



CHADWICK SERVICE

BLOG POST MAY 2018

### **Chadwick Service Company's guide to Building Automation**

A Building Automation System (BAS) refers to an electrical control system used to monitor and control a building's various systems such as HVAC, mechanical, fire safety, flood safety, security, surveillance, ventilation, indoor air quality, humidity controls, indoor & outdoor lighting, plumbing and water use. Adaptive learning capabilities are built into the building automation system to allow it to "learn" from actual building use by its occupants. The aim of BAS is to save energy and reduce maintenance by running systems optimally.

There are many components to building automation and when facilities are controlled and monitored in this fashion, a more comfortable and reliable working environment exists for the employees and/or customers. Additionally, building automation introduces a level of energy efficiency which allows facility management to adopt sustainable practices and reduce energy costs.

The main component in building automation is the "controller", a specialized computer which can regulate each system according to parameters created by building staff, such as running air conditioning during business hours and reducing cooling after hours. The technology may also use adaptive learning to teach itself about the building's use – such as when rooms are being used and when they aren't - and determines how to optimize systems for peak energy efficiency. A building controlled in this way is often referred to as a "smart building".

### **When speaking about building automation, a number of terms are used interchangeably:**

- Building Automation System (BAS)
- Building Management System (BMS)
- Building Control System (BCS)
- Energy Management System (EMS)
- Energy Management Control System (EMCS)
- Direct Digital Control (DDC)

### **The possibilities of building automation**

- Adjust the lighting systems based on time of day and/or occupancy
- Operate HVAC systems more efficiently
- Coordinate various systems within a building to work together to increase overall efficiency
- Optimize how much outside fresh air to introduce to regulate comfort and air quality inside the building



- Instruct the HVAC system to heat and cool rooms independently of each other
  - Respond to a fire warning and immediately disable systems which may pose additional hazard
  - Instantly notify building personnel via email or text of a problem with one of the systems
  - Closely monitor individual egress and access
  - Turn security cameras on and off according to parameters
- And many other possibilities.

Example:

Sensors in an executive office suite detect an increase in temperature in an office that is unoccupied. This knowledge may have been entered into the computer at setup (for instance, no one is typically working at 1:30 AM), or may have been “learned” by the computer based on actual use patterns of the executives. The sensor relays this information to the controller which applies its logic, determines there are no occupants and that there is no need for heat and sends instructions to the HVAC system to reduce heat output. The heating system responds and dials back its heat output. All of this happens in a matter of seconds.

### **How Building Automation Systems Work**

Building Automation Systems (BAS) rely on 5 components:

1. **A dashboard or UI** (user interface) where building personnel input data and monitor systems data.
2. **Communications protocol** which facilitates communications between controllers and sensors.
3. **Sensors** which measure and collect necessary data like temperature, CO2 output, humidity, room occupancy, daylight, air quality and many other parameters.
4. **Controllers** which act as the brains of the system, gathering data, delivering commands, monitoring performance and learning. They are typically programmable logic controllers (PLCs), system & network controllers, and terminal unit controllers.
5. **Output devices called Controls**, such as relays and actuators which execute commands from controllers.

### **Benefits of Building Automation Systems**

#### **BAS save money.**

An energy efficient building costs less to run and utility bills are a substantial expense for any building owner. A Building Automation System can “learn” when a building is occupied and when it isn’t and adjust its lighting, heating and cooling accordingly. Additionally, a building can monitor outdoor conditions and adjust lighting as necessary and use cooler or warmer air from the outside to adjust indoor comfort levels and fresh air. Energy savings with BAS can amount to 5-15% annually.

#### **Data collection and reporting.**



Systems fail, that's reality. A Building Automation System detects system failure immediately and reports it to authorized personnel. If necessary, it will shut down systems to avoid catastrophic failure. That means less time diagnosing and shutting down systems manually by building personnel.

**Optimizing systems means longer life**

Running systems at optimal levels reduces overload and extends system life. That means reduced maintenance and replacement costs and better performance.

**BAS pays for itself over time**

When you figure in the offsets from reduced utility bills, longer system life and less maintenance, a BAS system pays for itself.

**Improved comfort = improved productivity**

When employees are comfortable they're more productive. Employees take fewer sick days when air quality and ventilation are optimal and are better able to focus on their work, boosting productivity.

**Environmentally friendly.**

By reducing energy consumption, building automation systems can reduce greenhouse emissions. BAS can also monitor and control wastewater systems and plumbing systems, improving their efficiency, and record data to validate a building's energy use to qualify for LEED certification.

**Increases property value.**

Building Automation Systems lower utility costs and therefore increase net operating income. This adds to a commercial buildings' value.

**Simplifies building operation**

Computerized monitoring via the user interface shows building personnel systems status at any given time, reducing the need to climb to the roof or go into the ceilings to check on equipment.

**Potentially eliminates business downtime**

Emergency repairs can be very costly, not only in maintenance but in lost revenue if your business must close while repairs are performed. BAS allows you to see where problems are at any given time and address them accordingly before a catastrophic breakdown occurs.

Chadwick Service Company installs and maintains Building Controls and Building Automation Systems. Call us today and let's discuss how much you'll save.

.