4 Smart Building Case Studies Making the World More Sustainable

Why Are Smart Buildings Needed?

Around **40%** of global energy consumption can be linked directly to buildings. This sustainability challenge makes the role of smart buildings *paramount* to meeting zero-emission initiatives worldwide.

The Role of Smart Building Software

Architecture, Engineering, Construction and Operations (AECO) software will drive the development of **next-generation** commercial smart buildings from conception to operation, extending the industry's digitization and expanding Building Information Modeling (BIM) adoption and value.

Architectural Design Software Case study

Who?

Ramboll, a global architecture, engineering, and consultancy firm, tackled the design of a school building in Scotland. This was to meet new Department of Education thermal comfort standards.

What?

Simulation of the performance of the mixing box system case in a winter scenario, with the windows closed and the fans turned on. Results showed velocity, temperature distribution, and thermal comfort. This is used to adjust the heating and air conditioning system design or rearrange classroom desks and chairs.

Results

Engineers could **predict and optimize** the performance of a heating and air conditioning system in the early stages of the building design process—a particularly relevant topic for planning green building projects and obtaining Leadership in Energy and Environmental Design (LEED) certification.

Simulation Modeling Case Study

Who?

Inform Design AB is a Swedish consulting practice specializing in façades, building physics, and indoor climate assessments in highly glazed constructions. They worked on the Element office building in Maroussi, Athens.

What?

Simulation software enabled the company to assess designs to pre-predict the beam and diffuse solar radiation to be transmitted through every time step of the year. Data were then correlated with the real-life measured data from the weather station to provide a shading control strategy.

Results

The developed **shading control strategy** suggested banding of screens, accounting for the shading effect of surrounding buildings. Movable screen groups were created to be controlled together, as shown in the figure below. The **goal** was to avoid closing the screens too often in shaded façade areas and unnecessarily blocking views.

Digital Twin Case Study

Who?

Microsoft launched its smart buildings pilot in one of its Puget Sound buildings in January 2021 as part of the larger campus modernization project.

What?

IoT-connected devices with Azure Digital Twins integrated inputs from previously siloed data sources. Microsoft released an open-source smart buildings ontology built on **Digital Twin Definition Language (DTDL)**, enabling devices from many vendors to talk to Azure Digital Twins. It includes HVAC, security, lighting, and legacy and new devices.

Results

The system delivers reactive controls **informing** heating and cooling functions by room occupancy or adjusting carbon dioxide flow or humidity levels related to air quality sensing. In addition, sensors can also **trigger** maintenance alerts to make early fixes before a piece of equipment breaks.

Retrofit Case Study

Who?

In October 2019, the **Sydney Opera House** became the first Australian art institution to commit to the United Nations' Sustainable Development Goals (SDGs). This initiative aims to address the most pressing issues of our time. The Sydney Opera House and **Honeywell** collaborated on achieving its goals, including becoming a climate-positive building by 2023.

What?

Honeywell **smart sensors** measure temperature, humidity, and indoor air quality, as well as electrical and water consumption.

The **Building Management and Connected System (BMCS)** leverages data from various systems (e.g., emergency lighting, weather services, etc.) to tie operations to demand, occupancy, and external conditions.

AI/ML-based decision-making to highlight inefficiencies, mitigate risk, reduce cost, and support sustainability goals.

Results

The Opera House has already reduced its water consumption by **30%** through improved monitoring and reduced energy use by **20%**.

ABI Research's latest *Smart Commercial Building Software* presentation **dives deeper** into the role of smart commercial buildings in the modern city. This research assesses enabling technologies, building digitization trends, and key vendors making smart buildings possible.

Get the report today!

ABIresearch
THE TECH INTELLIGENCE EXPERTS™