

Smart Buildings are Smart Business

How to develop buildings with a sustainable leading edge

START



Agenda


1.  A time of change for commercial building

2.  Creating buildings that learn

3.  The ROI of smart

4.  Your smart building project starts here

5.  The future is even smarter

6.  Creating buildings of the future, today



Talk to us

A time of change for commercial building

Economics, urbanization and climate



Most developers, owners and investors would agree that the commercial construction sector faces greater challenges today than ever before.



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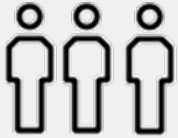


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A time of change for commercial building

Urban space is at a premium as cities become more densely populated.

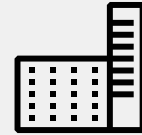


In July 2020, the world's population was estimated **at 7.8 billion**¹

A growing population demands more dynamic management of every building's space to accommodate a more fluid workforce and more careful stewardship of our energy and water resources.

1. United Nations Department of Economic and Social Affairs, 2018

The contribution of buildings to climate change is under a microscope.



Buildings consume more **than 30 % of the world's energy**

Buildings consume more than 30 percent of the world's energy and contribute almost 40 percent of global carbon emissions². Building green is no longer a luxury option. Many clients, tenants and occupiers now regard it as standard. Building developers are expected to include active emission² mitigation technology in their developments from the outset.

2. The National Human Activity Pattern Survey (NHAPS) 2001

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Greater regulation



In an effort to tackle these challenges, national governments across the world are imposing tighter restrictions on building use, energy consumption and emissions.

Shifting to more energy-efficient buildings is now regarded as central to carbon reduction strategies.



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Greater regulation

-20%



The EU aims to cut greenhouse gas emissions by 20 percent³ and increase energy from renewables by 20 percent. All new buildings must be Near-Zero Energy Buildings (EU)

3. The European Commission

0 emissions



The EU also aims to be a carbon neutral economy with net-zero emissions by 2050

Intelligent technology



Canada and the UK have significant plans for the rollout of intelligent technology into the built environment

+30%



In China, 30 percent of buildings must be green

The future is smart

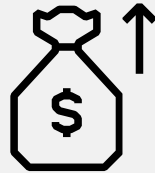
Cities have no choice but to evolve



Led by progressive locations like Singapore, Helsinki and Zurich⁴, ambitious planners are already designating city zones as Smart Quarters or even envisioning entirely smart cities.



The buildings constructed today are essential for smart city evolution. By building smart structures we make our cities more livable, workable and sustainable.



Rather than creating complexity, smart technology creates significant opportunity to increase return on investment (ROI) and meet tough environmental targets with ease.



Smart buildings also speed the adoption of green technology such as electric vehicles (EV) and solar power with clever integration. And for the far-sighted, technology may even change the role that buildings play in your portfolio.



The time has come to build a smarter future.

Let's create it together.

4. IMD-SUTD Smart City Index Report from The International Institute for Management Development (IMD) and Singapore University of Technology and Design (SUTD), 2020



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Creating buildings that learn



Smart Buildings are not new.

Architects and developers have been installing separate systems to control lighting, heating and ventilation (HVAC) for decades. Later systems have helped building managers control access to different areas of a site, mitigate fire risk and protect against power surges.

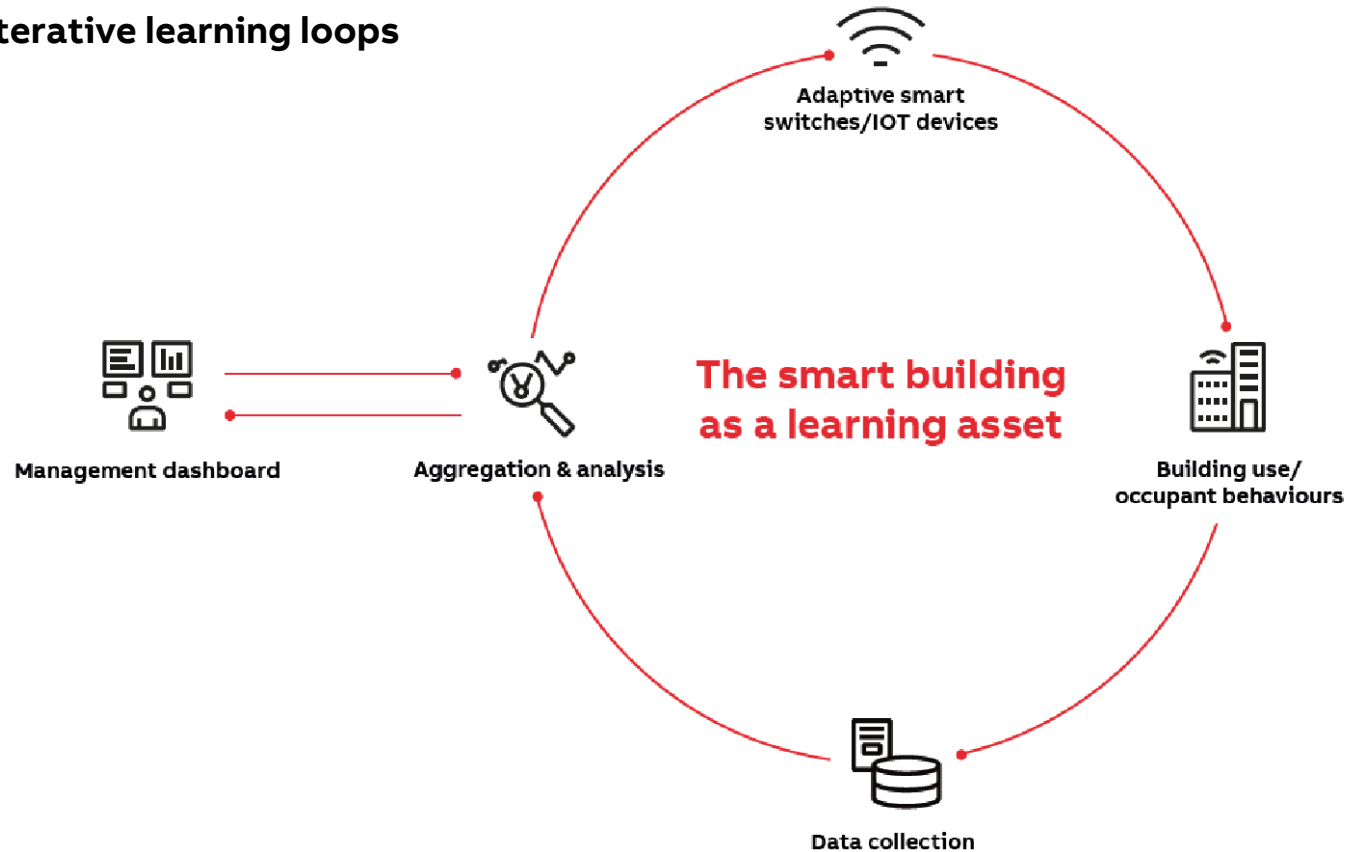


Creating buildings that learn

What is new is the addition of web-based platforms to allow these verticals to integrate seamlessly with each other.

They can deliver a single view of how efficiently and effectively a building operates. Armed with this data, managers can take proactive steps to avoid waste and improve use, cutting emissions and making savings at the same time.

Iterative learning loops



Creating buildings that learn



Vast amount of data generated by buildings

The vast amount of data generated by buildings transform them into iterative learning loops. Sensors in a building track the use of assets and resources and can adapt to the changing consumption or activity patterns that take place.



Buildings can make **autonomous decisions**

Using pre-installed algorithms, buildings can make autonomous decisions on things like adjusting lighting and HVAC levels, to reflect time of day, external environment, occupancy levels or any other variable.

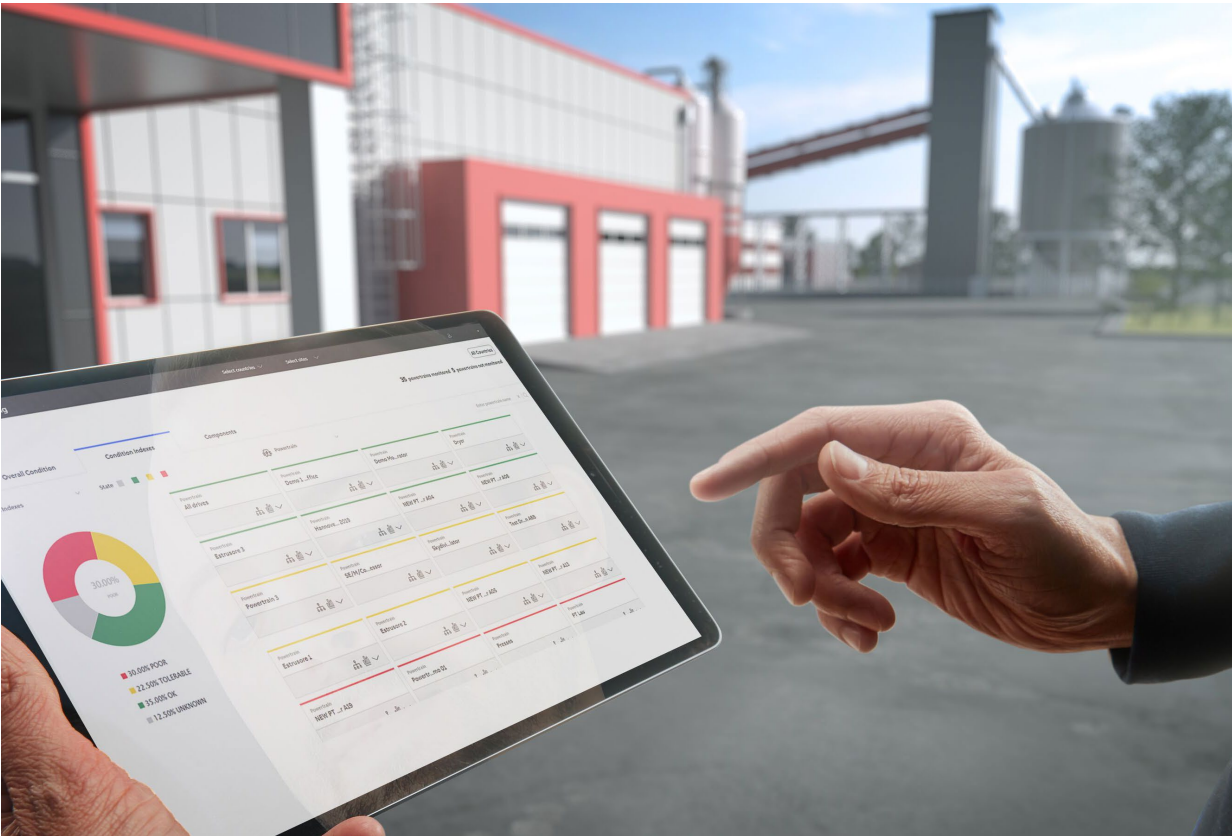
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Create recommendations for the reuse of spaces

Readings recorded by these smart systems can also be used to create recommendations for repurposing under-utilized systems, rooms or zones within a building.



Creating buildings that learn



Any autonomous decision can be tracked in real time on a digital dashboard by managers who are able to intervene at any point.

Access to this level of visibility and control is probably the greatest benefit of choosing to build smarter.



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The ROI of smart

There are several real benefits of smart buildings for developers and owners

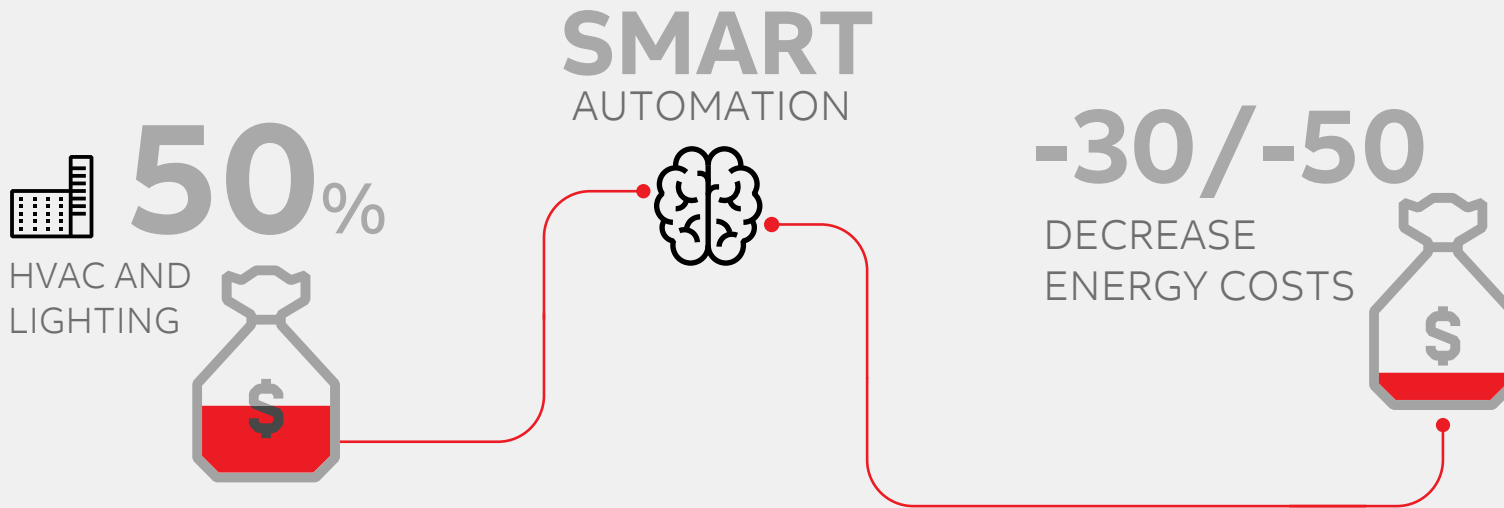


First, building smart ensures resources are used sustainably.

As a building adapts to the demands of its users, or the goals of its managers, it can save energy, cut emissions and reduce energy costs.



The ROI of smart



More effective and efficient use of power can save money, quickly repaying initial technology expenditure. HVAC and lighting alone can account for about 50 percent of energy use in an average commercial building. By incorporating smart automation, managers may see decreased energy costs of 30 to 50 percent.

Comparing energy savings to the falling cost of installing a basic smart management system, smart buildings immediately prove their worth. If a smart system delivered an energy cost saving of 25 percent, with an installation cost of \$37,500 USD for a 50,000 ft² building, the annual savings could be \$23,000 USD annually, with a payback period of less than two years⁵.

5. HSBC. Smart Buildings Cut Emissions. March 2020

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Smart buildings can make a profit

Roof space given to photovoltaic arrays can generate power that is stored in batteries in the building.

Excess power can in some cases can be sold back to the grid, making the building energy positive and creating an additional revenue stream for building owners.



Mission to Zero

Smart Buildings in Smart Cities



Reduction

IN OPERATING COSTS

Solutions to reduce operational costs **by up to 30%**



Safety

Helping personnel manage critical events and **minimizing repair and service time**



Energy

EFFICIENCY

Patented load management system integrated into metering allow marked reductions in **CO2 emissions**



Reliability

Monitor, prevent, enable **predictive maintenance and reduce intervention time** to ensure continuous operations



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Mission to Zero

ABB's Lüdenscheid site is ABB's first carbon neutral factory of the future



Mission to Zero:

ABB's CO₂-neutral factory
Lüdenscheid, Germany



A smart solution:

Lüdenscheid integrates a range of technologies into one intelligent system, which is digitally networked and controllable. On sunny days, solar technology generates up to 100% of the factory's requirements, enough to supply 340 private households. When used in conjunction with the site's cogeneration plant, Lüdenscheid can generate 14% more energy than needed. This surplus can be sold back into the public grid, meaning that the site is energy positive.



Outcome:

The flagship facility saves up to 680 tonnes of CO₂ a year. The site makes a significant and long-term contribution to improving the environment both locally and for the wider community.

CASE STUDY

ABB'S CO₂-NEUTRAL FACTORY

ABB presents state of the art solution for CO₂-neutral and energy self-sufficient factory of the future at its site in Lüdenscheid



[MORE INFO](#)

Building smart

Building smart minimizes maintenance costs.



Intelligent maintenance is up to
9 times cheaper
than a traditional approach

Predictive fault-finding can save maintenance time and labor, as well as minimizing downtime for expensive equipment or services. Some estimates suggest that smart-enabled predictive maintenance is 3 to 9 times cheaper than a traditional reactive approach⁶. Tenant and occupant satisfaction are often also higher as systems that experience failure can be identified, repaired and re-booted quickly.

6. Construction21 International. Smart buildings: predictive maintenance is crucial. 2019

Smart buildings are more resilient to power outages.



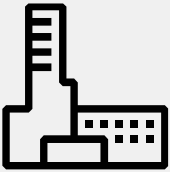
Maintaining power
is critical in most businesses

Maintaining power is critical in most businesses, but this is especially true for hospitals where power outages could be life threatening. Smart technology can be used to ensure intensive care or surgery wards remain powered, even when power is lost elsewhere.



Building smart

Smart technology adds tenant appeal.

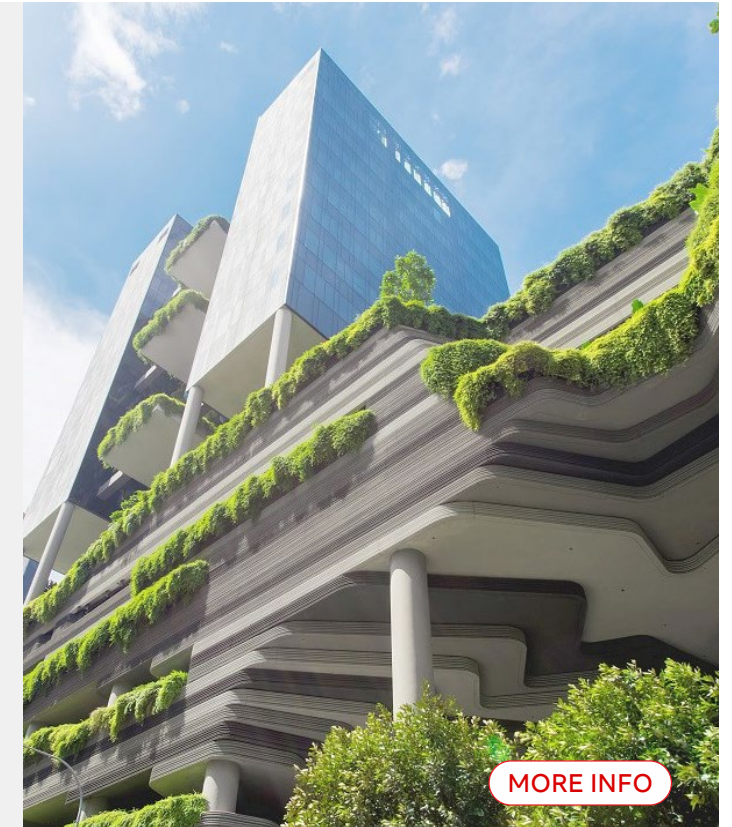


Smart features can be a **powerful source of differentiation** in the crowded commercial real estate sector.

Many tenants consider the effect that building selection has on their own brand. In a world where investors, clients and prospective employees interrogate companies for their sustainability and CSR strategies, a building with smart environmental management systems can be a dealmaker.

Research by USGBC, the developers of the LEED certification scheme, points out that 79 percent of those working in a LEED-certified building say they would choose another job in a LEED-certified building over a non-LEED building. Workers in LEED certified green buildings also reported feeling happier, healthier and more productive⁷.

7. US Green Buildings Council 2018

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Building smart

Smart technology revitalizes older building stock.



At least 40 percent of the buildings in Europe **were built before the 1960s.**

These currently rely on forms of passive energy management that are often deeply embedded in the fabric of the building itself; insulation, double glazing, flooring and so on.

The majority of methods are highly inefficient. They do not actively respond to how the building is used, nor are they easily adjustable. Even buildings erected as recently as the 1980s consume up to twice as much energy as new constructions.

Data from the European Parliament suggests the same ROI benefits enjoyed by new builds can be quickly realized by older ones. For instance, deep renovation of a building could reduce demand for heating by more than 70 percent.



-70%

DEMAND FOR HEATING



Lower energy costs, lower maintenance costs and fewer voids are all achievable from day one.



Case Study: FK Vienna Generali Arena



Intelligent Football Stadium

Generali Arena - Vienna, Austria

The electrical systems of the 95-year-old FK Vienna Generali Arena in Austria were no longer suitable for a large, professional soccer stadium.



A smart solution

ABB retrofitted the stadium with the latest in smart building technology, including a comprehensive range of energy-saving building control solutions to improve visitor experience. VIP areas are controlled via integrated Busch-SmartTouch panels, and light switches have been designed in the club's famous violet colours.



Outcome

As the first sustainable football venue in Austria, the stadium has become a modern sporting showcase for connected, safe and energy efficient spaces and delivers a unique experience for fans.

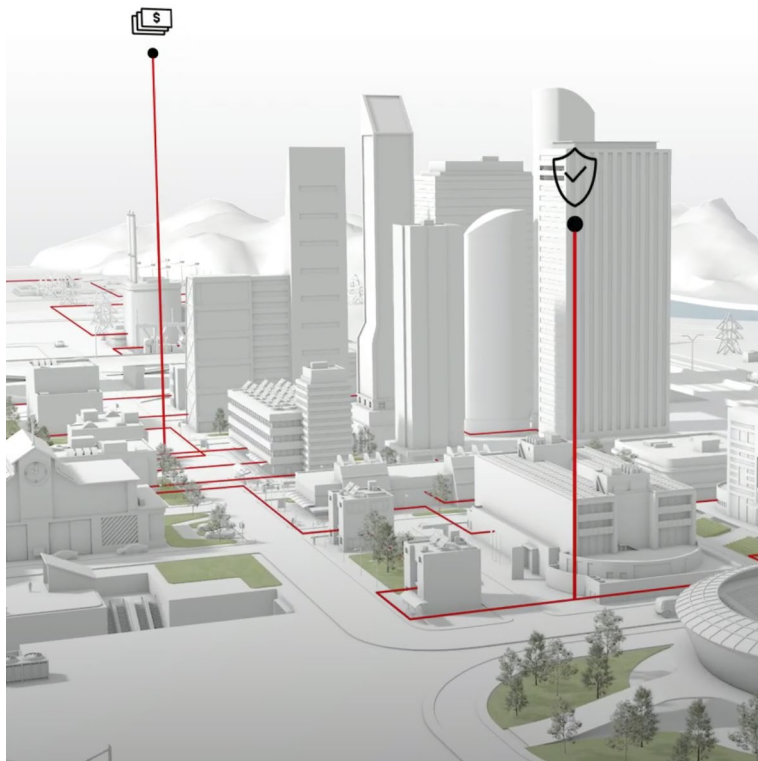
CASE STUDY

ABB'S CO₂-NEUTRAL FACTORY

ABB creates 'intelligent' football stadium for FK Austria

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Smart technology



Smart technology changes the way far-sighted owners view their buildings.



Integrating smart technology
into your building development
is a strategic decision.

It should be clear by now that a smart building is more than just as a cluster of products in a physical environment.

Owners and investors are able to adapt goals and plans as use patterns of the asset play out in front of them in real time. Data visualization means scenario plans can consider the longer-term management of the space. By using a 'digital twin' owners can experiment with changes of internal configuration or even consider entire changes of use to maximize asset value, all while controlling its consumption of resources.

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Building smart



The building itself becomes a platform for a host of different digital systems, services and functions which can change to match the owners' strategy. This 'Building as A Service' (BaaS) model has far-reaching implications for building lifespans, making it relatively easy to switch building functions over time and potentially sidestep obsolescence altogether.

Your smart building project starts here



With more than 130 years of experience leading complex electrification projects, ABB is uniquely positioned to provide advice on how to unlock the long-term benefits of smart electrification.

Experience tells us that success means making changes to the way you approach your build or refurbishment project.



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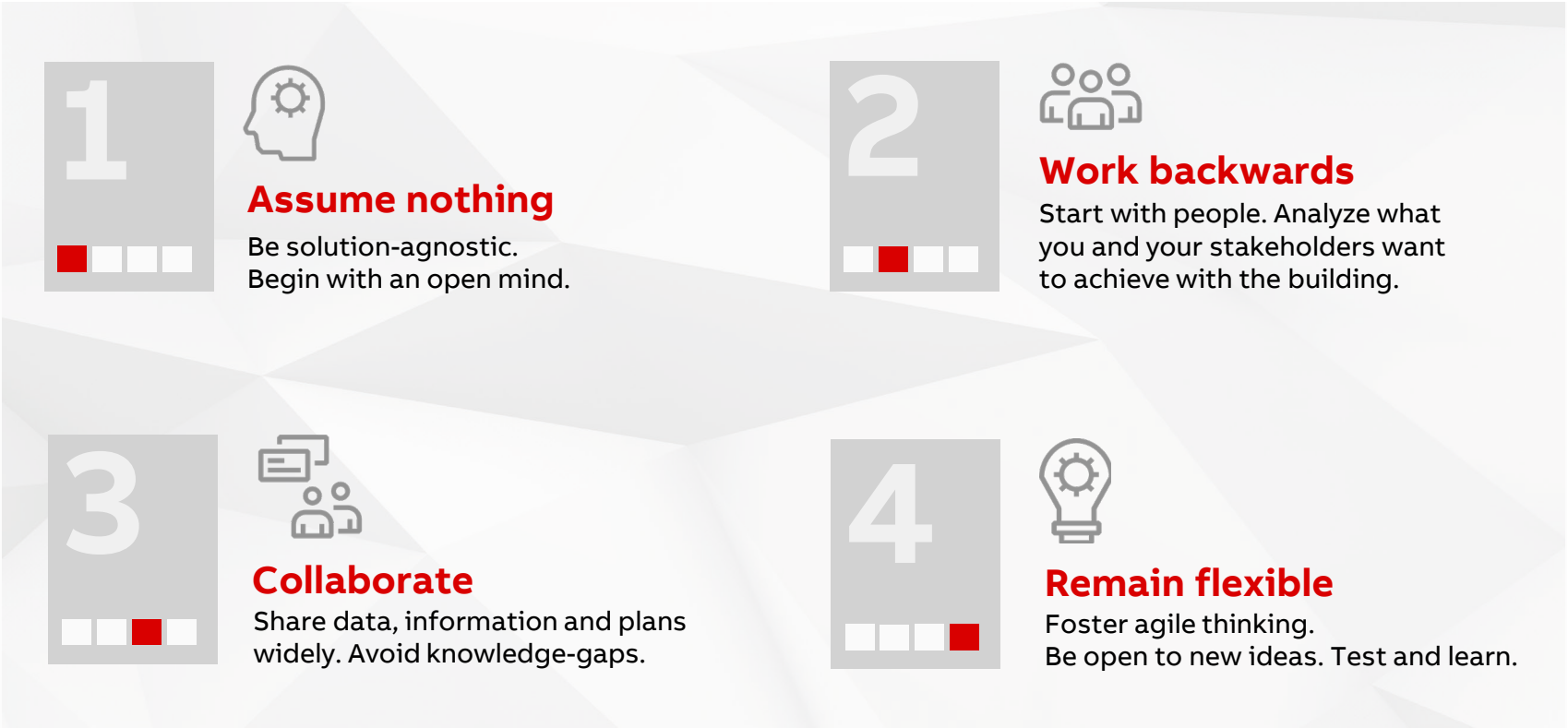


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Four pillars for smart building development

The most successful and future-proof smart buildings were developed using four key pillars

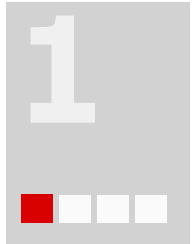


Clear, consistent alignment on the vision and its electrification requirement

 **Successful implementation**

A robust platform for current needs and future building evolution

Pillar 1: Assume nothing



If you want to avoid expensive mistakes, start with an open mind. Never consider solutions until you have listened carefully to what all the stakeholders want the building to achieve now and in the future.



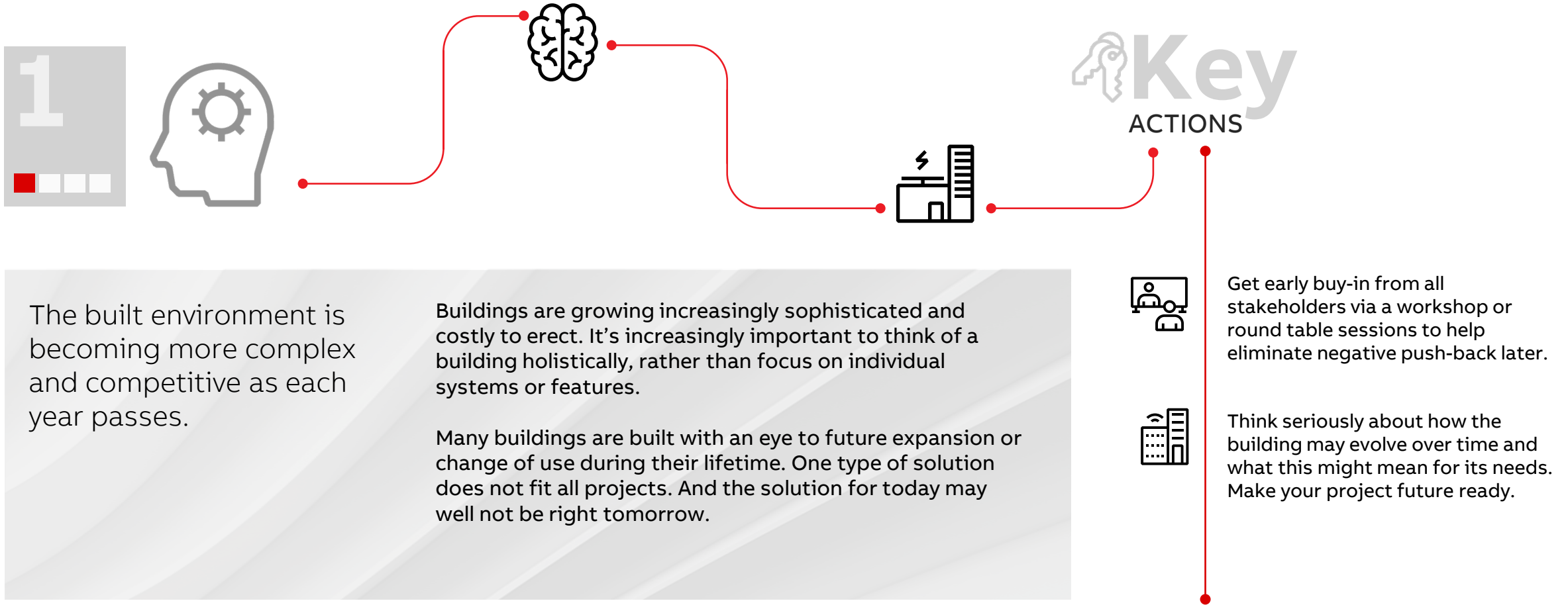
You have to start with a complete, holistic view of the building you're dealing with. Not every type of building is the same. Micro-segment and find the right solution for each one.

MATTHIAS WINKLER

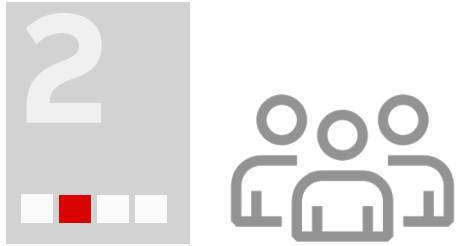
GLOBAL DIVISION INDUSTRY SEGMENT
MANAGER 'BUILDINGS', ABB

Pillar 1: Assume nothing

Key actions



Pillar 2: Work backwards



Buildings are created for people. Every build or refurbishment project should begin with a thorough exploration of how people will use the building and what a successful visit would look like. Think of this as the vision or mission for the building.



“

People in a building are trying to achieve something. Those people need to be at the forefront of your planning.

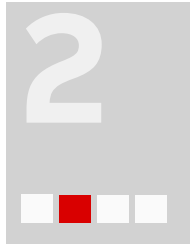
BETH RAY

HEAD OF GLOBAL PRODUCT MANAGEMENT
COMMERCIAL BUILDING AUTOMATION, ABB

”

Pillar 2: Work backwards

Key actions



Once all of those involved in the project understand the vision, you can work backwards as a team to design the most appropriate solution architecture.

Be sure that everyone understands the goals of all stakeholders including investors, owners, tenants, occupiers and even the wider city or national government before any planning begins. When you consider all of these different perspectives at the outset you can avoid misunderstandings later down the line.

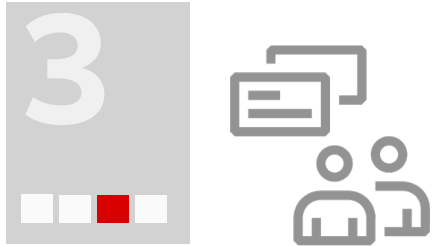


Research with eventual building users can help you prioritize needs and goals.



Ensure everyone shares a clear, simple vision for what you're trying to achieve. Try to condense this to a single inspiring sentence if possible. Consider workshopping this sentence with your stakeholders if it lacks clarity or there's no consensus.

Pillar 3: Collaborate

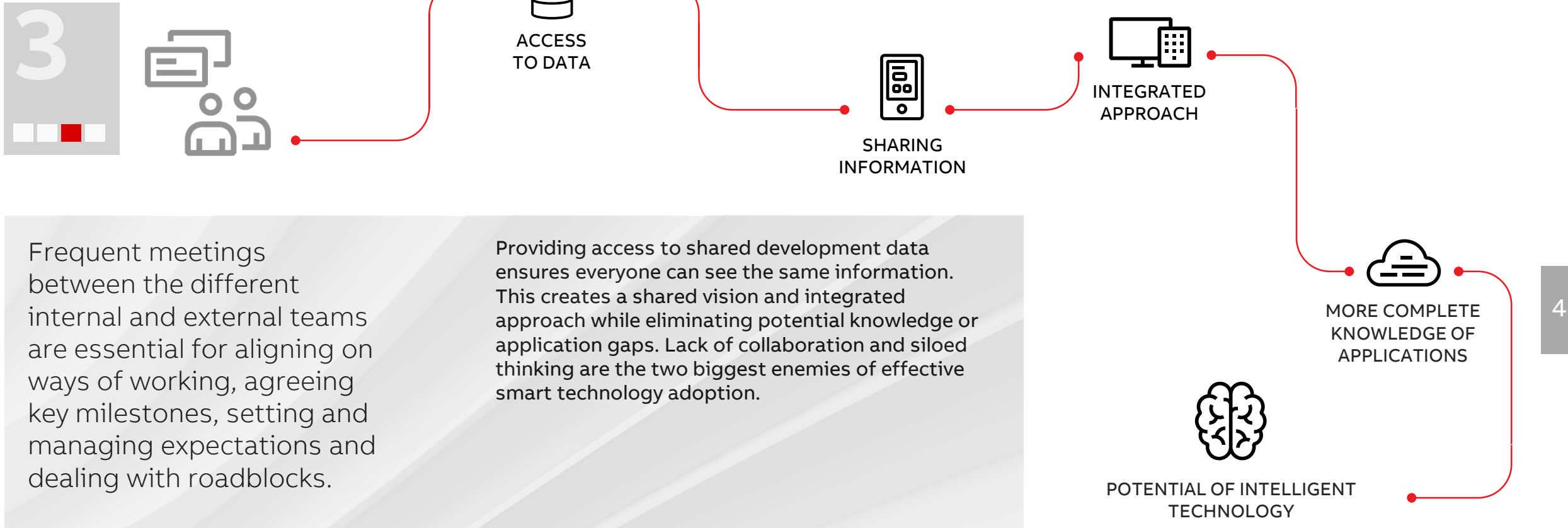


Collaboration will be at the heart of your success. Smart technology is a web of switches, sensors and devices that need to knit seamlessly together.

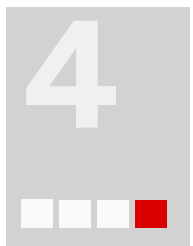


Creating a successful building is about creating that same unity when it comes to people's viewpoints, expertise and expectations.

Pillar 3: Collaborate



Pillar 4: Stay flexible



Smart technologies are constantly evolving, and so is the thinking around smart building. Many buildings have lifespans counted in decades and will need the facility to adapt to new demands, absorb new technologies or change core function.



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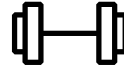
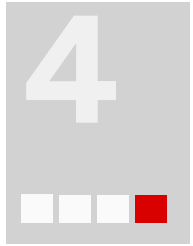


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Pillar 4: Stay flexible

Key actions



As you embark on your electrification process it's wise to be similarly adaptable and open to new opportunities, challenges and even constraints. Adopt an agile mindset. Test and learn and test again.

Be unafraid to experiment with new ideas and solutions but also uncompromising on efficiency, productivity, quality and safety. This can be challenging and takes commitment and strong team alignment.

Think big, but start small – this allows a more iterative, test and learn approach to your project.

Use industry blogs and social media to follow the latest developments and freshest thinking to apply to your projects.

Think ahead. Buildings live for decades and their functions can change. Being open minded can help take into account how the needs of the building's users might change in years to come.

The future is even smarter



There has never been a better time to adopt smart building technologies. Intelligent buildings that would have been unimaginable a few decades ago are now a reality. And as technology advances we can expect even greater leaps forward.



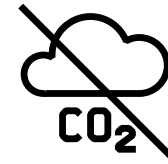
The future is even smarter



Independently
intelligent



Recognition of
people



Carbon negative
buildings

—
We can expect more of the everyday building functions to become automated.

Smart offices will become independently intelligent, learning how occupants use the space and services and then proactively adjust lighting, HVAC and other systems to maximize health and comfort.

—
Buildings will recognize people entering.

Buildings will recognize employees as they arrive at work, direct them to an EV charging point and then on to a workstation configured to meet their requirements for a productive day's work. Visitors to an overseas office will be recognized as they arrive and automatically checked-in with all the appropriate access rights and personalized settings.

—
Buildings of all kinds will become energy positive and carbon negative.

More offices, hospitals, malls, stadiums and homes will capture and store renewable power from the sun and wind. Many will supply power back to the grid or to EVs charging on site.



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The future is even smarter



—
Becoming more energy-efficient means buildings help combat climate change.

Elimination of fossil fuel use combined with carbon-capture materials in the fabric of the building will mean buildings ‘switch sides’ to start playing an active role in cleaning our cities and combating climate change.

—
Smart technology in buildings will also keep us healthier for longer.

Hospitals will check patients in from the ambulance and assign a room and medical team before the patient arrives. Environmental control in hospitals will monitor oxygen and CO2 levels, lighting and heating to optimize the conditions for each patient’s recovery.

—
Ultimately, we can start to view buildings as blank platforms for smart technologies.

Subscription-based Building as a Service (BaaS) models may go mainstream in the next decade. These will allow building owners to download a turnkey software package that quickly transforms a suitable physical shell into a digital hospital, a hotel, a university department, an office HQ or a residential home for the elderly.



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The future is even smarter



Building owners will enjoy previously impossible flexibility to respond to market opportunities by quickly changing their building's operating system and repurposing their asset. Building obsolescence could become a thing of the past.

Creating buildings of the future, today



Smart buildings are increasingly taking a leadership role in the development of smart cities and are widely recognized as essential tools in meeting the many challenges that we face today.



Creating buildings of the future, today

At ABB, we believe that the global rise of smart building technology is an opportunity for smart developers, owners and investors. It will provide significant sustainable and financial benefits, as well as answering social and environmental needs.



For those who approach building development with a collaborative and open mindset, smart technology is an opportunity with business-transforming potential.

Creating buildings of the future, today

As a technology pioneer for 130 years, ABB has market-leading expertise in smart building electrification and integration.

Along with the breadth of the ABB automation offer, ABB Ability™ boasts more than 200 digital solutions across industries, each of them the result of collaboration and partnership with our global customer base. We deliver value by bringing future solutions to you, today.

130-year
TECHNOLOGY PIONEER



+200
DIGITAL SOLUTIONS



Future
SOLUTIONS

Wherever you are on your journey, talk to ABB now, and learn how we can deliver a leading edge to your smart building project.

Let's write the future of smart buildings, together.



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Talk to us

We keep your electrical system installations at the highest level of availability and safety, giving you access to real-time data from across your operations. The benefits of connectivity and data availability can result in savings up to 30%.



ABB