

What's Hanging Over Your Head?

Emergency lighting and the true cost of constant

With so much to contend with in the logistics and industry environment, emergency lighting can be an overlooked component. In today's always-on economy, downtime is at a premium and as 24/7 production and delivery become increasingly common, finding available slots for maintenance and testing in the facility's natural downtime cycle becomes more challenging. Maintaining the emergency lighting system is critical, however, to ensure the safe, efficient and compliant running of any facility. It should be considered an integral part of a facility's ongoing operations and managed and reviewed accordingly. Unfortunately this approach is not consistently adopted across all industries.

The built environment of the logistics and industry sector has evolved significantly over the last decade, reflecting the changing way that goods are produced and distributed. Vast warehouses are fast becoming an established part of the industrial landscape, and existing infrastructure is refurbished or retrofitted to keep pace with developments. Advances in

luminaires and emergency lighting products as well as technological innovation are combining to support ever more efficient facilities. At the same time, the regulatory and legislative background is changing. Safety standards are being raised and the need to maintain a compliant emergency lighting system is essential. More widely, the energy performance of buildings is continuing to improve, influenced by the Energy Performance of Buildings Directive, and this in turn is having an impact on the widespread adoption of energy efficient lighting and emergency lighting.

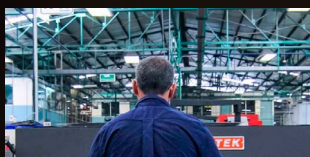
This eBook makes the argument that improving safety regulations and the availability of more efficient lighting systems present an opportunity for logistics and industry professionals to review, refurbish or retrofit their emergency lighting to the benefit of their overall operations. New financing models that reduce risk are available to enable this, while smart technology delivers optimised systems with minimal maintenance and wider analytics.



Set up to fail

Establishing infrastructure that complies and contributes

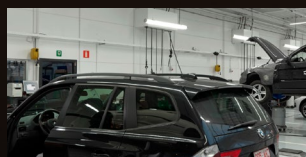
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Lighting the way to Energy Efficiency

Updating and renovating industrial infrastructure in Europe

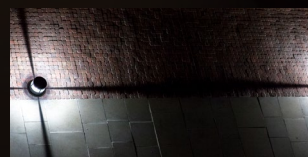
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A Smarter Play

Creating connections to achieve strategic goals

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Smarter Approaches to Financing

Financing upgrades with more flexible solutions

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Set Up to Fail

A regulated area

Throughout Europe, emergency lighting is a required part of a building's lighting infrastructure. It helps to ensure occupants are able to evacuate a building quickly and safely by directing people to appropriate emergency exits and that illumination is maintained in working areas in the event of normal electrical failure. There are minimum legal standards that industry must adhere to and these are detailed in the European standard EN 1838:2013, lighting applications – emergency lighting. Member states may stipulate more rigorous requirements through local directives, as is the case in the UK for example, where a minimum duration of three hours for emergency lighting in the event of a supply failure is called for, over and above the one-hour duration in the European standard.

Emergency lighting is essential for the establishment of a safe working environment and it is a clearly regulated area. Research shows, however, that despite the legal and moral obligation to install and maintain emergency lighting, failure rates are high. Much of this is attributable to businesses failing to update their safety systems following refurbishments, including ones where internal areas are reorganised, as well as a tendency to focus on the initial expenditure of emergency lighting above ongoing maintenance and testing. Neglecting this component of the working environment may mean that organisations are falling foul of the law, however, and instances are already emerging within Europe of businesses being prosecuted for breaches of health and safety in the area of emergency lighting and large fines being issued.

Emergency lighting in all European countries must be maintained to meet the regulatory requirements of EN 1838:2013

56%

of European businesses fail to update their safety systems after internal reorganisation

55%

of firms focus on initial expenditure for emergency lighting rather than also considering ongoing maintenance

in almost

40%

of sites visited by contractors, broken or inadequate emergency lighting was reported

Top five emergency lighting maintenance issues recorded at sites by electrical contractors were:

44%
Broken or faulty lamps



42%
Inadequate logbook records



39%
Inadequate emergency lighting signage



35%
Batteries not charged



25%
Inadequate lux levels



The Cost of Failure

Failure to not only correctly install but also maintain and test appropriate emergency lighting and signage within a commercial working environment means organisations are not meeting required European standard EN 1838:2013.

Emergency lighting in all European countries must be maintained to meet the regulatory requirements of EN 1838:2013

One hour is the minimum duration of batteries for European emergency lighting. Country-specific requirements may differ so check local standards.

Full duration tests of emergency lighting systems must be carried out annually and documented with appropriate records

Making the first move

When it comes to emergency lighting there is a straightforward first step for businesses to check to ensure their system is functioning energy-efficiently and cost-effectively. This is that their emergency lighting is operating using an LED-based rather than an incandescent-based system. While the benefits of LED lighting are widely understood and accepted, and certainly within new buildings are a given, there is still a need for older industrial premises and logistics warehousing to undertake this transfer. Lighting typically represents 30% of overall energy consumption for a business and with incandescent lighting consuming a massive 75% more energy than its newer LED counterpart, there is an immediate incentive to make the switch. Old technology is rapidly being overtaken by more energy efficient and cost effective lighting products and control systems. Keeping up-to-date with these developments will deliver immediate commercial returns.

Considering LED-based systems in the context of emergency lighting is important. The failure rate for metal halides is significantly higher than LED which has an impact not only on cost but also maintenance and safety too. Metal halides can deliver varying, and in some cases, poor levels of illumination whereas reliability is an essential factor if an emergency situation is faced. As LED products and systems continue to mature, the limited control offered by a halide-designed network cannot be upgraded to reflect the new capabilities of smart-based technologies. This is particularly relevant to the area of testing and maintenance of emergency lighting, with LEDs able to work with smart systems to deliver easier testing through remote and automated offerings.

Lighting typically represents 30% of overall energy consumption for a business



Lighting the way to Energy Efficiency

More energy efficient lighting

With an estimated 35% of the European Union's buildings over 50 years old and almost 75% of building stock classed as energy inefficient, there is a clear need to update and renovate existing industrial infrastructure in Europe. The Energy Performance of Buildings Directive (EPBD) 2010 is an important piece of legislation that supports the move towards creating more energy efficient buildings in the European Union through targets such as requiring all new buildings to be 'nearly zero energy buildings' (NZEB) by 2020. It is an evolving piece of legislation, changing to keep pace with innovation and to ensure targets are appropriate and reflect current thinking. April 2018, for example, saw the latest round of amendments approved by the European Parliament which included areas such as encouraging the use of information and communication technology (ICT) and smart technology to boost energy efficiency and building control which has a direct impact on emergency lighting systems, as well as strengthening long-term building renovation strategies. The trend towards more stringent energy legislation with increasingly demanding safety standards continues, so reviewing emergency lighting will support businesses in remaining compliant and reducing energy costs.

Renovation is also an important consideration. The European Commission estimates that only between 0.4% and 1.2% of building stock is renovated each year. This could mean that many businesses are missing out on the commercial benefits of improving the energy efficiency of their buildings as well as potentially falling behind with compliance.



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Lighting and emergency lighting typically represent around 39% of commercial electricity consumption, so any efficiency gains able to be secured in this area will have a significant impact on both enhancing efficiency levels and reducing operating costs. Renovation must also include maintaining, and where appropriate updating, emergency lighting systems to remain fully compliant with standard EN 1838:2013. Depending on

the scale of the project, retrofitting offers a cost-effective and low risk route to lighting efficiency upgrades without any major alteration to the building. From new build to large-scale renovation to more modest retrofitting, the important takeaway is to ensure that energy efficient lighting, including emergency lighting systems, are as up-to-date and compliant as possible.

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Testing times

Compliance is not a one-off achievement, it is a process. This is particularly true of emergency lighting which is integral to the provision of a safe working environment. Clear guidance on the frequency and requirements of emergency light testing exists for each territory within the EU. Although this may vary within individual countries, the minimum requirement is for facilities to maintain an EN1838 compliant

system. Emergency lighting is required to remain illuminated when the normal electricity supply goes out to ensure the safe evacuation of all people from the building. In terms of testing and remaining compliant, a full duration test must be carried out at least annually. The variance is the duration of the test depending on the minimum battery life stipulated.

Compliance is not a one-off achievement, it is a process



Emergency Lighting Testing Procedures

Recommended schedule for testing emergency lighting:		
Daily / weekly tests	Monthly	Annually
Check all charging indicators are on and indicate normal levels.	Each emergency light should undergo a short duration test, via a controlled power cut. After completion of this test all charging indicators should be checked as in the daily / weekly test.	Each emergency light must be tested to the full duration of the battery rating. This does not necessitate the testing of the entire system at once however, a schedule can be drawn up to spread the testing to accommodate zonal requirements and uptime of the individual facility.

Despite clear guidance on the frequency and requirements of emergency light testing, anecdotal evidence is backed up by statistics that it is often not maintained, or tested, to the relevant standard. As governance becomes more stringent and penalties more severe for those facilities failing to carry out the correct procedures, this is an area in which many businesses need to improve. There are multiple ways in which the laws for emergency lighting can be broken, from failing to do a risk assessment to not keeping up with the latest standards, to not carrying out – or correctly documenting – testing. After any facility refurbishment, the emergency lighting system should always be reassessed to ensure it is correctly arranged and still compliant.

Heavy fine for Tata Steel

In the UK, Tata Steel was fined £200,000 after lighting failed completely during an accident in which 300,000 tonnes of molten metal was spilled in a factory in Wales. As a result of the post-incident investigation, Tata implemented improved lighting at its facility.

The true cost of downtime avoidance

Testing is not a tick-box exercise to remain compliant, it is a way of identifying maintenance issues and any required upgrades and is key to preventing incidents. If testing indicates regularly that maintenance is required then consideration should be given to whether fitting an upgrade, through retrofitting or otherwise, is more cost-effective. Ad hoc, little and often maintenance when lighting and emergency lighting fails can add up to a significant amount of downtime and cost. The true cost of maintenance needs to take into account not only maintenance costs, which often include additional machinery such as cherry pickers for high-ceiling warehouses, but also lost productivity through downtime, both individual and incremental. These piecemeal fixes can add up to more than the cost of either retrofitting upgrades or installing a new lighting solution to reduce maintenance and benefit from increased reliability and energy efficiency. This is an opportunity to increase uptime, reduce costs and insulate the business from regulatory fines and penalties for breaches in safety in one go.

A Smarter Play

Smarter lighting and business analytics

Smart technology is creating better connections to enable more efficient operations across many diverse areas of business, and this includes lighting and emergency lighting systems. Within the logistics and warehousing sector, the ability to take advantage of new smarter products was initially hampered by a reliance on wired systems which degrade over time and are disruptive to replace. Not only was the installation upheaval perceived to be too great for upgrading cabling infrastructure, particularly given the size and scope involved, but add in concerns around cost and security and the returns on investment were deemed not worthwhile.

Wireless infrastructure has transformed this thinking, encouraging more rapid take up of smarter-based intelligent lighting systems and as a consequence transforming the applications of and benefits from smart technology. Open architecture has allayed concerns over cost, enabling commercial operations to add-on to existing infrastructure and benefit from wireless installations without the need to overhaul complete systems and avoiding the necessary downtime this would bring. This has also meant that logistics operations and industrial companies can scale up lighting infrastructure as and when it becomes available, plugging-in compatible products that enhance the functionality and deliver the analytics that a smart-based technology lighting network can provide.



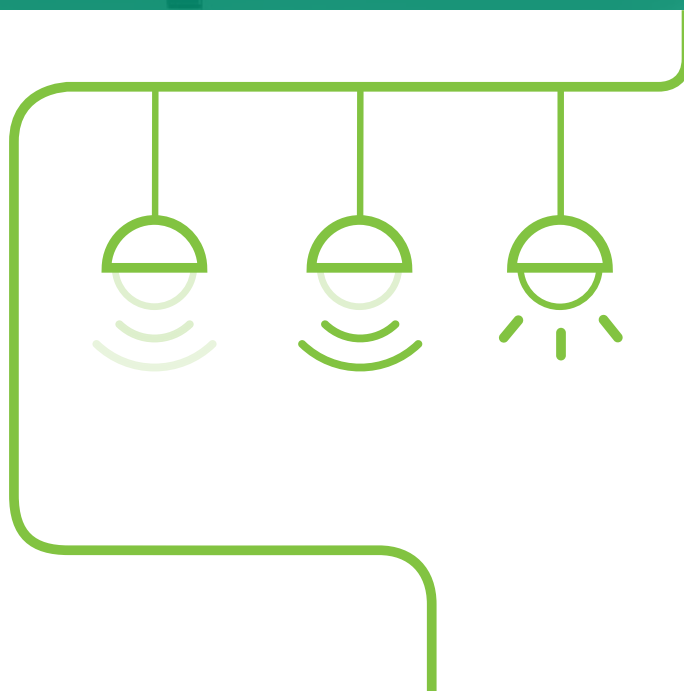
Taking advantage of intelligent lighting control systems can save businesses up to

87%

Smarter lighting is able to support a business in achieving its strategic goals and improving the efficiency of its overall business operations. In the context of warehousing, these developments are especially relevant, both in terms of sensor-driven lighting but also at a more advanced level in terms of analytics. The big data collected through the lighting system becomes valuable once analysed to reveal the usage of building spaces. In the warehousing sector this helps companies understand which parts

of the warehouse are used more often than others and as a result enables them to change the position of the most frequently requested goods to minimise travel time for workers and directly improve day-to-day operational efficiency. The occupancy analytics and intelligent control provided by smarter lighting systems can also identify bottlenecks in production and track how assets move through the building to increase the efficiency of production, packing, deliveries, storage and distribution.

The evolution of smart and the growth of the Internet of Things (IoT) continue to unlock new possibilities from lighting systems



Smarter lighting capability

Emergency lighting also benefits from smarter-driven functionality. Intelligent systems that automate testing and detection requirements for emergency lighting eliminate the need for lengthy, intensive and also costly fault searching. This not only benefits business operations but also provides the reassurance that a building is both compliant and safe.

Emergency lighting systems that offer remote monitoring and live system status to provide diagnostics in real-time make it even easier for facilities managers to have an overview of single or multiple sites at any given time and also to be alerted should indicators change. Instant system status diagnostics means problems are identified and dealt with quickly to maximise the uptime of business-critical operations.

Mobile-enabled controls are essential in today's always-on workplace, allowing facilities personnel to monitor lighting and emergency lighting from their individual device anywhere and at anytime.

The evolution of smart and the growth of the Internet of Things (IoT) continue to unlock new possibilities from lighting systems. From smart-enabled luminaires that automatically detect the surrounding conditions and set the light output accordingly to systems that automatically commission themselves through learning patterns of movement and making required adjustment, smart lighting is delivering now and will continue to deliver tangible business benefits across the logistics and industry sector.

Smarter Approaches to Financing

New ways of financing upgrades

Lighting represents a large part of an organisation's electricity consumption and with energy bills predicted to increase 30% by 2030, exploring new ways to control and reduce these costs should be firmly on any business agenda. While there is recognition that more efficient lighting and emergency lighting systems, including LED and intelligent controls, can have a positive effect on reducing operational costs, at the same time there are financial considerations in terms of funding this investment and the speed of return on any capital outlay. The lighting industry is aware of these issues and alongside investing in new products, it is also exploring new funding models.

One such way that is increasingly being used across many aspects of a company's operations is to transform investment from a capital expenditure (CAPEX) to an operational one (OPEX). This removes the need for upfront capital but allows organisations to reduce energy costs, improve operational efficiency and meet sustainability measures while at the same time protecting working capital.

50% of lighting is estimated to be highly inefficient so there is a clear opportunity, as well as a financial necessity, for today's businesses to reduce the amount of energy their premises consume by reviewing their lighting and emergency lighting.



50%

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...transform investment from a capital expenditure (CAPEX) to an operational one (OPEX)

CAPEX

OPEX

There are a number of different OPEX-based solutions and finding the right one largely depends on the size of the project and therefore the level of investment required. The best practice approach to ensure the right payment option is secured is to first undertake an energy audit. It is essential that the right balance between performance and cost is struck. By carrying out an on-site assessment it is possible to clearly and correctly establish the efficiency gains that could be realised through any investment, the infrastructure required to enable this to happen and the appropriate financial solution to maximise the savings return to the business.

The lighting industry has listened to the concerns of businesses and developed flexible solutions to finance new lighting solutions that spread the cost in a manageable way, distribute savings equitably and in some instances, offer a longer-term service-based agreement.

Easy repayment

For projects between £10,000 and £250,000, a straightforward hire purchase-based agreement is a good way to spread payment of a lighting upgrade without the need for capital outlay. Manageable monthly payments are predictable while there is no capital expenditure and no upfront costs, allowing businesses to use their working capital elsewhere while improving the efficiency of their energy consumption. The benefits of reduced energy consumption and efficiency savings, such as reduced maintenance and a lower luminaire failure-rate, are immediately realised by the business using this type of arrangement.

Savings sharing

A more in-depth financial option which guarantees savings and shares any benefits between the lighting company and the customer is a savings sharing solution. Still OPEX-based, this tends to be suitable for projects above £100,000 and is a partnership in which any savings that are made through improved lighting are shared 50/50 between the lighting contractor and the customer. This offers a lower risk profile for a business by effectively incentivising the lighting company to realise efficiency gains through improved lighting and emergency lighting systems. If choosing a savings sharing option, a guarantee should be available that if the project results in a loss then the lighting company will pay the difference.

'Light as a service'

A more innovative, long-term approach for larger organisations that is becoming increasingly popular as the trends towards outsourcing remains strong is upgrading lighting infrastructure using a service level agreement. Appropriate for projects over half a million pounds, a service agreement has the benefit of offering known operating costs over the specified contract term. Light as service effectively outsources the supply, installation, management and commissioning of lighting and emergency lighting infrastructure for a fixed monthly repayment. This repayment is usually lower than an organisation's current lighting bill and has the added benefits of ongoing commissioning of upgrades throughout the contract and no ad hoc maintenance costs. Contracts can be anything up to twenty years and depending on the size of business and length of term, there is opportunity for significant energy savings, above 50%, both during the financial term and beyond.

Logic saved

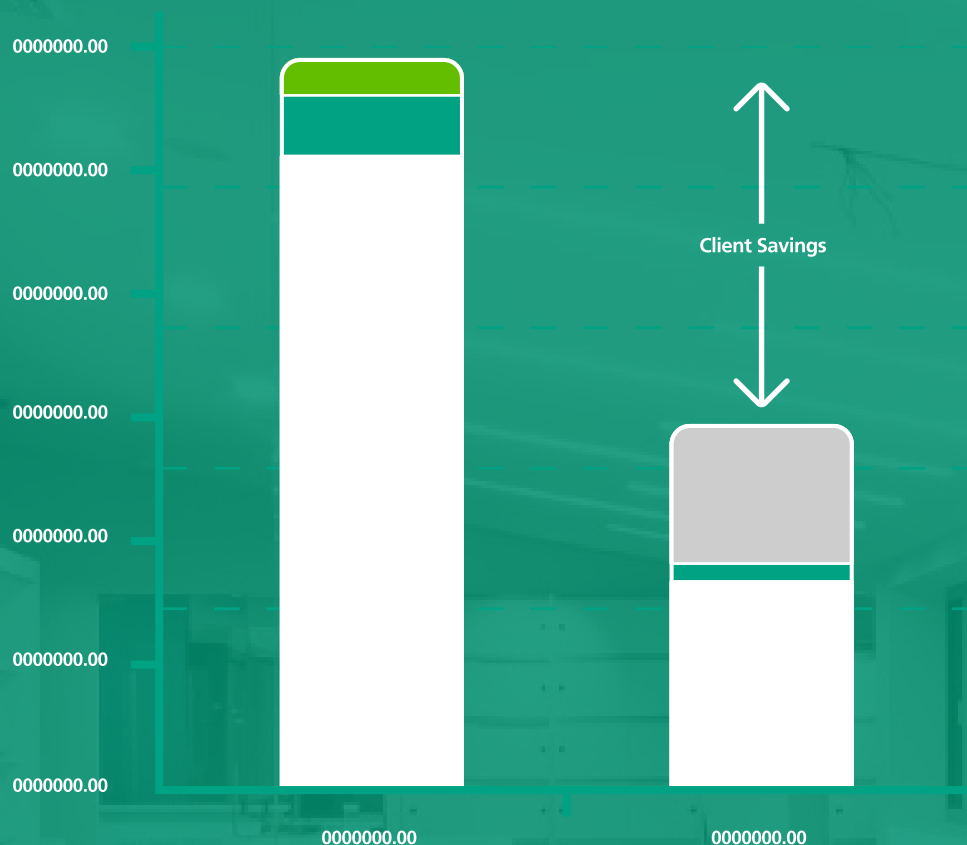
£162,980

Proposed annual savings during finance term

...these increase to

£221,592

once the finance period ends.



10 Year TCD (all savings and Capital Allowance)

● Reduce costs ● Carbon costs ● Maintenance ● Electricity

Current operating costs

£281,899

Proposed costs during finance

£118,919

Proposed ongoing costs

£60,307

Base data (Including CCL)

Unit rate kWhr (£): 0.10544, increasing by 3% pa

Maintenance cost: £6,552.00

Burn hours: 87136

Control Savings: 35%





Although every effort has been made to ensure accuracy in technical detail within this publication, specifications and performance data are constantly changing. Current details should therefore be checked with Feilo Sylvania Europe Limited.

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