

Smart Buildings

Intelligent solutions for energy efficiency, health & wellness, cost optimization and CO_2 savings

What is a Smart Building?

Smart buildings are mostly commercial properties whose technical equipment is monitored, controlled and automated as part of intelligent building management. The underlying technologies are networked and remotely controllable devices as well as automated processes with the option of software-based control.



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This is how digital monitoring and control technologies are turning offices, schools, hospitals, retirement homes, buildings used for residential or industrial purposes, hotels and retail spaces into smart buildings. In these buildings, important parameters such as light, air quality or room temperature can be measured and controlled automatically and, if necessary, centrally.

In contrast to the smart home, in which an individual residential unit is networked, digitisation in the smart building comprises the entire building.

Smart buildings are a trend topic in the area of sustainability in the real estate industry.



What is the market for Smart Buildings?

The global building automation and controls market size was valued at \$ 101.91 billion in 2019, and is expected to reach \$ 215.59 billion by 2027 growing at a CAGR of 11.10 % from 2020 to 2027.

Building Automation and Controls Market Outlook-2027 Source: https://www.alliedmarketresearch.com/building-automation-controls-ma

101,91 bn US\$



"The global building automation and controls market size is expected to witness significant growth during the forecast period, owing to the rising need for advanced energy-efficient interventions."

Markets and Markets, 2022 Source: https://www.marketsandmarkets.com/Market-Reports/smart-building-market-1169.html



How does a Smart Building work?

Smart buildings are intelligent digital ecosystems that network, automate and centrally control a wide variety of systems such as heating, ventilation and air conditioning, lighting, fire protection, access control or room occupancy.

Each system in turn consists of smart components (sensors and actuators) collecting data and communicating with each other. The control can be centrally monitored and operated by staff or automated by means of intelligent algorithms.



4 What are the benefits of Smart Buildings?

Digitalization and intelligent automation of entire buildings and building complexes pay off especially in the commercial environment.



increase in employee motivation and productivity

15% reduction in absenteeism Space optimization:

25-40%

reduction in space and operating costs through optimization according to real occupancy levels

Energy & CO₂ savings:

20-30% in commercial properties (typically)

Safety of buildings:

- Leak alarm to protect against water damage
- > Control by CO₂, smoke or fire detectors
- Intrusion detectors for windows/doors, motion detectors

Maintenance:

- > Ensuring continuous operations
- > Avoidance of downtimes

What are the benefits of wireless technology in Smart Buildings?

Sensors play a pivotal role in intelligent buildings. They provide the raw data for digital space management. Wireless-based solutions offer clear advantages in Smart Buildings:

- > Simple, quick installation without cables no downtime or closing of areas, no mess or noise
- More cost-effective than wired solutions (up to 70 % for retrofitting, around 30 % for new buildings)
- » "Peel & Stick" sensors or push-buttons can be installed anywhere, easily added or repositioned



The battery-free wireless technology from EnOcean goes one step further.

- > Self-sufficient operation thanks to energy harvesting: wireless modules harvest energy from the environment (e.g. movement, light, temperature differences).
- > No battery changing, no maintenance, no toxic waste
- Comprehensive ecosystem with interoperable products from numerous suppliers (international standard)
- > Proven: EnOcean technology installed in over 1,000,000 buildings worldwide

Sources: Mark Jewell, Selling Energy Data from EnOcean and T.System

f. Dr. Michael Krödel (2021). The influence of Smart Buildings upon the wellbeing and productivity of office workers

Wireless saves time and money

2,33 hours



Time saved for installation of lighting, shading and temperature control in 20,000 m² of office space.

Assumptions: 2.8 min. installation time per 1 m cable and approx. 2.5 m of cable per m2 of office space.





1 man-year costs battery service (10 min./sensor, 233 working days x 8h).

Sustainability as a mega topic – politics defines the scope



The European Green Deal aims to make Europe the first continent to become climate neutral by 2050. The goal is to emit no more greenhouse gases than our ecosystems can absorb naturally. To make this goal legally binding, the Commission has introduced the European Climate Change Act. By 2030, net greenhouse gas emissions are to be reduced by at least 55% compared to 1990.

With NextGenerationEU, the international community is investing in green technologies, cleaner vehicles and public transport. Buildings and public spaces will become more energy efficient. Between 2021 and 2027, almost one third of the EU budget of over 1.8 billion euros will be spent on climate-related measures.



green = funds for the European Green Deal in the EU budget 2021-2027 (expenditures for climate protection-relevant measures) Quelle: https://www.boell.de/sites/default/files/2020-11/infrastrukturatias%202020.pdf



The USA rejoined the Paris Climate Agreement under President Biden. By 2030, the net greenhouse gas pollution of the entire economy is to be reduced by 50-52 % compared to 2005. By 2050, the entire US economy is to be climate neutral.





Local Law No. 97 of 2019, passed as part of the Climate Mobilization Act by the New York City Council in March 2019, requires large (over 25,000 square feet) existing buildings in New York City reduce their emissions by 40 % by 2030 and 80 % by 2050 (compared to base year 2005).

The law is unique and novel in its aim because it targets existing buildings and requires owners to invest in renovation and retrofitting to make their buildings more energy-efficient. The New York Post has called the law "one of the most ambitious climate legislations for buildings enacted by any city in the world."



Sources: New York City Council Press Council to Vote on Climate Mobilization Act ahead of Earth Day – Press (nyc.gov) Nonko, Emily (January 16th 2020). "NYC buildings prepare to drastically reduce emissions to avoid penalties". New York Post



Focus on existing and new buildings

Overall, buildings account for 40 % of energy consumption and 36 % of greenhouse gas emissions in the EU with similar figures in most developed countries. This is mainly split between the phases of construction, use, renovation and demolition. Energy-efficient buildings are absolutely essential to achieve the climate targets set. This also includes the retrofitting of virtually all existing buildings.

In this context, the consistent use of building automation alone could save about 12 % of energy consumption and 10 % of CO_2 emissions. However, only about 1 % of the national building stock is actually renovated each year. Far too little! The current renovation rates should be at least doubled.

New EU rules help Member States achieve a more energyefficient building stock and facilitate access to finance. The Energy Performance of Buildings Directive 2010/31/EU (EPBD) and the Energy Efficiency Directive 2012/27/EU (EED) have been revised and will be implemented in national laws.

A dynamic network for professional Smart Buildings

The EnOcean Alliance is an international association of leading companies in the building and IT industries. Founded in 2008, the open non-profit society is committed to developing and marketing interoperable, maintenance-free and field-proven system solutions for smart homes, smart buildings and smart spaces based on the EnOcean wireless standard (ISO/IEC 14543-3-10/11).



Scan the QR code to learn more about our Smart Building solutions powered by energy harvesting technology https://www.enocean-alliance.org/solutions-and-benefits/solutions/smart-buildings/



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