



Lighting and Energy Saving Controls group (LaESCg)

Technology, products and systems for saving energy



About

Lighting and Energy Saving Controls group (LaESCg)

The Lighting and Energy Saving Controls group (LaESCg) provides a useful forum in which industry peers can discuss upcoming legislation, input into government policy and help educate and provide best practice to the business energy demand side sector.

The LaESCg encompasses demand side industry sectors with an interest in:

- Lighting - installation, control & retrofit
- Energy Saving Controls - heating, ventilation and air conditioning (HVAC)
- Building energy management systems (BEMS)
- All other building controls associated with energy saving measures.

LaESCg Ethos:

The group supports the effective, professional and transparent approach to supplying products and/or managing Energy Saving projects.

Effective:

Assisting the end user to achieve and maintain significant energy and cost savings in an economically efficient manner.

Professional:

Providing a level of customer care that enhances the reputation of the industry.

Transparent:

Establishing clear and concise information about expected energy savings through the use of technology.

LaESCg Chair:

Julian Kay, Chair, LaESCg

Julian is Managing Director of DANLERS Limited, UK manufacturer of energy saving controls for lighting and HVAC. DANLERS Limited is one of ESTAs longest serving members and has been involved with the organisation since 1991. In his spare time Julian is a song writer and composer as well as a published children's book author.

Chair's Introduction

Every organisation, both private and public sector, needs to control its costs to maintain a healthy balance sheet. Energy costs come straight off the bottom line and the biggest consumers of energy in most buildings are heating, cooling and lighting.

Although simple and easily understood, this wide-ranging statement hides behind it the complexity involved in implementing, managing and sustaining a fit-for-purpose lighting and energy saving control strategy.

The following pages aim to set out and explain some of these complexities before highlighting the ESTA members who have the expertise to deliver a strategy for you.

ESTA's Lighting and Energy Saving Controls group, as explained previously, not only supports an effective, transparent and professional approach to supplying products or services but also, aims to deliver useful information, best practice and advice to industry stakeholders.

I encourage you to read through some of the guidance herein and to task us to provide the right services and technology for your needs.



Julian Kay,
Chair - ESTA LaESCg
and Managing Director, DANLERS Limited

Lighting Controls

Lighting controls make a significant contribution to reducing energy consumption and reducing CO2 emissions e.g. by between 40% and 80% on lighting consumption, which could be 20% to 40% on the total building consumption.

All lighting controls (stand alone, dedicated lighting control systems, converged systems) need to be explained in a concise manner without reference to 'sophisticated, complex technology'.

Different types of buildings and users require different lighting control solutions. There are economic, practical solutions suitable for ALL applications – from large offices through to industrial sites, small shops, care homes and domestic premises as well as in external and display lighting applications.

Lighting controls should make the lit area habitable, productive and comfortable for occupants.

Installations should allow flexibility on office re-organisation.

Whilst safety issues are paramount, lighting controls should predominantly be based on presence detection and light level control, coupled with readily available manual adjustments.

Examples of Control methods and protocols

Switching

ON/OFF switching of the electrical load via a switch or relay.

Phase dimming

Dimming or brightening the lighting by altering the waveform of the electrical supply to the lighting load.

Analogue dimming

Dimming or brightening the lighting by providing a 1-10VDC input to an appropriate ballast.

Digital dimming

Examples are DALI (Digital Addressable Lighting Interface) and DSI (Digital Serial Interface). Dimming or brightening the lighting by providing a digital input to an appropriate ballast.

Categories of Lighting Control:

1. Stand alone switches/controls

A control which can switch a circuit directly. May be wired in parallel with other stand alone controls or control adjacent circuits through simple slave contacts.

2. Lighting control systems

A system typically comprises centralised relays and/or dimmers with slave inputs such as occupancy switches, photocells or manual actuators. Such centralised controls can control many circuits. Slave inputs can also be linked to building management services.

3. Building management services

A building management system which can control many electrical services within a building.

1. 'Stand Alone' Lighting Controls

Stand-alone is the term used for a single control which controls a single lighting circuit (although slave relays can also be used for controlling neighbouring lighting circuits). The most common of these types of controls are described below.

Occupancy detectors/switches

These products detect the presence of people in the specified detection area. There are various technologies, most commonly passive infra-red, microwave, ultrasonic and/or sound detection. Usually the occupancy detector or switch also includes an adjustable photocell or daylight-linked dimmer, so it takes into account ambient light levels as well as occupancy.

Photocells

A photocell detector or switch switches the lights on or off in response to ambient light levels.

Daylight-linked dimmers

A daylight-linked dimmer dims or brightens a dimmable lighting load in response to ambient light levels.

Time lag switches

These products are switched on manually, and switch off automatically after a chosen time lag has elapsed.

Remote controls

Wire-free fixed or hand held senders can send signals to receivers which switch or dim an electrical load.

Dimmer switches

These products enable manual dimming and brightening of a lighting load by a building user.

Time switches

These products provide automatic timed switching of electrical loads, according to a pre-set schedule.

Combined functions

The previously mentioned functions can be combined in the same product. For example, a remote control can be used to send a signal to make a control switch on for a set time lag.

Smart controls

Smart controls bridge the gap between stand-alone controls and lighting control systems. They offer the installation simplicity of regular stand-alone lighting controls, yet with many more complex functions and programming options.

Advantages of stand-alone lighting controls

The main advantages of stand-alone lighting controls lie in their simplicity and relatively low cost, leading to shorter payback periods from energy saving.

2. Lighting control systems

Lighting control systems are area-wide or building-wide connected networks of lighting control.

The systems themselves incorporate the sensors mentioned earlier, such as PIR, Microwave and photocells in addition to switches or touchscreens used in standalone controls. These individual system elements are then typically connected via controllers and network switches to provide a building wide solution. They use either common control protocols such as DALI or proprietary protocols specific to individual vendors.

There are a range of different topologies for lighting control systems. Some use room level controllers (intelligent lighting control modules) networked together which often distribute the electrical circuit as well as the control circuit.

Other systems such as DALI run a low voltage bus circuit from a central riser based controller or switch that can accommodate up to 64 devices; lights, sensors or switches per bus circuit.

Control systems typically require more involved commissioning and maintenance than standalone solutions.

Advantages of lighting control systems

Lighting control systems offer all the benefits of standalone controls but also give a range of additional benefits as outlined below:-

- They offer flexibility if an area changes usage or layout as the system can be reconfigured easily to accommodate such changes.
- They enable the easy linking together of areas, such as rooms and the corridors outside them to provide comfort and safety to building users.
- Central visualisation and control of the system from a head end PC application.
- Integration with BEMS and HVAC systems to provide greater energy savings and common control of building comfort systems.
- Automated emergency lighting testing to ensure this life critical system is tested in line with safety standards.
- The provision of predictive maintenance regimes to enable lights, ballasts or drivers to be managed cost effectively at end of life.

3. Internet of Things Lighting control systems

With the emergence of the Internet of Things and ongoing developments in communication protocols, a new generation of lighting control systems is becoming established in the market.

The distinguishing feature of these systems is that, apart from mains power supplies, they require no physical cables to transmit power or data between the lighting controls and the luminaires.

These systems are typically commissioned via a mobile device or desk-top computer, can be remotely monitored and can store data, such as energy use, on the cloud.

The lights can be controlled by occupancy detectors, photocells and manual switches, by using mobile devices and/or according to programmed schedules. These systems can typically control light states (ON/OFF), dimming levels, light colour and colour temperature, and they usually include scene setting functions.

ZigBee

In a ZigBee based system, the ZigBee devices (lighting controls and luminaires) form a mesh network in which instructions are passed around all devices. Both commissioning and monitoring the system are carried out via a ZigBee gateway and a Wi-Fi router.

Bluetooth Low Energy

Similarly, in a Bluetooth Low Energy system, all the enabled devices (lighting controls and luminaires) form a mesh network in which instructions are passed around all devices. Monitoring can be performed via a Wi-Fi gateway. However, commissioning can be carried out directly via any of the devices in the Bluetooth network, without having to use a gateway.

Powerline Communications

A Powerline Communications system uses the existing mains wiring to transmit signals between lighting controls and luminaires. Commissioning and monitoring are both carried out via a gateway.

The advantages of these newer systems over conventional, wired systems are as follows: With no need for cables between the controls and the luminaires, there are savings in installation time and in the cost of materials.

There is even greater flexibility on change of use in buildings, as systems can be recommissioned electronically, without the restrictions that would be posed by the physical wiring arrangements.

4. Building management systems

Building Energy Management Systems

Control of plant and lighting is the most important energy efficient measure. It is generally better to control inefficient plant correctly, than install efficient plant and let it run out of control.

Upgrading controls (or their strategy) is often the single biggest improvement that can be made to enhance the energy efficiency of existing buildings.

Common problem:

Although the controls maintain the building at the correct environmental conditions (specifically temperatures) they might reduce performance and increase consumption if not programmed with energy efficiency in mind.

BEMS Software Programming Control

Converting (re-programming) a Building Management System (BMS) into a Building Energy Management System (BEMS) is very cheap and can promote massive savings.

Basic time control

Ensures that plant only operates when needed. A seven day program allows individual days to be programmed, and with the use of exceptions engineers can programme in a single event, following which the system automatically reverts to the standard time schedule.

Using Optimum start / stop

It is usually necessary for a building's HVAC systems to operate for a period of time before people arrive in order to get the building up to its normal occupied temperature. This is known as the warm-up period. Optimum start is an intelligent control that learns how the length of warm-up period relates to outside air temperature and switches on the HVAC plant accordingly.

On-Demand heating and cooling

Plant should only operate when required with reasonable demand levels. It is vital that simultaneous heating and cooling of the same area is avoided.

Sequencing

HVAC plant should be sized to allow an incremental build-up to maximum demand, rather than, for example, specifying a single large boiler sized at 100% capacity. In this way, heating (or cooling) output can be made to match demand much more closely.

Linking to External ambient Temperature: Deadbands

The difference between heating and cooling set points is known as the deadband, i.e. the temp range where the system remains idle. Only when the heating or cooling set points are exceeded will the system re-activate. The deadband can on occasion be widened; for instance in winter, when staff come in wearing warm clothing, the setpoint for heating can be reduced by 1 or 2°C, and similarly the cooling setpoint can be adjusted in warmer summer months.

Set points

Having both heating and cooling setpoints being offset by external weather conditions, either reducing the temperature set point by 1°C whilst in heating or increasing it by 1°C whilst in cooling mode can save as much 10% of the energy consumption.

As recommended by CIBSE, to look at a set point of 21 deg. C +/- 1 deg. C in the winter and 23 deg. C +/- 2 deg. C in the summer months, this can be automated with a BMS.

Disabling boilers and chillers on ambient temperature when possible.

When Outside Ambient Temperature (OAT) > 16 °C, disable boilers and / or perimeter heating and there is a potential of isolating cooling when OAT < 13 °C (This is not always suitable in buildings like Data Centres).

Heating Compensation - Compensated flow temperature

Both heating and cooling systems can work with compensated setpoints. If loads are low then reducing flow demand will increase system efficiency.

Cooling Compensation (Delta T Reset)

If the Return Temperature drops, then the cooling demand is lower than design value, so the Flow Temperature can be allowed to increase (as this makes the chiller run more efficiently).

Delta T	Flow Temp
>5°C	8°C
>4°C	9°C
>3°C	10°C

Free cooling

Optimise the required temperature from Air Handling Units (AHUs) to maximise the use of free cooling. Can include using AHUs to purge during unoccupied periods.

Chiller water systems

Optimise chillers (when possible) to maximise time in free cooling mode, including lifting setpoints when demand is low. Free coolers can easily be retrofitted to existing chilled water systems.

Anti-cycling

Where heating and cooling systems are operating very close to their set points, they will tend to operate in short bursts as the set point is continuously met. To allow the BEMS to hold off for longer, the units should be controlled by return temperature value as well as the supply temperature.

Zone Control

All heating and cooling equipment in one area should be grouped and controlled together to prevent them fighting against each other. However, separate areas with separate needs should be controlled independently.

Calibration

It is very important to ensure that the sensors of the BEMS are calibrated regularly. The BEMS controls the systems according to its numerous sensor readings; therefore the control sensor should always take priority in BMS Planned Preventative Maintenance (PPM).

Variable Speed Drives

(VSDs) are installed to save energy by reducing motor speeds. They can be generally fitted to motors > 5kW. Any type of control relating to temperature, pressure and/or CO₂ should be considered for its ability to maximise energy saving. Controls can also be used to reduce a motors speed (where oversized). A small speed reduction will save energy in proportion to the cube of the speed.

Building Analytics

There are varying forms of building analytics, these automatically trend energy and equipment use, identify faults, provide root-cause analysis and prioritise opportunities for improvement based on cost, comfort, and maintenance impact. This software complements BEMS dashboards because it takes the critical next step of interpreting the data — showing not just where, but why, inefficiencies occur. This provides actionable information for troubleshooting and preventative maintenance, as well as for solving more complicated operational challenges.

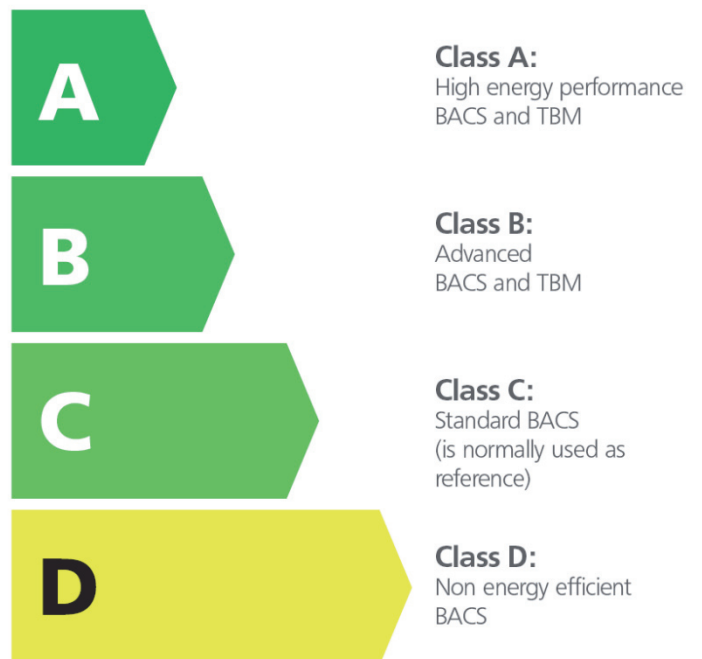
Energy Saving Controls

BS EN 15232

BS EN 15232 is a standard for building controls, concerned with energy efficiency and occupant comfort. It includes a list of controls and building automation technologies that have and impact on energy use in buildings, plus a method to define minimum requirements for controls in different types of buildings, including offices, hospitals, schools, retail and restaurants.

The British Standard also has a series of classes representing different levels of control of the energy performance. Class D are non-energy efficient controls, whilst C are considered as standard and are used as the reference point in EN 15232; B are advanced and A high energy performance.

Energy Performance Classes



Note: The Standard terms Building Automation and Controls Systems (BACS) and Technical Building Management Systems (TBM) are known as Building Management System (BMS) and Building Energy Management System (BEMS) respectively in the UK.

How can Controls be used?

Controls can be used to manage heating systems, cooling systems, air conditioning systems, lighting systems and blinds – as well as fire and security systems and lifts. They can also be used to directly collect data from meters. Energy data can then be displayed on the BEMS; having good quality data about actual energy consumption is the key to achieving an energy efficient building.

Choosing a class of Controls

When choosing a class of control you need to also consider what else the controls can do, what type of control you need and the technologies available.

The range of building control technologies - Control & Uses and applications

Building management system (BMS)	A BMS is a computer-based system which integrates building functions, i.e. heating, ventilation and air conditioning (HVAC), fire, security, power systems and lighting	Available in pre-programmed or programmable formats	Systems are available for all types of businesses and sizes of buildings
Building energy management system (BEMS)	BEMS control and monitor plant such as lighting and HVAC in order to specifically address energy use	BEMS does not integrate all control systems as a BMS does, i.e. control of security and fire protection systems is not normally included	
Demand control or zone control	Demand control enables the HVAC system to operate until the demand is satisfied, e.g. cooling, hot water, radiators and air handling	Demand control can be linked to CO2 sensors or footfall sensors	Allows the building to be separated into zones in which services are supplied and controlled as required
Sequencing	Sequencing can be a stand-alone control or via the BMS/BEMS	Controlling the number of boilers required to meet the current heating load of the building	
Weather compensation	Controlling the indoor temperature of the building independently of increases or decrease in outdoor temperature	Enables energy savings to be achieved by reducing the heating system's operating (flow) temperature	
Boiler load optimisation	Stand-alone control which prevents boilers from dry cycling and reduces energy costs	Boiler optimisation can be programmed as part of the BEMS and some have a standard strategy package to do this	
Optimum start/stop	A time schedule should be set up to control plant and equipment to fit in with the occupancy of times of a building. This time schedule will also be used to provide optimum start (and stop) of the HVAC plant to ensure comfort conditions are achieved for the start and finish of occupancy		
Occupancy controls	Mainly used in lighting systems, though they can also be used for fast-response extract fan systems in bathroom areas	There are typically four types of sensors: passive infrared (PIR) sensors, ultrasonic sensors, microwave sensors and audio sensors	
Variable controls	Controlling the speed of drives and fans when full speed is not required will deliver cost savings		
Interlock controls	Prevents unnecessary energy use and plant operation	For example, if doors or windows are opened, sensors detect this and the interlock controls prevent the boiler(s) or air conditioning from operating	

Good practice and specifications

Class B control is generally accepted as providing good practice, which can be programmed to maintain environmental conditions within pre-set limits that reflects occupation schedules, occupation status as well as the level of activity in each zone.

Use of the Building Environment Zone Controls criteria in the UK Energy Technology List (ETL), and the summer/winter change-over functionality and 365 day programming, as defined in BS EN 15500, will cover the Heating, Ventilation and Air Conditioning (HVAC) requirements of Class B.

How to control lighting

Extra requirements will have to be added when other types of equipment are controlled, for example: Lighting control; Automatic monitoring and targeting equipment; Commercial refrigeration

equipment system controls and Air compressor master controllers.

Lighting controls are technology specific; and are products that are specifically designed to switch electric lighting on or off and/or to dim its output. In addition to the functionality covered by the building environment zone controls, lighting controls cover presence detection and daylight detection – with and without dimming.

How to specify controls

Again the UK Energy Technology List (ETL): www.gov.uk/guidance/energy-technology-list criteria – can be used when specifying lighting controls, heating management controllers and Variable Speed Drives (VSDs). These should be added to the Class B control requirements where appropriate.

Please remember that, if you specify a class under BS EN 15232, the whole of the building must have that level of control to be compliant with the standard.

The use of this standard and the estimation of savings on a case-by-case basis is an expert's job. If required, the European Building Automation and Controls Association (eu.bac) has a certification scheme based on BS EN 15232. The purpose of this scheme is to ensure that a system's extensive features and functionality, in terms of energy-saving measures, are installed and used to their full potential over the lifetime of the system.

What next?

Once you are ready to implement your lighting and controls strategy, it's a good idea to get expert help (although, due to the complex nature of this technology area and its application, you may choose to engage this earlier).

ESTA Members (here covering Lighting and Energy Savings Controls) have the skills and experiences for all your energy management needs.

Make our directory, your one-stop-shop for your energy efficiency expertise ->



ABB Limited

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ABB is a global leader in power and automation technologies that enable customers to improve performance while lowering environmental impact.

ABB Low Voltage Products and ABB Discrete Automation and Motion have technologies for all markets including residential, commercial and industrial, focusing on Energy efficient solutions in both buildings and processes.

Lighting and lighting control | Daylight linking - switching / dimming | Intelligent luminaires | Lighting control network systems | Occupancy control | Remote wireless lighting controls | Scene setting | Stand alone lighting controls [timers; dimmers]



Armstrong Fluid Technology

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Quality assurance (UK): ISO 9001-2000, ISO 14001

Armstrong is a leading designer and manufacturer of HVAC equipment, packaged systems and integrated plant rooms. It also leads the market in the area of low and zero carbon solutions with expertise in the integration of any combination of biomass, heat pumps, solar thermal and condensing boiler technology.

Control equipment and systems | Boiler and burner management | Intelligent HVAC controllers | Stand alone HVAC controls



Arthur McKay & Co Ltd

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Arthur McKay is a specialist Building Support Services Group established in 1958. Arthur McKay has developed through sustainable growth, into a business of 950 employees with circa £100million turnover per annum. We currently deliver professional Building Services Solutions to the public and private sectors throughout the UK. Our services include; Principal Design, Project Management, Capital & Refurbishment Project Delivery, Integrated Facilities Management, IT and Networks solutions.

BEMS integrated lighting control | Daylight linking - switching / dimming | Intelligent luminaires | LED lighting | Lighting control network systems | Luminaires and light fittings | Occupancy control | Remote wireless lighting controls | Scene setting | Stand alone lighting controls [timers; dimmers]



Chalmor Limited

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Chalmor has over 30 years expertise in heating and lighting systems to UK organisations of all sizes and in all markets. It is a one-stop shop supplier of heating control solutions and turnkey energy saving lighting, with a specialty in Retrofit projects. It has a reputation to deliver projects on time, to specification and to the highest customer satisfaction. Chalmor is an accredited Carbon Trust supplier.

Its customers benefit from the (predicted) lowest energy usage and cost, with fit for purpose lighting and heating at the right level of comfort for an organisation's users.

Control Equipment And Systems | BEMS Building energy management systems | Integration software | Intelligent HVAC controllers | Sensors, valves and actuators | Stand alone HVAC controls | Lighting And Lighting Control | Daylight linking - switching / dimming | LED lighting | Lighting control network systems | Luminaires and light fittings | Occupancy control | Remote wireless lighting controls | Scene setting | Stand alone lighting controls [timers; dimmers] | Low Energy Heating Controls



Clover Controls Ltd

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Clover Controls was established in 1992, and are System Integrators in the field of intelligent environmental controls. A full turnkey solution can be offered for the design, supply, installation and commissioning of intelligent control systems for heating, ventilating and air conditioning applications.

Clover Controls became the first systems company based in the North East of England to become a Trend Technology Centre, and are also Regional Partners for the TAC UK range of Xenta LonWorks controllers. Specialist in-house software skills have enabled the company to become respected as true system integrators, offering customised software solutions to fully integrated intelligent products from different manufacturers, thereby solving the most complex of problems for the building user.

In addition, they are able to offer a full after sales service comprising of a wide range of maintenance packages, including twenty four hour, seven day, emergency cover.

Lighting and Energy Saving Controls group (LaESCg) - Member Directory

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lighting architects reconnecting people to places using light

Connected Light

David Lakey, Business Developer

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At Connected Light, we have spent 30 years turning this vision into a reality through a powerful choice of products, projects and proofing expertise. As one of the UK's leading lighting experts we deliver powerful outcomes to public and commercial businesses..

BEMS integrated lighting control | Daylight linking - switching / dimming | Intelligent luminaires | LED lighting | Lighting control network systems | Luminaires and light fittings | Occupancy control | Remote wireless lighting controls | Scene setting | Stand alone lighting controls [timers; dimmers]



CP Electronics

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CP's philosophy is to design, develop, manufacture and support world-class lighting controls. It also seeks to bring innovation, quality and expertise to a wide range of markets throughout the world, working with any light-source, any building, and any space.

CP Electronics have 50 patents within its product range - significantly higher than the industry average. Core products range from single standalone detectors to fully addressable lighting control systems.

Control equipment and systems | BEMS Building energy management systems | BEMS supervisory software | Intelligent HVAC controllers | Sensors, valves and actuators | Stand alone HVAC controls | Lighting and lighting control | Daylight linking - switching / dimming | Lighting control network systems | Occupancy control | Remote wireless lighting controls | Scene setting | Stand alone lighting controls [timers; dimmers]



DANLERS

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DANLERS Limited is committed to the design and manufacture of innovative energy saving products across a wide range of applications, from large commercial end users to domestic applications and to providing high quality service and support to those customers. The product range includes occupancy switches, photocells and dimmers, time lag switches and remote controls.

The DANLERS philosophy is to design high quality, reliable products that are straightforward to install and generally use the existing wiring, making them suitable for either retrofitting or new installations keeping costs to a minimum and ensuring rapid payback. Control projects can be tackled room by room or area by area, providing flexibility for budgeting or logistical requirements.

Stand alone HVAC controls | BEMS integrated lighting control | Daylight linking - switching / dimming | Occupancy control | Remote wireless lighting controls | Scene setting | Stand alone lighting controls [timers; dimmers] | ETL Lighting Controls



Essential Control

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Combined BMS/aM&T Solutions
Proprietary energy control, monitoring and metering technology that complements our customers energy, CO2 savings, legislative compliance and comfort control objectives. Flexible and fully scalable solution.

BEMS Building energy management systems | BEMS supervisory software



MS Electronics Limited

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We at MS Electronics are driven to design and manufacture innovative, high quality and reliable Energy Saving Controls to efficiently and effectively manage energy use for the benefit of the environment, to reduce your carbon footprint, to secure you lower energy bills and to equip you with better efficiencies to control your energy usage.

We design and manufacture all our products on-site in Essex to the highest of standards and are so confident in the reliability of our products that we provide a 5 year guarantee on all products. With our own in-house design team we can be very flexible and responsive to your individual requirements through our bespoke design and customisation services.



SavaWatt Controls

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[Control Equipment And Systems](#) | [Refrigeration control](#) | [Ventilation control](#) | [Lighting And Lighting Control](#) | [LED lighting](#) | [Luminaires and light fittings](#) | [Remote wireless lighting controls](#)

Life Is On



Schneider Electric Limited

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Schneider Electric offers a comprehensive solution to your entire building requirement, from power distribution and monitoring to complete Building Management Systems. Schneider Electric can provide added value benefits for your buildings through energy efficient solutions, ensuring total flexibility for modifications during the life cycle process.

[BEMS Building energy management systems](#) | [BEMS supervisory software](#) | [Integration software](#) | [Intelligent HVAC controllers](#) | [Process control systems](#) | [Sensors, valves and actuators](#) | [Stand alone HVAC controls](#) | [Ventilation control](#) | [Lighting And Lighting Control](#) | [BEMS integrated lighting control](#) | [Daylight linking - switching / dimming](#) | [Intelligent luminaires](#) | [LED lighting](#) | [Lighting control network systems](#) | [Luminaires and light fittings](#)

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<http://www.bre.co.uk/energyguidance>

About ESTA (Energy Services and Technology Association)

ESTA is the UK authority on demand side energy management, with over 30 years' experience as a not-for-profit organisation owned by its members. We are continually dedicated to supporting a growing membership base to deliver:

- a platform and voice for demand side energy efficiency
- a network of service & technology providers with a common goal
- an aware, engaged & participative membership
- high quality thinking to shape the agenda for the industry

ESTA has a long-term commitment to reducing energy consumption through the application of technology and expert services. In order to achieve this we are heavily involved in promoting the economic benefits of energy demand reduction through efficiency and management.



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