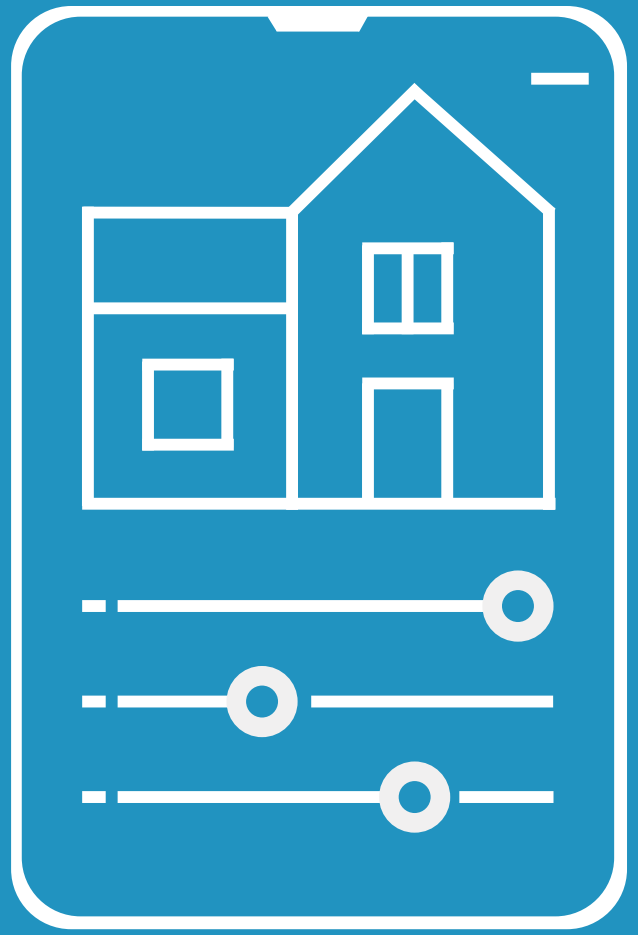
REFERENCE CASES

BUILDING AUTOMATION AND CONTROL SYSTEMS (BACS)

OUR MEMBERS

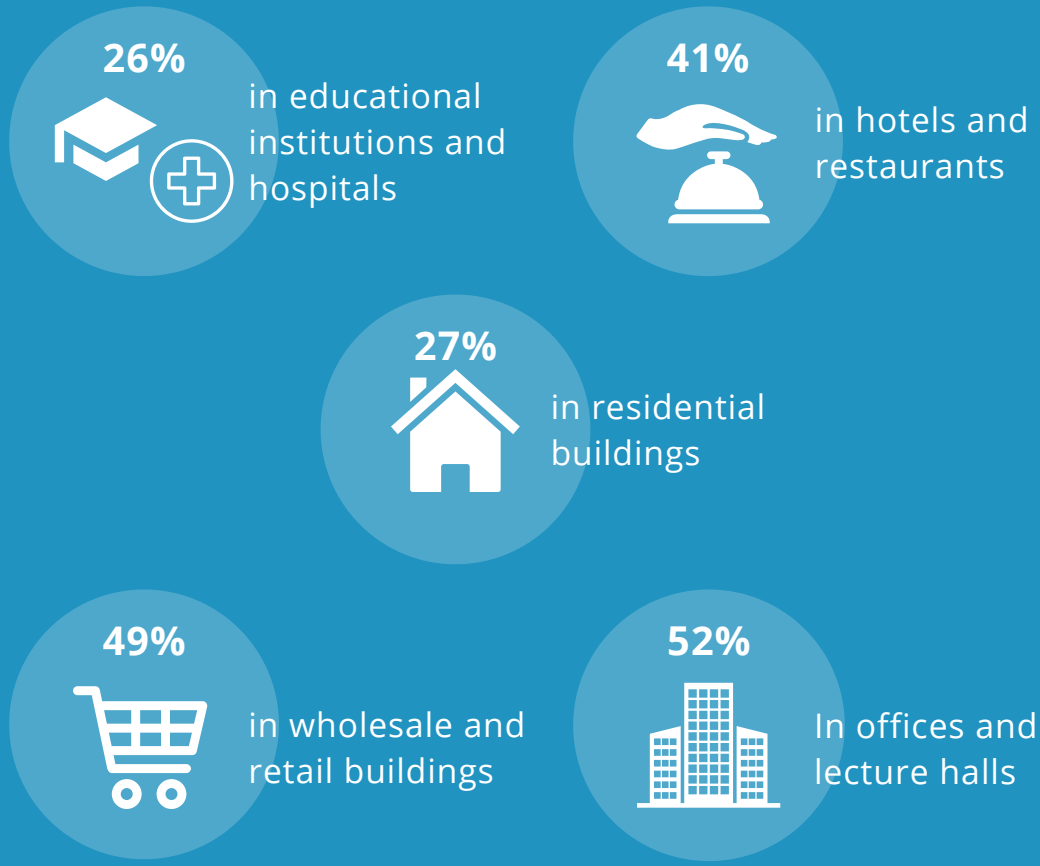
"A world where energy efficiency and sustainability in every building is achieved through the optimal application of home and building controls, automation systems and services."

/TABLE OF CONTENTS



20% of the energy consumed by European buildings is wasted, which amounts to approximately € 270 billion every year. BACS is a cost-effective technology (on average € 28,7 per m2) with a fast payback time of an average of 3 years and, reducing the wasted thermal and electrical energy.[1]

BACS can reduce energy consumption by up to:[2]



1. Waide study, *"The scope for energy and CO2 savings in the EU through the use of building automation technology"*
2. EN 15232, Impact of BACS and TBM on the energy performance of buildings

/COLLEGE BUILDING, THE UNITED KINGDOM
NEW BACS INSTALLATION

The installation of a brand-new BACS installation, alongside reviewing and optimizing control strategies resulted in energy and carbon savings as well as improvements in wellbeing and comfort conditions for occupants.

Payback
2.5 years

Investment
€ 144,410

Operational savings
€ 59,040/ year

CO2 saved
27 tons/year

Improvements through BACS:

- Upgrade from BACS Class C to Class B,
- Optimization of boiler plant operation strategy
- Continuous energy monitoring and exception reporting
- Maintenance and service provision

/UNIVERSITY OF NOTTINGHAM, UK
LEED PLATINUM – SMART GREEN

TThese 4'500 m2 premises were not compliant with the UK University Charter and its high environmental standards. It was unattractive and did not provide connected services or data visibility. The site was complex with multiple applications and facilities, of different ages with different architecture.

Investment
€ 580,000

Operational savings
25% reduction

Improvements through BACS:

- BREEAM Outstanding and LEED Platinum certifications
- Workplace safety and comfort costs dropped by 25%
- Upgraded Occupant comfort – overall control of the building up 70%, temperature control up 50%
- Predictive maintenance and bureau support – reduces the risk of downtime through critical equipment monitoring and alarm management
- Scalability for monitoring and control with best-in-class cybersecurity

/UNIVERSITY BUILDING, THE UNITED KINGDOM
NEW BACS & BOILER SYSTEM INSTALLATION

The focus was on the improvement of Building Automation and Control System (BACS) capabilities from class C to B. Additionally the project included an upgrade of the boiler plant. This resulted in energy and carbon savings as well as improvement in well being and comfort conditions for occupants.

Payback
7 years

Investment
€ 736,500

Operational savings
€ 104,010/ year

CO2 saved
468 tons/year

Improvements through BACS:

- Upgrade from BACS Class C to Class B,
- Optimization of boiler plant operation strategy
- Optimization of AHU plant operation strategy
- Continuous energy monitoring and exception reporting
- Maintenance and service provision

/VIENNA TECHNICAL UNIVERSITY, VIENNA, AUSTRIA
CONVERSION INTO ENERGY-PLUS BUILDING

The Energy Balance and infrastructure of this 13'500 m2 1960s building were not up to modern standards and required complete renovation as part of the “TU University 2015” modernization project. The goal was to convert it into an energy-plus building.

Operational savings
88% reduction

Improvements through BACS:

- Operating on 88% less energy
- Easy use for facility management and end-user
- Continuous energy monitoring and exception reporting

/OFFICE BUILDING, TECHNOPOLE, GRENOBLE, FRANCE
LEED NC PLATINUM – SMART GREEN AND MICROGRID

This 10'500 m2 project did not have any sustainability credentials. It was lacking both system integration and data exchange. There were added difficulties with new technologies being spread over several dated buildings.

Payback
4.3 years

Investment
€ 393,000

Operational savings
€ 92,000/ year

Improvements through BACS:

- Reduced consumption from 127kWh/m2 to 43kWh/m2 per year (Target 45kWh)
- Platinum LEED in Operations certified (91 points)
- Platinum LEED Design-Build +Construction (83 points)
- Smart grid and solar-ready
- Space and meeting room management to increase safety and efficiency
- 24/7 remote management capabilities
- Predictive maintenance and reliable service continuity for critical equipment
- Full visibility of key performance indicators
- Smart technologies to foster collaboration, improve the workplace and attract talent

/CALL CENTRE OPERATIONS BUILDING, THE UNITED KINGDOM
BACS REVIEW AND COMMISSIONING

The focus was on a detailed review of existing control strategies and re-commissioning of HVAC plant items' operation (AHU and Chiller Plant) for a modern office building. This resulted in energy and carbon savings as well as improvements in well being and comfort conditions for occupants.

Payback
<2 months

Investment
€ 4,500

Operational savings
€ 42,760/ year

CO2 saved
186 tons/year

Improvements through BACS:

- Optimization of main HVAC systems including
- Optimization of chiller plant operation strategy
- Optimization of AHU plant operation strategy
- Exception usage/operations alarms set up for HVAC systems
- Maintenance and service provision

/OFFICE, BAVARIA TOWERS, MUNICH, GERMANY
IMPROVEMENT OF BACS

Improvement of the degree of building automation as part of the expansion of the rental areas. The integration of control of solar shading, lighting and temperature control into the central building automation improves workplace comfort, simplifies the operation of the system technology, reduces energy consumption and ensures the value retention of the property through consistency and expansion options of the building automation.

Operational savings
€ 60,000/ year

CO2 saved
97 tons/year

Improvements through BACS:

- Increase the automation level from category C to B
- One room control unit for lighting, sun protection and temperature control
- Improved control through room automation
- Continuous energy monitoring and exception reporting
- Extension possibilities for future GA solutions

/OFFICE, ONIX BUILDING, LILLE, FRANCE
SOLAR SHADING TEST

Test of combined automated interior solar shading and artificial lighting for one year on the second floor of the building. Real demonstration with automated interior blinds (SOMFY). Combination of commands with artificial lighting (PHILIPS LIGHTING). Automated adaptation of light level, with natural light first.

Payback
<3 years

Investment
€ 20/m2

Operational savings
20% consumption reduction

Improvements through BACS:

- Decrease of 29% of total energy consumption, 10% decrease in HVAC and heating, 54% decrease in lighting
- Significant increase in employee comfort
- The resolution of visual discomfort is achieved by regulating the intensity of artificial light according to the presence of people.
- Lighting intensity according to the presence of natural light sources to achieve an improvement and an average illuminance level according to the AFE recommendations

/HOSPITAL, GERMANY
NEW BACS INSTALLATION

This 29'000 m2 project included cross-system modernization of the technical building systems with simultaneous optimization of all energy processes. In this way, the Aller Weser-Klinik was able to reduce its energy costs by 50% and reduce electricity consumption from the grid by almost 75%. Beyond Building Automation and Control Systems, the project covered the installation of a combined heat and power unit (CHP), and the replacement of all boilers and air-conditioning systems. The project lasted 7 months without an interruption in hospital operations.

Payback
<7 years

Investment
€ 1.9 Mil

Operational savings
€ 270,000/ year

CO2 saved
1444 tons/year

Improvements through BACS:

- Renewed Building Management Equipment
- Continuous energy monitoring and exception reporting

/HOSPITAL, KREISKRANKENHAUS LUDMILLENSTIFT MEPPEN (GERMANY) RENOVATION AND EXTENSION

After years of growth, the HVAC system of Ludmillenstift Hospital reached its limits. The repeated expansion and renovation measures led to major difficulties in regulating and maintaining the thermal energy generation (heating/cooling) and the hydraulic distribution system. The objective of the 58'000 m2 project was to create a consistent and demand-dependent thermal energy supply to the individual zones, increase the efficiency of the thermal energy generators, monitoring and optimisation of the energy flow, and saving energy in thermal energy generation and distribution.

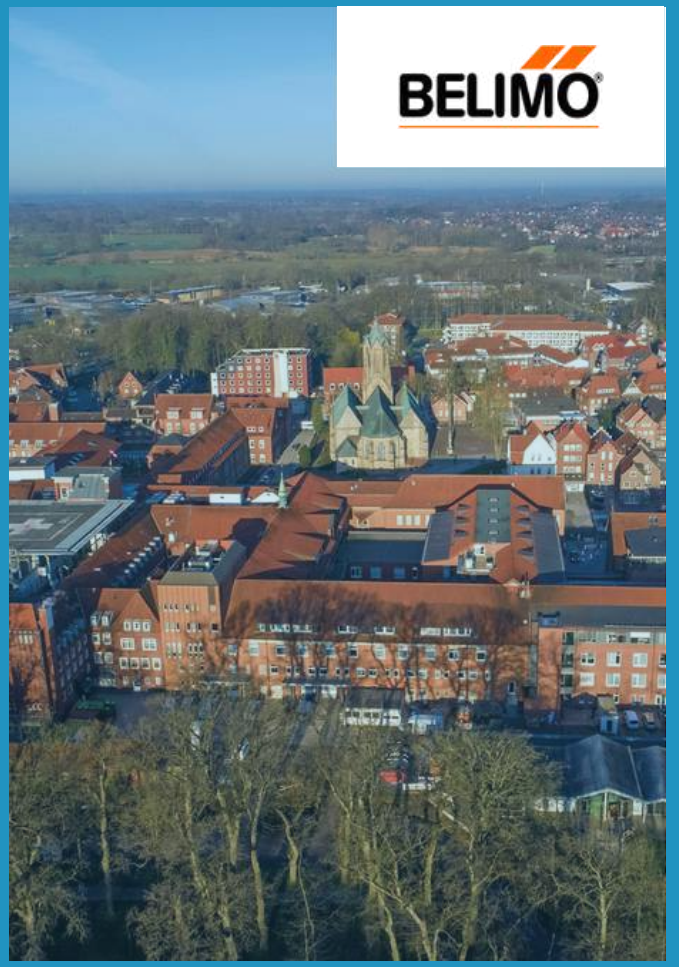
Investment
€ 150,000

Operational savings
1GWh natural gas/ year

CO2 saved
202 tons/year

Improvements through BACS:

- Demand-dependent supply of thermal energy to the consumers
- Permanent balancing of the systems
- Increased room comfort and appliance efficiency
- Continuous measurement and recording of energy flows for future optimisation



/RESIDENTIAL BUILDING, MILAN, ITALY
HYDRONIC BALANCING OF HEATING SYSTEM

The project covered five 9-storey apartment buildings in Milan. Earlier installation of a new boiler and thermostatic radiator valves did not deliver the intended savings and created noise in the system. After the analysis, it was decided to implement an automatic balancing solution. The installation was completed in just two weeks with little disturbance to the tenants. With the new solution implemented, the tenants now save more than 14% on the energy bill every year.

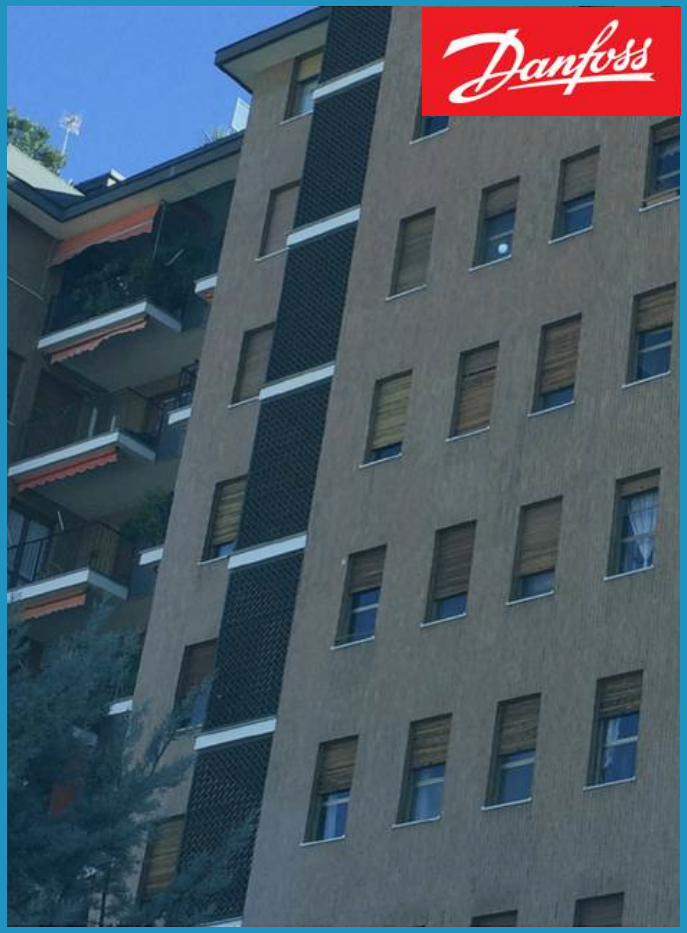
Payback
2.2 years

Investment
€ 26,400

Operational savings
14% consumption reduction

Improvements through BACS:

- Balancing valves enabling proper heat distribution and savings
- Eliminated issue of pressure fluctuations, which is often the cause of noise problems



/RESIDENTIAL BUILDING, MJÖLBY, SWEDEN
IMPLEMENTATION OF HYDRONIC BALANCING & CONTROL

The project covered a 10-storey building owned by the housing association Bostadsbolaget AB. The building consists of 25 apartments with a total floor space of 1876 m2. After the analysis, the housing association decided to implement an automatic balancing solution for the heating system and to install new thermostatic valves on all radiators. With the new solution implemented, the housing association now saves more than 20% on the energy bill every year.

Payback
3 years

Operational savings
20% consumption reduction

Improvements through BACS:

- Radiator thermostats deliver energy savings and im
- Balancing valves on the supply pipe enable propper heat distribution and savings

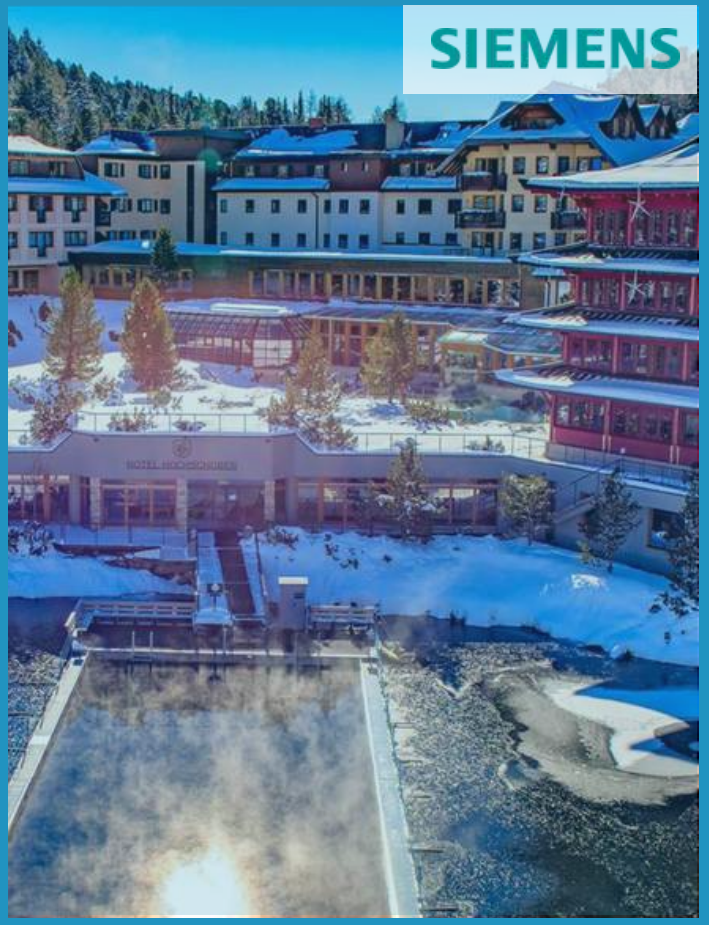
/HOTEL HOCHSCHOBER, KÄRNTEN, AUSTRIA
RENEWAL OF TECHNICAL BUILDINGS SYSTEMS

The hotel had 14 technical centres, some of which are very outdated, are only moderately automated and are not networked with each other. There is no central control technology. The systems are therefore uncoordinated from an energy perspective, particularly in respect of heat distribution.

Investment
€ 1.7 Mil

Operational savings
€ 112,900/year

CO2 saved
389 tons/year



Improvements through BACS:

- Optimization of main ventilation and air conditioning systems
- Optimization of heat distribution
- Continuous energy monitoring
- Online support and CRSP connection
- Central Control Unit (Design CC main station)
- Complete digitalization of the whole technical hotel system
- Implementation of a new heating pump and PV Plant
- Optimization of the swimming pool technology

/INDOOR SWIMMING POOL, SPORTS CENTRE AUSTRIA
NEW BACS INSTALLATION

The Aquacity St. Pölten hosts 150,000 visitors every year. Over three floors and 6'000 m2, it includes a sports pool, a toddlers' area with a play stream, a wave bay, whirlpool, water slide, teaching pool, Kneipp station, herbal steam bath, sauna and solarium. Thanks to the new components of the technical system, Aquacity consumes 38% less heat energy and 18% less electricity. Beyond BACS the project included the Renewal of all the Technical Building Systems, installation of a heat pump and, conversion to LED lighting.

Operational savings
€ 145,000/year

CO2 saved
400 tons/year

Improvements through BACS:

- Renewed Building Management Equipment
- Continuous energy monitoring and exception reporting

Energy Performance of Buildings Directive (EPBD 2018)

eu.bac Guidelines and Study on the impact of BACS in the revised EPBD

eu.bac EPBD BACS compliance verification package

European Commission Technical assistance for ensuring optimal performance of technical building systems under the EPBD:

- Technical guidelines for BACS
- Technical guidelines for Article 8 on TBS

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