because patients may be in a vulnerable condition, undergoing direct application of electromedical devices, in intracardiac treatment, surgery, or post-op recovery.



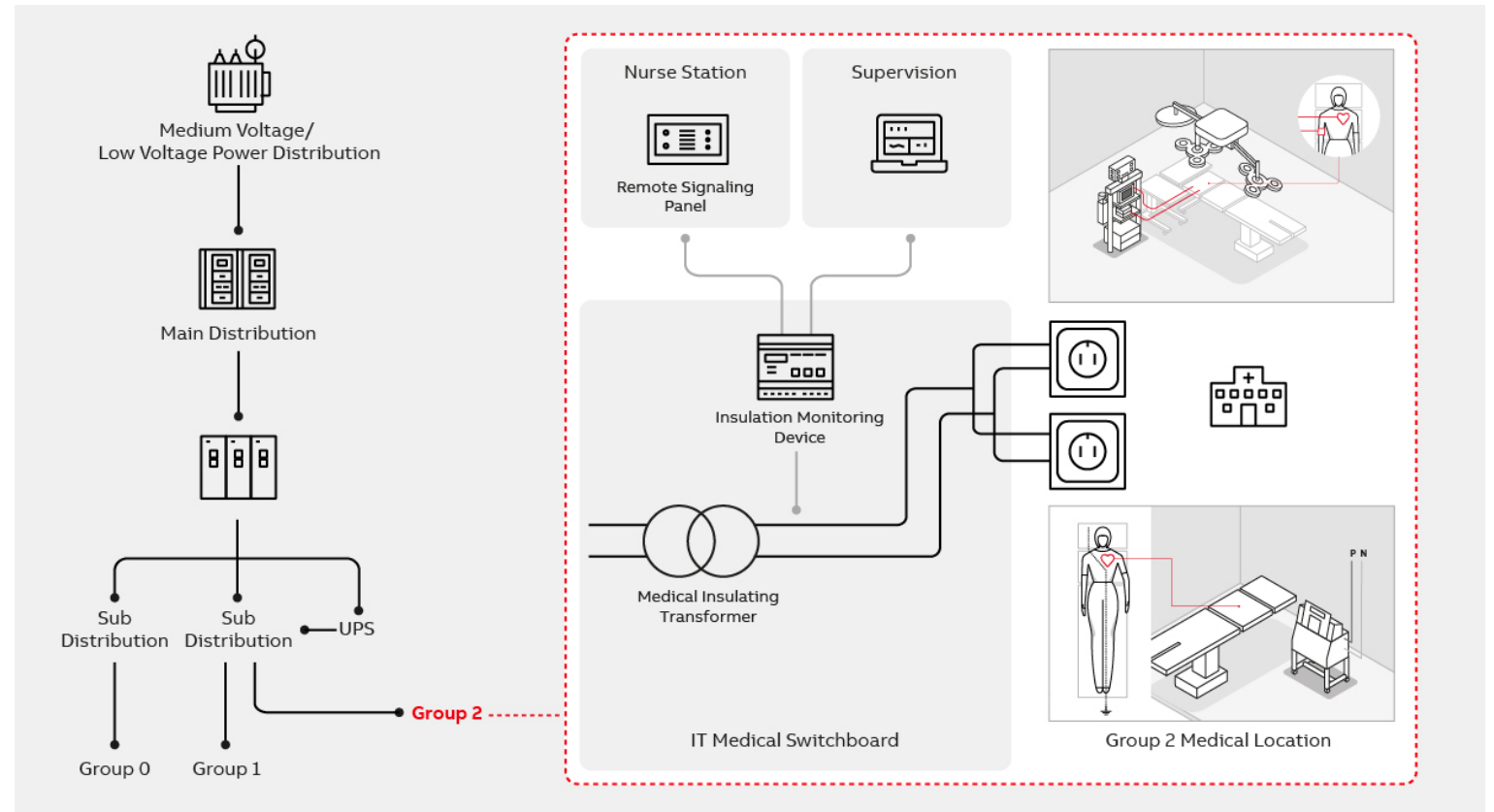
A safer environment

The **IEC 60364-7-710** standard imposes specific requirements for the design and implementation of electrical systems inside Group 2 locations. To prevent microshocks, the standard allows the use of a Medical IT System together with equipotential bonding protection as measures against indirect contact.

The standard also allows the use of a Medical IT System to guarantee operational continuity of necessary loads in the event of a first earth fault.

The **AS/NZS 3003** standard allows similar requirements for electrical systems in Cardiac Protected Areas (equivalent to Group 2 locations).

Complying with these tougher technical standards is growing increasingly important. Rapid urbanization requires effective and reliable infrastructure that keeps patients and staff safe, even in the most critical conditions.



A safer environment

The ABB solution for the **Becamex International Hospital** in Vietnam uses a system of advanced technology applied to the power solution.

With more than 1,000 beds, solutions including the purpose-built **ABB H+ Line**, are essential to ensure operational continuity in Group 2 medical locations.

CASE STUDY BECAMEX INTERNATIONAL HOSPITAL

Supporting reliable operations of leading hospitals in Vietnam



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H+line

Practical guide for patient areas in medical locations



H+line
Practical guide for patient areas
in medical locations

ABB's practical guide to design Group 2 medical locations according to IEC 60364-7-710 and Cardiac Protected Areas according to AS/NZS 3003

[DOWNLOAD](#)



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Greater resilience

Whether you are operating a large hub hospital like the Becamex or a suburban clinic, maximizing uptime and minimizing downtime is essential. Ensuring continuity and regularity of power is non-negotiable for every kind of medical facility as outages can be a matter of life or death.



Source: BBC/Doctors for Health. They use the example of Venezuela's five-day 2019 power blackout, during which 26 people died in hospitals. Victims included kidney failure patients unable to receive dialysis and victims of gunshot wounds prevented from receiving lifesaving operations.

Greater resilience

Modern uninterruptable power supply (UPS) systems are essential to maintain power continuity. Modular architectures protect supply to areas that cannot tolerate any kind of power disruption. These include operating rooms and pharmacies as well as safety systems like smoke extraction, emergency lighting luminaires and systems and all other critical loads.

A modular approach



UPS installation is based on independent modules that include all the hardware and software required for autonomous operation. In the event of a single module fault, only the one affected will fall out of the system, allowing the remaining modules to remain functional.

A modular system was essential for **Hospital Nova** in central Finland. It ensured an uninterrupted electricity supply to critical areas of the hospital. With ABB's unique modular UPS architecture, based on independent and autonomous modules, the facility is now able to accelerate fault repair and enable flexible power transfer from one area to another, without any downtime.

CASE STUDY HOSPITAL NOVA

ABB state-of-the-art power distribution technology to keep Hospital Nova operating safely 24/7



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Greater resilience

A modular approach

ABB's MNS®-Up solution provides backup power whenever needed for the biggest healthcare facility in north-west Switzerland, the **University Hospital of Basel**. The solution combines low-voltage distribution switchgear with modular UPS for critical power applications to provide the hospital's data center with scalable power distribution and uninterruptible power supply in a single, modular, compact system.

CASE STUDY UNIVERSITY HOSPITAL OF BASEL

Improving data center performance at the University Hospital Basel with MNS®-Up solution



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In North-East France, the **Émile Durkheim hospital** (opening 2021) will rely on advanced protection and control technology to ensure total security and emergency back-up in the event of network failure. Designed specifically for critical applications, ABB's LC1000 UniSec solution combines Relion® protection relays and sensor technology in the medium-voltage switchgear to detect and isolate faults in the network in less than one second.

CASE STUDY ÉMILE DURKHEIM HOSPITAL

ABB's smart solutions safeguard power of new hospital in France



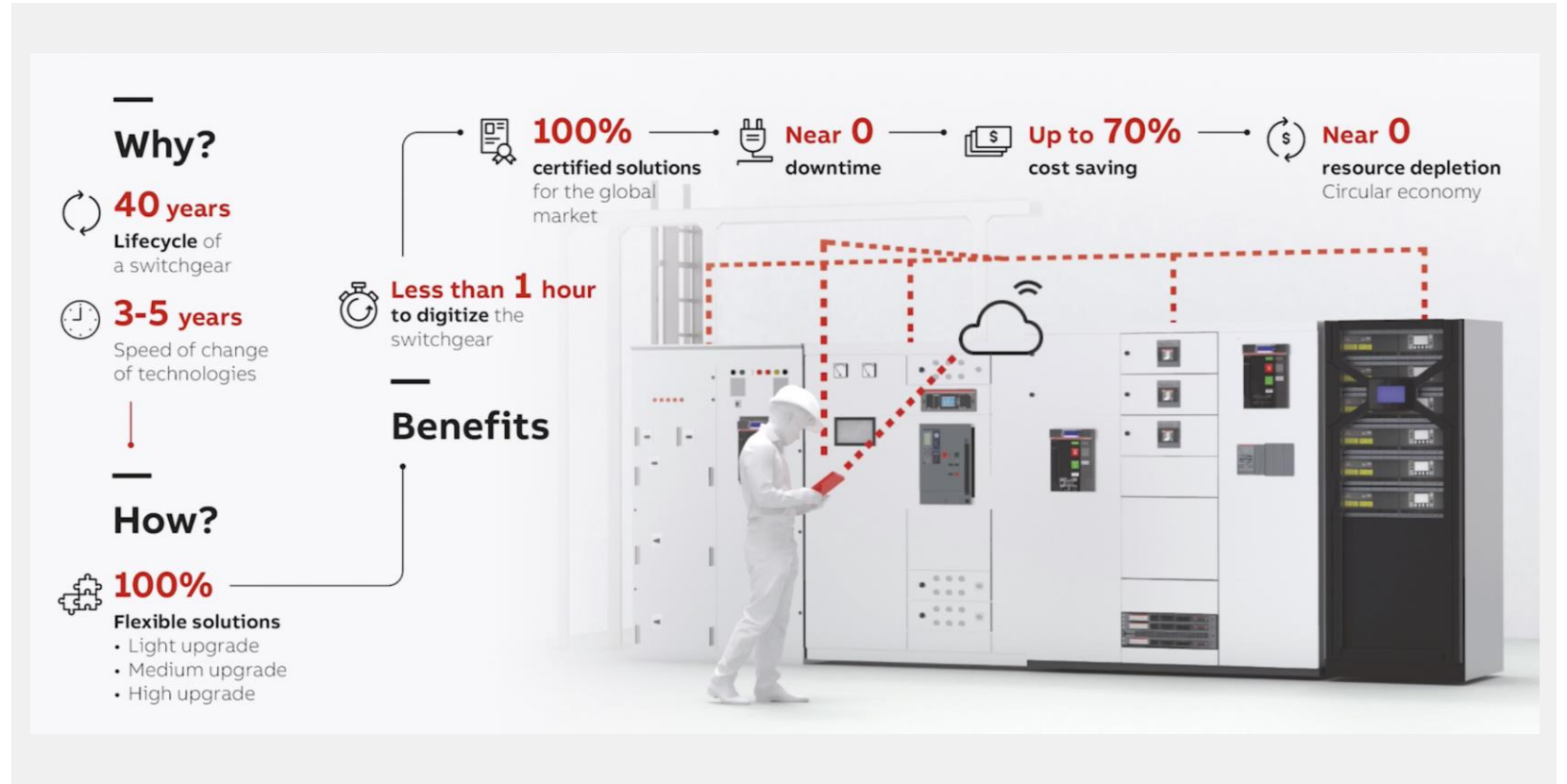
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Greater resilience

A modular approach

ABB solutions' modularity makes it easy to upgrade this type of installation without changing it entirely, allowing greater flexibility and equipment sustainability. To further support this, **ABB solutions for smart upgrades and updates** allow facility managers to maximize the efficiency of their existing distribution systems.

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Improved asset management

In the smartest hospitals, intelligent electrification is used not only to monitor but to quickly predict or detect issues and then deploy the right response.



Harmonic changes in a scanner, air conditioner or switch can be an early indication of a fault. Predictive maintenance algorithms make identifying and fixing this type of error faster and less expensive. They allow hospital facility managers and end-users to remotely monitor power system health 24 hours a day, via a cloud-based energy management platform.

Users can optimize facility performance in real-time and move from schedule-based maintenance to needs-based intervention, so servicing is only performed when necessary and the risk of downtime is reduced.

“

A smart hospital is like a self-healing network — fixing failure in the power supply loop increases reliability, safety and improves the user experience.

PETER GROSS - GLOBAL SEGMENT MANAGER,
UTILITIES AND INFRASTRUCTURE

”

Improved asset management

Predictive maintenance of this type is not restricted to greenfield developments or closed single-supplier ecosystems.

The ABB Ability™ Energy and Asset Manager is an example of an open-standard cloud platform that integrates easily with third-party hardware and application programming interface (API) platforms, making it ideal for both new build and retrofit upgrades.

[MORE INFO](#)



Improved asset management

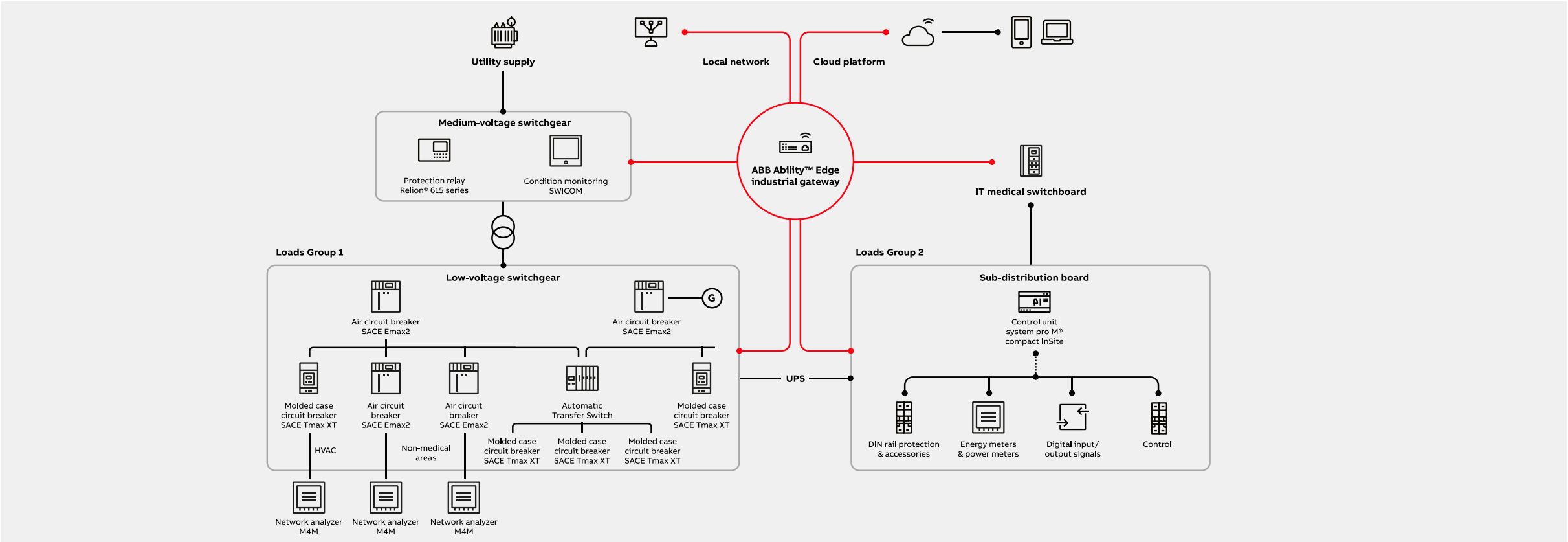
Better energy management is also key to improved asset return on investment and maximum energy efficiency.

Smart metering and monitoring help ensure facilities have flexible and scalable access to the power they need. With the right system, facilities can expect a 7 percent improvement in energy efficiency, facilitating **qualification for LEED Certification, compliance with Australian National Construction Code Energy Efficiency, Nabers Energy, Green Star requirements** and typical ROI in less than 3 years.

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Improved asset management



Better outcomes

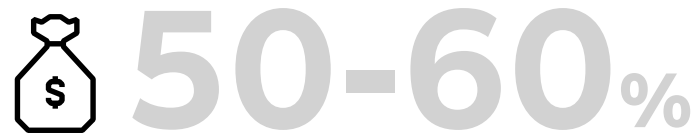
Smart hospitals are substantially more sustainable and resource-efficient than traditional healthcare facilities, delivering significant operational expenditure (OpEx) savings.



Better outcomes



Most OECD (organization for economic co-operation and development) countries that implement digital healthcare technologies could save more than 10 percent of their annual overall national healthcare expenditure.



Cost reductions of 50-60 percent are also achievable thanks to reduced energy use and longer asset lifecycles, using solutions like KNX single room and KNX ventilation control alone.

8) Finding the Future of Care Provision, The Role of Smart Hospitals. McKinsey and Co. 2019 KNX, The Worldwide Standard For Home And Building Control.
9) KNX Association International 2019

Healthcare facilities could also see energy usage savings of up to 20 percent when using a Building Energy Management System. **The Mercy Hospital in Jefferson**, United States, is one such hospital experiencing resource efficiencies as a result of better energy management. The facility invested in ABB's Cylon® solution, ASPECT, a system that uses an iCalendar scheduling system to alert technicians to wear and tear on regularly used equipment. This resulted in uninterrupted services, as well as the ability to devise custom schedules for operating devices, helping the hospital to increase its energy efficiency.

CASE STUDY THE MERCY HOSPITAL IN JEFFERSON

As much as 30% of the energy consumed in hospitals is used unnecessarily.



[MORE INFO](#)

Better outcomes

Other key benefits for facilities include:



Lower risk of legislative penalties, thanks to in-built efficiency standards compliance.



Reduced environmental impact
With sustainability proving a pressing concern¹⁰, hospitals that are partially solar-powered or equipped with on-site electrical vehicle infrastructure, contribute to an emission-free future and enjoy reduced electricity bills. This allows for greater investment in other departments.

10. According to Healthcare Without Harm and their partner Arup, global health care's climate footprint is equivalent to the annual greenhouse gas emissions from 514 coal-fired power plants. If treated as a country, the health sector would be the fifth-largest emitter on the planet.



Opportunities for increased ROI
Deploying smart technology makes facilities more attractive to investors. With venture capital funding more readily available for smart initiatives, facilities have the opportunity to unlock funds to extend the building or improve the quality of care and safety for patients and staff¹¹.

11. McKinsey reports that investments in digital health solutions increased exponentially, from about US \$1 billion in 2011 to more than US \$8 billion in 2018. Source: Finding the Future of Care Provision, The Role of Smart Hospitals. McKinsey and Co. 2019

Better outcomes

Other key benefits for facilities include:



Safeguard reliable power distribution with digital air- or gas-insulated switchgear

From commissioning to operation and spare part handling, total project execution is simplified with embedded sensor technology in the switchgear.



Remote maintenance capabilities

With integrated condition monitoring solutions in the switchgear, such as ABB Ability™ Condition Monitoring for electrical systems (CMES) and ABB Ability™ Condition Monitoring for switchgear SWICOM, optimized electrical system problem identification and management can be run remotely, limiting on-site activity to the absolute minimum.

ABB Ability™ Condition Monitoring for electrical systems (CMES)



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ABB Ability™ Condition Monitoring for switchgear - SWICOM



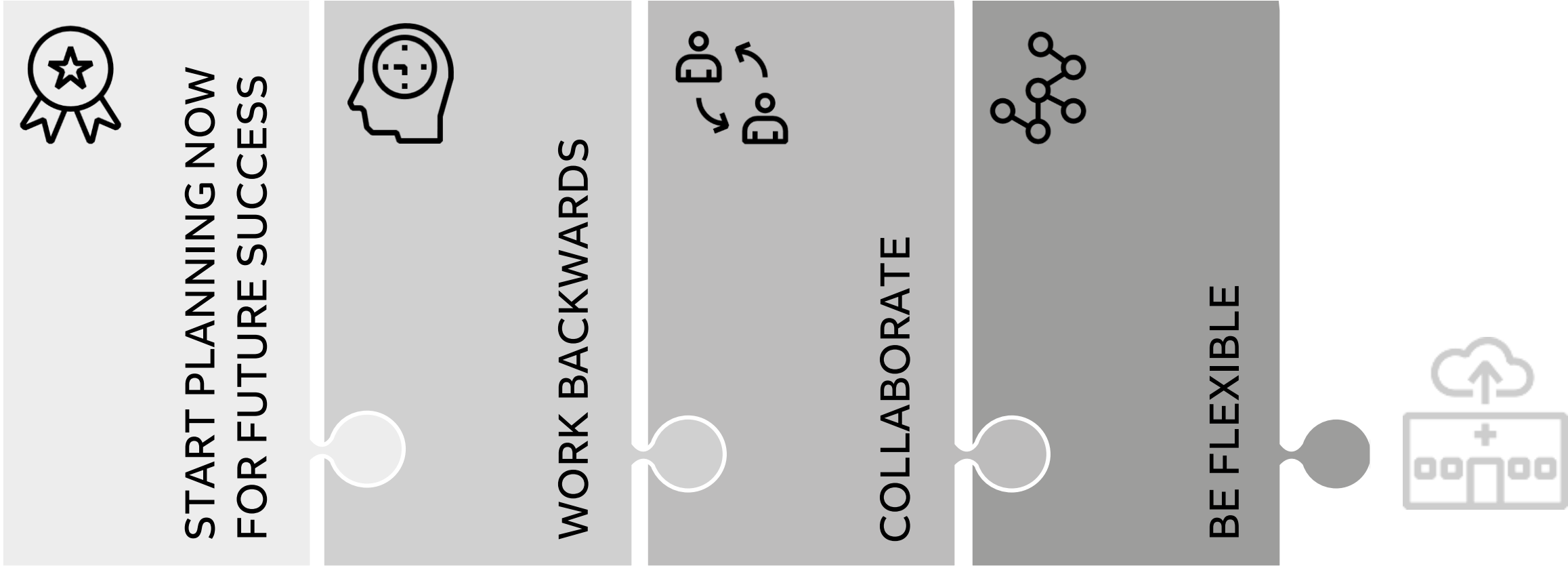
MORE INFO

Start planning now for future success

Modern medical facilities are some of the most complex buildings ever developed. It can be a challenge for designers and managers to balance a host of competing demands.



Start planning now for future success



Start planning now for future success



Maintaining focus and clarity has never been more key. That's why designing, building or managing smart electrification in a future-ready medical facility means moving away from a traditional product or vertical silo-led approach.

It means seeing your hospital or clinic as a single, integrated power network. It's this kind of strategic perspective shift that can crystalize financial benefits and ensure both a reliable, robust power supply and your facility's enhanced efficiency.



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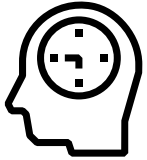
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Work backwards



Whether you are working on a new build or a refurbishment, you're probably already thinking holistically about the overall goals of the stakeholders you represent.

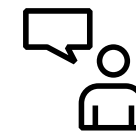
Smart electrification should also be considered with a holistic mindset. A hospital is a network of electrical services and functions that work together smoothly. It is goal-driven and responsive to the needs of the body it controls.

An energy audit is an essential first step to understanding your power requirements. It also creates space to discover opportunities for optimized productivity, safety and efficiency solutions that might not have been originally considered.

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Don't think of smart hospital electrification as a series of products, or even as a collection of vertical systems.

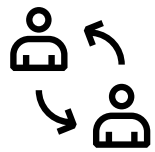
Think of it as a holistic solution based on a thorough strategic energy audit.



SRIRAM B. - PRODUCT MARKETING
MANAGER ENERGY DISTRIBUTION
(SMART BUILDINGS)

”

Collaborate



Major healthcare projects have planning stages that last several years, involving a range of different key stakeholders and technology partners. As you know, collaboration is fundamental to overall success.

The right technology can facilitate an added layer of seamless collaboration within healthcare electrification projects. For instance, **Building Information Modeling (BIM)** enables the creation of a digital 3D model that includes data associated with physical and functional characteristics.

BIM allows stakeholders to collaborate in real-time on coordinated models, with the ability to digitally add a wide range of electrical solutions and assess how well they will integrate in reality. This leads to faster, much more precise design and planning, which cuts project execution time, reducing workloads and saving costs. It also closes the gap between construction and maintenance phases, allowing team members to continue collaborating on the BIM model of a project right across its lifecycle, using existing data stored in the model for future projects.

BIM adoption is increasing on a global scale: in a recently published survey, design and construction companies use BIM in 60 percent of their projects, and this percentage is expected to grow to 85 percent by 2022¹². This is especially true of hospital projects, which are often public, complex and larger in scale and require increasing amounts of BIM processes to comply with national mandates.

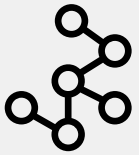
12. Building Information Modeling (BIM) Usage Global Survey, 2019. Source: GlobalData

Tailored BIM tools can even be developed in collaboration with ABB experts to meet your specific needs.



MORE INFO

Be flexible



Facility managers and designers are well aware that building, realization or refurbishment is a dynamic, fluid process. Goals and technologies change all the time and a sophisticated hospital can take years to design, commission and construct.

Once built, the facility will have a lifespan of decades. To remain at optimal functionality, it must continue to evolve, meeting new demands and absorbing new technologies and practices.

This makes finding flexible, open solutions essential. While some solutions may have long lifespans, fast advancements in technology provide the possibility for an upgrade or change every 3-5 years.

Getting left behind is not an option.



Be flexible

“

There has always been a vision to create smart hospitals, but in the past, it was not very integrated. Now the platform is more open and we’re seeing a conversion of IT and OT systems. This is enabling levels of integration that really were not possible before.

PETER GROSS - GLOBAL SEGMENT MANAGER UTILITIES AND INFRASTRUCTURE

”



KK Women’s and Children’s Hospital in Singapore benefited from this kind of flexibility when ABB used direct replacement technology to upgrade outdated elements of old circuit breakers with smart air circuit breakers, – avoiding downtime in the power supply. Smart solutions such as this deliver greater labor efficiency in the future, saving facilities time and money.

CASE STUDY
KK WOMEN’S AND CHILDREN’S HOSPITAL IN SINGAPORE

ABB circuit breakers reduce critical downtime for major Singapore hospital



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Overcome today's medical challenges with intelligent facilities

Right now, a vast array of challenges confronts healthcare facilities around the world.



Overcome today's medical challenges with intelligent facilities

There are growing pressures to be more cost-efficient in energy and resource use. Facilities must optimize their processes while delivering more effective and ever-improving patient experiences.

New ailments are also emerging, many requiring innovative, energy-intensive treatments. This could mean long-term or lengthier care, or even treatment at a distance to access global expertise or avoid the spread of infection. The resilience of the power supply is more important than ever.

Added to all of this is the wider social pressure on medical facilities of all sizes to operate sustainably and reduce their overall waste and emissions footprint.

If healthcare design is to meet all these complex challenges, it needs to adopt a new way of thinking.



Overcome today's medical challenges with intelligent facilities



A siloed, product-led approach needs to be replaced with one that sees a modern treatment centre as a complex, interconnected system.

The technology, installation and management of such a system calls for new ways of working together, ensuring a smarter, more resilient outcome for healthcare facilities.

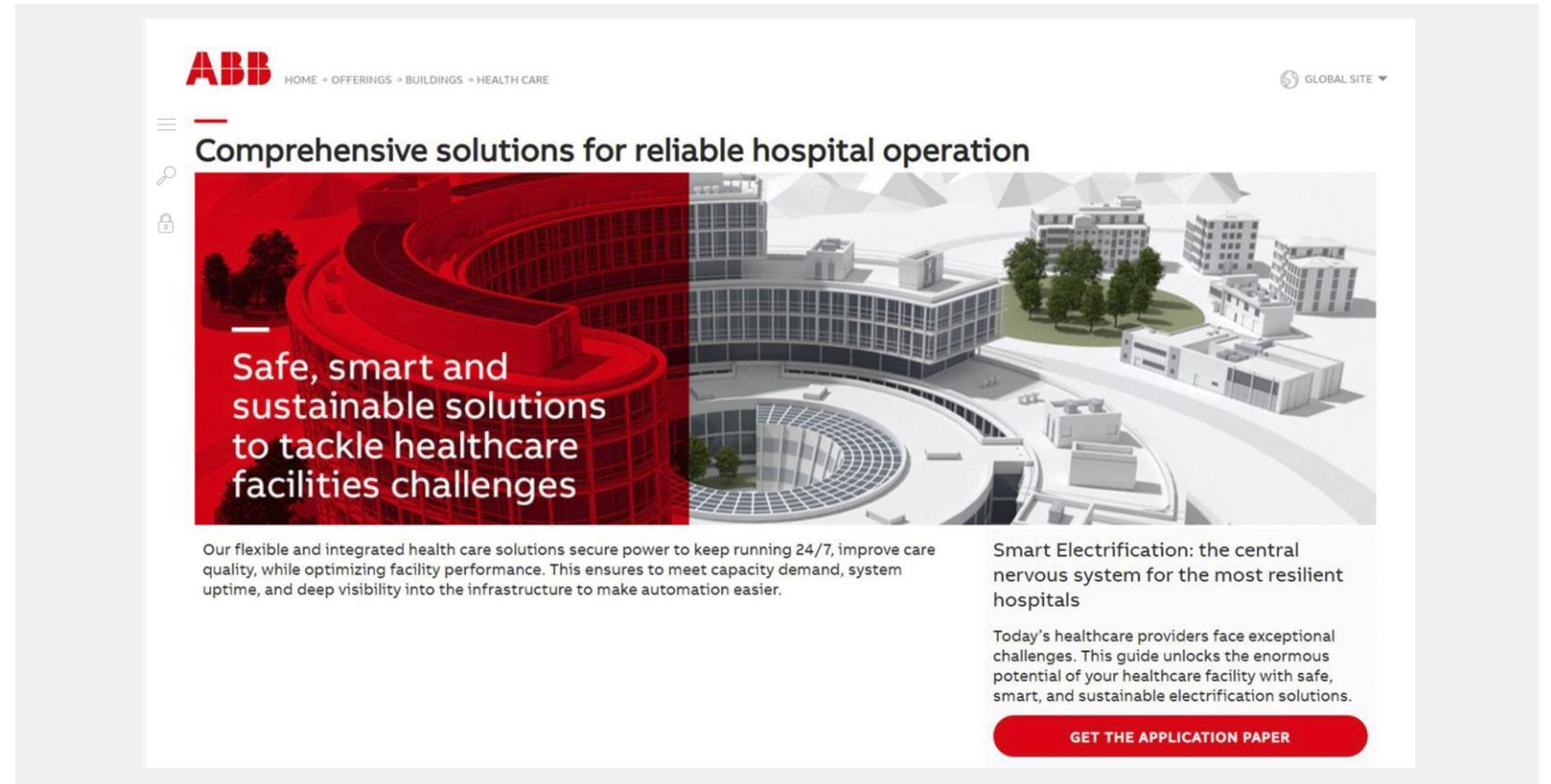
ABB's 130 years of experience in electrification, our comprehensive range of digital solutions and our sustainability leadership make us a natural partner for ambitious healthcare operators, owners and designers.

Overcome today's medical challenges with intelligent facilities

Whatever the scale of your project, now is the time to get in touch. In partnership with us, you'll discover why smart electrification is at the core of the world's most intelligent medical facilities.

Learn more about our holistic portfolio of smart, safe and sustainable solutions here.

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The screenshot displays the ABB Health Care website. At the top, the ABB logo is followed by navigation links: HOME, OFFERINGS, BUILDINGS, and HEALTH CARE. A 'GLOBAL SITE' dropdown menu is in the top right. The main heading reads 'Comprehensive solutions for reliable hospital operation'. Below this is a large image of a modern hospital building with a red overlay on the left side. The text on the red overlay says 'Safe, smart and sustainable solutions to tackle healthcare facilities challenges'. Below the image, there are two columns of text. The left column states: 'Our flexible and integrated health care solutions secure power to keep running 24/7, improve care quality, while optimizing facility performance. This ensures to meet capacity demand, system uptime, and deep visibility into the infrastructure to make automation easier.' The right column is titled 'Smart Electrification: the central nervous system for the most resilient hospitals' and says: 'Today's healthcare providers face exceptional challenges. This guide unlocks the enormous potential of your healthcare facility with safe, smart, and sustainable electrification solutions.' At the bottom right, there is a red button that says 'GET THE APPLICATION PAPER'.

Talk to us

We are the partner that can power and digitalise your future. Together we can ensure your health facility reaches efficiency while delivering outstanding patient outcomes.



ABB