

Demand an energy efficient building

Solutions for Green Buildings

Schneider
Electric



Energy Efficiency in buildings

The regulatory environment

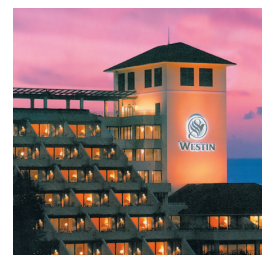
Buildings account for around 40% of European energy consumption. As a result, in 2002 the European Union issued Directive 2002/91/EC on the energy performance of buildings (known as “EPBD” - Energy Performance of Buildings Directive) which was revised in 2010 with Directive 2010/31/EU. Based on these regulations, the European Committee for Standardization (CEN) was charged with developing precise calculation standards: and so in July 2007, standard EN 15232 "Energy performance of buildings – Impact of Building Automation, Controls and Building Management" was developed, enabling the effects of automation and management on buildings' energy consumption to be effectively assessed. Recently a new updated version, EN 15232:2012 was published.

In fact, recent years have seen a steady increase in the use of automation systems in commercial and residential buildings due to the awareness of the huge benefits that these can bring, both in terms of environmental comfort and safety and energy savings and energy management.

The new EPBD Directive will soon be acknowledged at national and regional levels by the respective responsible bodies, which will gradually make automation and control systems a requirement in new construction and refurbishment.

Thanks to the European influence, the regulatory environment is changing in favour of improving efficiency in end use of energy, in particular relating to:

- Automation of systems to improve their energy efficiency;
- Adoption of intelligent measurement systems for active control and accountability of energy consumption.



60%

Lighting, heating, cooling and ventilation account for more than 60% of a building's total energy consumption.

Intelligent buildings save energy

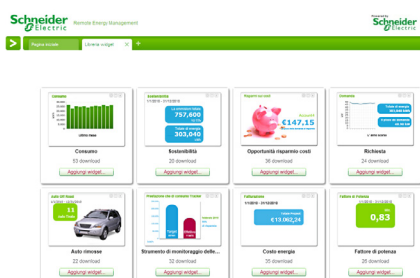
We can increase your building's IQ

Having the right technology and knowing how to use it is the key to achieve energy efficiency.

Innovations aimed at energy management will continue to have a significant impact on reducing energy costs and emission levels. Complete, company-wide solutions are needed in order to provide integrated management of the various technological subsystems involved in regulating and controlling Electrical and Thermal energy, IT infrastructure and Security, with the necessary levels of functionality and complexity to meet the needs of those involved in the building's design and management.

Schneider Electric offers a wide range of technologies and solutions which enable you to reduce energy consumption and plan for the future. By applying our solutions in a practical and economically sustainable way, you could reduce your energy costs by 10 to 30 per cent, if not more.

Energy OnLine Monitoring Solution

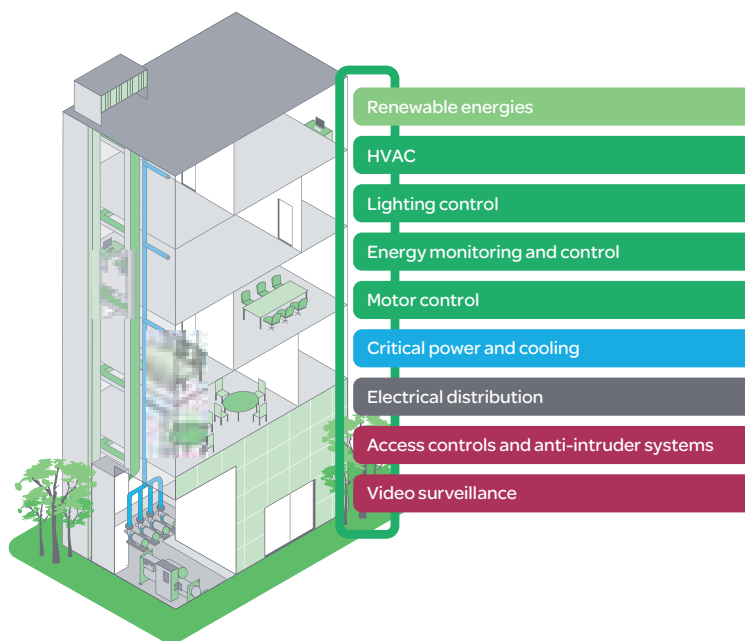


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The 30% reduction in buildings' energy consumption corresponds to a 5% increase in net operating income. What is truly important to you?

Efficiency



Integrated solutions for Green Buildings

- Efficient lighting control
- HVAC optimisation
- Home and building automation solutions
- Renewable energy solutions
- Solutions for sustainable mobility

Solutions for system energy monitoring and control

- Increases confidence in information to support decision-makers
- Increases efficiency and cuts unnecessary energy costs
- Monitors energy performance KPIs, so the organisation can take control
- Sets and meets Environmental Responsibility objectives

Advantages of Green Buildings*

- Operating costs reduced by 8.5% to 13.6%
- Building value increases from 6.8% to 10.9%
- Occupancy rate increases by up to 6.4%
- Increase rental income by up to 6.1%

*Source: McGraw Hill Construction, Green Outlook 2011, Green Trends Driving Growth, 2010

Improving building energy efficiency through automation

Standard EN 15232

With the EN 15232 standard, the significant contribution of active energy efficiency, driven by a building's control and management systems, can be measured. It includes for example heating, cooling and lighting.

The standard defines the potential thermal and electrical energy savings that can be achieved by introducing particular automation functions, as belonging to a specific energy efficiency class (A,B,C).

High efficiency	Class A	<table><tr><th colspan="2">Moving from class C</th></tr><tr><th>to class B</th><th>to class A</th></tr><tr><td>Total consumption</td><td>~19%</td><td>~29%</td></tr><tr><td>Thermal energy Heating/ Cooling</td><td>~20%</td><td>~30%</td></tr><tr><td>Electrical energy</td><td>~7%</td><td>~13%</td></tr></table>	Moving from class C		to class B	to class A	Total consumption	~19%	~29%	Thermal energy Heating/ Cooling	~20%	~30%	Electrical energy	~7%	~13%
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Electrical energy	~7%	~13%													
Advanced automation	Class B														
Standard automation	Class C														
No automation	Class D														

Promoting Energy Efficiency with BACS

The European Building Automation and Controls Association (eu.bac) has developed a plan for promoting improved energy efficiency of Building Automation and Control Systems (BACS) with the help of the EN 15232:2012 standard and a new eu.bac System certification scheme.

The eu.bac System certification scheme has been developed to advance the state of the art in energy efficiency and specifically provides means and a process for certifying energy performance of BACS in buildings, at the first delivery and during the lifetime.

This provides a more holistic approach of certification of systems including the construction, commissioning and handover to the customer as well as throughout the lifetime of the plant. The target is a certification of the entire building automation system in a building.

The eu.bac Certification Scheme serves the purpose of helping building owners to put the right requirements for energy saving measures to be delivered in their installations of BACS. It helps them (or their consultant) to specify best practice energy saving measures to an extent that they are willing to pay for– i.e. to set expectations at the right level.

The procedure for eu.bac System certification is designed as a three step process:

1. The first step is a self-declaration by the provider of BACS that a particular system is capable of delivering the functionality described in the eu.bac System Technical Recommendations.
2. The second step is the certification of a BACS installation in a specific building. This is done by an authorized auditor who makes a site visit.
3. The third step is the periodic inspection of the BACS installation. This is to verify that the certified functionality is still available and working properly.



Making measurable and quantifiable savings

The EN 15232 standard clearly demonstrates the benefits which can be obtained by moving from one energy class to another.

By analysing tables 1 and 2, we can immediately make a qualitative and quantitative assessment of the energy benefits that using an automation system brings to building management.

With regard to **thermal energy** in non-residential **buildings** (table 1), moving from energy efficiency class C to a higher class will result in savings ranging from a minimum of 9% (class B for hospitals) to a maximum of 50% (class A for libraries); for residential **buildings**, savings range from a minimum of 12% (class B) to a maximum of 19% (class A).

With regard to **electrical energy consumption** (please note that these figures do not include consumption arising from office and household appliances) in non-residential **buildings** (table 2), moving from energy efficiency class C to a higher class results in a minimum saving of 2% (class B for hospitals) to a maximum 14% saving (class A for schools and similar premises); for residential **buildings** savings range from a minimum of 7% (class B) to a maximum of 8% (class A).

"Thermal Energy" in Non-Residential Buildings								
Type of Building/ Premises	BAC efficiency classes and factors				Savings achieved by moving to class B or A instead of C or D			
	D	C	B	A	Saving B/C	Saving B/D	Saving A/C	Saving A/D
	No Automation	Standard Automation	Advanced Automation	High Efficiency				
Offices	1.51	1.00	0.80	0.70	20%	47%	30%	54%
Libraries	1.24	1.00	0.75	0.50	25%	40%	50%	60%
Schools	1.20	1.00	0.88	0.80	12%	27%	20%	33%
Hospitals	1.31	1.00	0.91	0.86	9%	31%	14%	34%
Hotels	1.31	1.00	0.85	0.68	15%	35%	32%	48%
Restaurants	1.23	1.00	0.77	0.68	23%	37%	32%	45%
Shops/ Warehouses	1.56	1.00	0.73	0.60	27%	53%	40%	62%
"Thermal Energy" in Residential Buildings								
Single-family houses, apartments, other residential premises	1.10	1.00	0.88	0.81	12%	20%	19%	26%

Table 1 (from EN 15232) Energy savings for consumption of thermal energy

Electrical Energy in Non-Residential Buildings								
Type of Building/ Premises	BAC efficiency classes and factors				Savings achieved by moving to class B or A instead of C or D			
	D	C	B	A	Saving B/C	Saving B/D	Saving A/C	Saving A/D
	No Automation	Standard Automation	Advanced Automation	High Efficiency				
Offices	1.10	1.00	0.93	0.87	7%	16%	13%	21%
Libraries	1.06	1.00	0.94	0.89	6%	11%	11%	16%
Schools	1.07	1.00	0.93	0.86	7%	13%	14%	20%
Hospitals	1.05	1.00	0.98	0.96	2%	7%	4%	9%
Hotels	1.07	1.00	0.95	0.90	5%	11%	10%	16%
Restaurants	1.04	1.00	0.96	0.92	4%	8%	8%	12%
Shops/ Warehouses	1.08	1.00	0.95	0.91	5%	12%	9%	16%
Electrical Energy in Residential Buildings								
Single-family houses, apartments, other residential premises	1.08	1.00	0.93	0.92	7%	14%	8%	15%

Table 2 (from EN 15232) Energy savings for consumption of electrical energy

Why is this important to Schneider Electric?

Energy is very important to building owners, specifying consultants, building managers and operators, and growingly to the occupants of a building. It is clear that just tracking the development of energy use from the bills from the utilities is not sufficient when it comes to having an understanding of where, when and for what purpose the energy is used in the building. Building Automation systems delivered by Schneider Electric help building owners, managers, operators and occupants learn about their properties and in particular what to do about it when energy wasting is discovered.

The European standard EN 15232 is providing a framework for energy related functionality that can be delivered by the BACS. With the additional certification available by eu.bac there is an opportunity to add credibility to the whole installation and commissioning process. As such it is an excellent help for all involved in the building lifecycle to bring added value to the customers.

It brings customer value during the whole lifecycle of the building.

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Due to the development of Standards and resources, the features mentioned in the text and illustrations within this document may only be considered binding upon Schneider Electric's confirmation.

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