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eu.bac System

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ABSTRACT

State-of-the-art building automation systems are energy-efficient and sustainable. Recently eu.bac [2] has revealed the potential for increasing energy efficiency in buildings with a system certification independent of the manufacturer.

The Energy Performance of Buildings Directive (EPBD), which was adopted by the EU in 2002 and revised in 2010, is an important step towards the improvement of the energy efficiency of the large stock of existing buildings in Europe. As a result, more than forty EN standards have been developed with the aim of harmonizing the methods of calculating the energy consumption of buildings in Europe. EN 15232 [1] shows how building automation can be used to minimise energy consumption.

The new 'eu.bac System' [3] methodology assesses building automation based on EN 15232 [1].

The auditing of a building automation system represents an ideal basis for optimising the installation – so-called 'continuous commissioning'–and supports building automation manufactures services with recognised standards. This leads to sustainable operation and maintenance of building value through life time.

The European Building Automation and Controls Association (eu.bac) [2] was founded in 2003. It comprises both manufacturers and providers. Its objectives are to promote building automation, ensure product quality and to actively support CEN/ISO standardisation and European directives.

1. Introduction

The primary purpose of a building is the provision of space for working, living, presentations, pleasure, etc. Each building must satisfy the user requirements. The most favourable conditions possible for humans and furnishings must be created in the building.

The building automation ensures that, depending on the use requirements of the building, optimal climatic conditions prevail. It links all existing systems in a building and optimises the interaction in terms of the best ambient conditions with maximum energy efficiency. The prerequisite for energy efficiency at a desired level of comfort is an intelligent building automation system that provides the required energy in the right quantity at the right time and at the right place.

A large proportion of the heating, cooling, air conditioning and lighting provided in the building is wasted. This means they are provided even when this results in no benefit at all.

Effective measures for preventing waste are described in the European standard EN 15232 [1]. The principle or central theme in this set of regulations is needs-based operation of the systems. Energy in the form of heat, cold, conditioned air and lighting should only be provided when there is demand on the user side. Usage and thus, in large part, the users dictate when and how much energy must be consumed. Systems with consistent, automatic identification of needs achieve the highest energy efficiency class. Occupancy detectors and a room control request the energy in a targeted manner from energy processing.

The basic principle is: Use energy only when it results in a benefit. Eliminate waste! (Fig. 1).

A demand-led control strategy can be used in any building, regardless of its age, façade, etc., and always leads to significant energy savings compared to constantly supplying the building.

2. Sustainable building automation

From what point is building automation sustainable? Let us assume a serviceable life of a building ranging from several decades to 100 years. It is very likely that the use of the building will change more than once during this time. Even if the purpose remains the same (the office building remains an office building),

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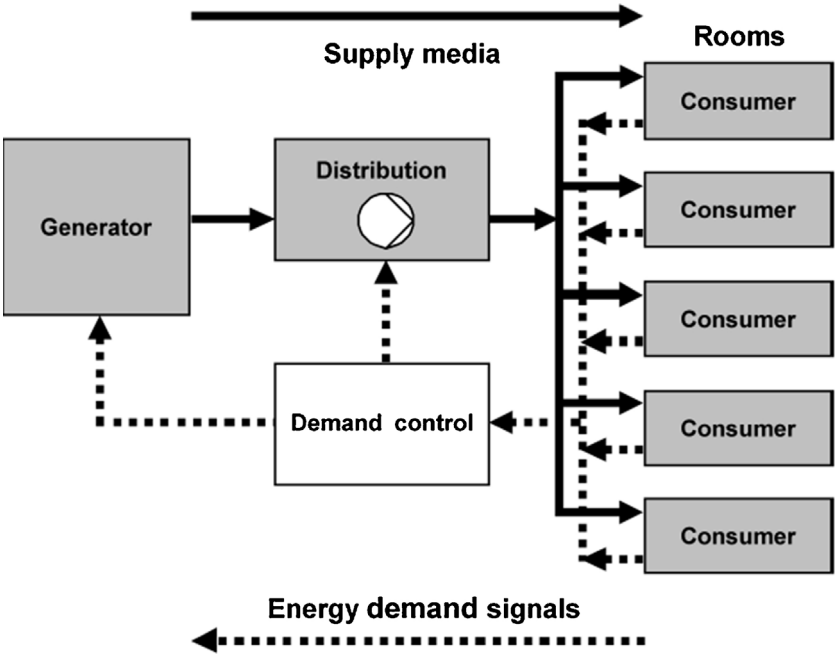

Fig. 1. Demand control according to EN 15232.

the requirements for operation continuously change based on use. These changes in use are driven by changing tenants, adaptation to economic changes, technological changes, generational changes and changing socio-cultural requirements. In addition, technical development cycles are getting shorter and regulatory requirements are increasing. This often results in increased operating and maintenance costs. The reason for rising costs is usually that the supply of energy to the building is not adapted to changing requirements.

A building automation system can be described as sustainable if it can adapt to changes in use over the long term and bring about ecological, social and economic benefits.

The energy-saving potential and life-cycle aspects that can be achieved through building automation are not considered comprehensively enough in current building certifications such as LEED, DGNB, etc.

With the new audit methodology eu.bac System, this gap is closed. The procedure is based on the existing standard EN 15232 [1] and was scientifically tested by Dresden University of Technology. These system audits help to save energy and reduce operating costs throughout the entire life cycle and ensure efficient and sustained operation. The installed equipment is checked periodically. In this way, deviations from the state during commissioning or deviations from the current usage can be identified, allowing corrections to be made (Fig. 2).

Fig. 3 illustrates the effects of regularly audited and optimised operation and a system that is thus adapted to changing use requirements.

Key for Fig. 3:

1. Standardised, energy-efficient functionality
   - Optimal specification of a BA system with the best cost-benefit ratio
2. Guaranteed functionality
   - Using the first audit to check the ordered and the installed functionality
   - Standard handover report
3. Guarantee of sustained operation
   - Guaranteed availability and functionality of the system
   - Compliance with comfort specifications
   - All parameters undergo thorough checks
   - Compliance with the specified energy-efficiency class

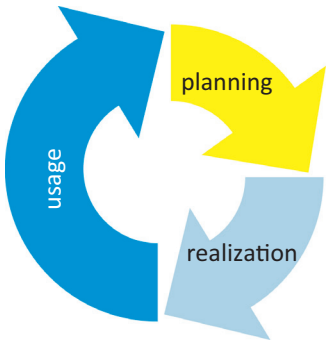

Fig. 2. Life cycle of a building.

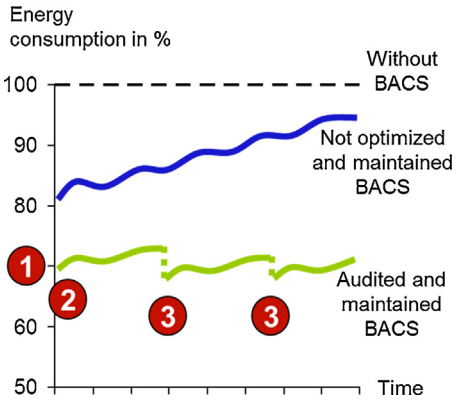

Fig. 3. Illustration of the effect of a system audited and optimised during operation.