UK LIGHTING SECTOR STRATEGY

A development plan for a competitive and sustainable lighting industry

In association with:

Foreword by The Rt Hon Michael Fallon MP Minister of State for Business and Energy
Domestic lighting consumes **15 TWh**

Global demand for lighting fixtures

£ **72 BILLION** in 2013

UK lighting consumes **58,000 TWh per year** (CIBSE)

Using effective lighting controls & energy efficient lighting could drop this to 4 to 6%

[14,500 TWh per year]

70% COMMERCIAL 26% RESIDENTIAL 4% STREET LIGHTING

Cover photos:
Top: Mike Allcock managing director of Thorlux Lighting, Redditch, Worcestershire; the Glace luminaire by Concord Lighting, Newhaven, East Sussex.
FOREWORD

The global demand for lighting fixtures in 2013 was £72bn and sales of LED products are predicted to grow 20 per cent year-on-year through to 2025. Currently, the UK supply chain supports 1,700 companies across a diverse lighting sector and is worth £2.3bn to the economy. The UK is home to more than 140 lighting design practices that specify lighting for mainly overseas projects and which present a unique opportunity for lighting manufacturers to access global markets.

The UK is the leading destination for foreign direct investment into the European Union, with a growing proportion coming in high technology sectors. With the significant expertise in design and manufacturing, combined with policy and a business-friendly environment, the UK lighting industry offers significant investment opportunities to businesses through collaboration and direct investment.

The UK lighting industry’s products consume around 18 per cent of all electricity generated in the UK. Implementing good quality, smart lighting controls and energy-efficient lighting could reduce this consumption by enough to remove the need to build two new power stations in the future.

With the latest technology, it is now not only possible to conserve energy but we also have the opportunity to both reduce maintenance costs and to improve the quality of every aspect of the lit environment. There are no applications where this is not true.

By adopting improved lighting systems, the UK has the opportunity to reduce the cost of energy consumption, and thus CO2 production, thereby helping to meet the Government’s target of reducing greenhouse gas emissions by at least 80 per cent by 2050. We can expect lighting alone to provide 15 to 18 per cent of this total, further reducing the pressure to build power stations by freeing up transmission capacity and allowing complementary use of more renewables such as wind, wave and solar power.

Trends have demonstrated that energy costs are likely to rise while, at the same time, the cost of energy-efficient lighting is falling and will continue to do so for years to come. Furthermore, global legislation will restrict the use of high energy-using lighting products and there will be greater restrictions on polluting substances, together with environmental legislation. This will lead to a growing expectation that products should be reused, re-manufactured and recycled with greater ease.

All of these trends create opportunities and threats. The key lies in having a healthy, competitive and sustainable UK lighting industry that can respond to change with agility. This strategy and its developing plan, coupled with the industry and Government working in partnership, is designed to meet those opportunities and to help grow the UK lighting sector in a sustainable way.

The Rt Hon Michael Fallon MP
Minister of State for Business and Energy
WHAT WE’RE LOOKING FOR

It is testing for organisations to work together more effectively when, in everyday business, they are rivals. Our reward for doing so will be a cohesive sector focused on delivering shared outcomes while remaining competitive and fully respecting competition rules.

Outcomes

1. An expanding and sustainable sector, growing profitable companies across the supply chain and creating jobs.

2. A sector that attracts and develops talent.

3. Diversity of training and development, from craft apprenticeship to doctorates.

4. Rewards and recognition for the very best from the industry: people, products and companies.

5. Reduced carbon emissions from lighting. Much of the required technology already exists and payback can be fast. However, there are still misconceptions about this.

6. Partnership with all relevant Government agencies in order to meet the first four objectives.

Lighting designer Tad Trylski assesses a luminaire during the judging of the Lux Awards, designed to recognise talent and excellence in UK lighting.
National Car Parks (NCP) recently began relighting 149 multi-storey car parks with LED luminaires under a deal with energy performance contract provider Future Energy Solutions (FES). Expected to be the largest project of its type in the UK in 2014, it is financed through energy cost savings over time, giving NCP a modernised and energy-efficient portfolio of car parking sites at no upfront cost.

The project involves retrofitting more than 70,000 LED luminaires in NCP multi-storey car parks in the first six months. This is to be followed by a further 35,000 luminaires in environments such as station car parks and local authority sites. By relighting 45,000 car parking spaces NCP expects to cut its greenhouse gas emissions by 11,000 tonnes a year and to save more than 65 per cent of the energy those car parks consume.

The largest single deployment of LED lights in Britain, the project underlines the growth and speed with which LED lighting technology is now being used by households, government and companies. Car parks are lit for long periods, often 24 hours a day, all year round, and benefit enormously from low-energy, low-maintenance lighting solutions such as LEDs and lighting controls.

The first phase of the NCP project is funded in partnership with the UK Energy Efficiency Investments Fund managed by Sustainable Development Capital and funded by the UK Green Investment Bank. It was the first transport infrastructure project to qualify for the Government’s UK Guarantee scheme – which will provide up to £40bn to help important infrastructure projects raise finance – launched in 2013. The second phase will be undertaken by NCP and its partners.

The innovative funding model, the commercial methodology governing the deal and the technology solution combine to make it a landmark UK deal. It is ‘off-balance sheet, requires no upfront investment, dramatically reduces our operational costs for an extended period of time, and reduces our energy use substantially. This has a big impact both operationally and financially,’ according to NCP chief executive Jo Cooper. As a result of the initial contract with NCP, FES UK and Europe is in commercial dialogue with car parking operators in Europe and Australia.
Adoption of OLEDs
Development of off grid lighting
Phase out incandescent
Products fitting life cycle refurbishment
Phase out florescent
Skills mapped across the lighting sector
Greater number of apprentices at all levels filling skills gaps
Engage with schools
Greater engagement with public
Lighting targets linked to building rates
Increased exporting to growing markets
More purchased from the UK
Cross sector
More MBAs in the industry, general business skills
Development of lighting
Engaged with business
Development of a sector energy brand
Improve standards of enforcement
Customer understanding of warranties and guarantees
Develop new materials and processes
Engage with EU, TSB and EPSRC to develop sector offers
Develop off grid lighting
Develop a sector council
Develop sub-sector groups
Develop and grow relationship with sector councils important to lighting
Patent Box
R&D tax credits
Reduced tax burden for SMEs
Myth busting energy efficiency
Raise the profile of energy efficient lighting
Queen's Awards in lighting
Competitive supply chain
Growing service sector
More UK lighting suppliers
Engage with LEP to develop supply chain
UK Lighting Sector Road Map & Plan
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Raise the profile of lighting

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Growing service sector

More UK lighting suppliers

Engage with LEP to develop supply chain

Incentives for building refurbishment

Green Public Procurement initiatives

Regulation review and update

Green Bank investment

Technology

Skills

Market Development

Product Confidence & Reliability

Quality & Innovation

Leadership

Interventions

Communications

UK Supply Chain

2014

2020

2025

2030

Policy
LEADERSHIP

It is difficult for a large body such as an industry sector to have a meaningful conversation with an equally large body such as Government when such a diverse range of people, organisations and opinions is involved. The Lighting Sector Strategy is designed to focus effort on outcomes: what we want to see and how we can achieve it with the minimum effort and resource.

Outcomes

1. A thriving, growing sustainable UK lighting sector meeting the partnership’s needs.

2. A single body driving the outcomes of the strategy – supported by Government, Government agencies, regional bodies, local authorities, academia and trade associations – and delivering growth to the sector.

3. The development of sub-sector strategy groups to develop their own actions and targets, drive the plan forward and report to the sector body on progress against objectives. These must be led by industry in partnership with all the agencies and associations providing the resources needed to fulfil those actions.

4. Continuing work with the Green Construction Board, which takes collective responsibility for leading the change to a low-carbon economy in the UK built environment.

5. An annual report on the state of the sector that addresses the progress of the industry and the partnership.

6. A means of celebrating the success of the partnership, annually.

CASE STUDY: PARTNERSHIP

LIGHTING LIAISON GROUP (LLG)

The Lighting Liaison Group was formed from a core of industry trade associations and professional organisations with a primary interest in lighting. The aim was to ensure an effective exchange of relevant information, and agree a common aim on important lighting issues, especially the impact of Government policy and policy making in this area.

This group subsequently expanded the reach of the LLG, as it has become known, to include other organisations with interest in lighting matters and now includes the Highway Electrical Association, the International Association of Lighting Designers, the Institution of Lighting Professionals, the Society of Light and Lighting, the International Commission on Illumination (CIE) and the LIA. The LLG does not have a secretariat, but is chaired on a rotation basis by each of the participating organisations and, where appropriate, issues guidance documents, for example, its Guide to the Specification of LED Products.
POLICY INITIATIVES

A broad range of policy outcomes, initiatives and support mechanisms is already on offer but it is unlikely that the UK lighting industry is fully aware of all its options. Moreover, it is difficult for Government and its agencies to communicate these clearly to such a wide range of companies.

Outcomes

1. Improved communications and new channels to develop policy initiatives and communicate them across the UK lighting industry.

2. Clear feedback when policy is not working, supported by evidence.

3. A simple mechanism designed to enable an understanding of how and when the sector takes advantage of initiatives.

Cautious interventions

Incentives for retrofit of building stock with energy-efficient lighting will help to reduce energy consumption and emissions in the UK, as well as growing the UK market. Possible interventions could include:

Promotion of low energy lighting replacement of tungsten lighting systems.

Energy reduction breaks: what’s out there already, is it being advertised, used?

Best practice case studies.

Simplify tax breaks and communicate these clearly.

PATENT BOX

Developing and exploiting intellectual property rights (IPR) is central to the future sustainability and growth of many small companies. Tax reductions linked to IPR enable companies to see a return on their investment in innovation.

Outcomes

1. A greater use of the Patent Box by UK companies in the lighting sector.

2. A clear simple mechanism for communicating the Patent Box offer to companies.

3. An understanding of the level of use of the Patent Box by the sector.

4. Suggestions for changes to the Patent Box, communicated to Government.

5. Case studies on the use of Patent Box, specific to the lighting sector.

6. Developing and sharing an understanding of other ways of defending intellectual property.
R & D T A X C R E D I T S

Research and development is the lifeblood of companies. Few have survived for long in the market without developing new services, processes or products.

Outcomes

1. A greater use of the R&D tax credits by UK companies in the lighting sector.

2. A clear simple mechanism for communicating the R&D tax credits to companies.

3. An understanding of the level of use of R&D tax credits by the sector.

4. Suggestions for changes to the R&D tax credits communicated to Government.

5. Case studies on the successful use of R&D tax credits by lighting companies, communicated to the sector.

The R&D department at Holophane Europe in Milton Keynes, Buckinghamshire. Tax credits could be a way of boosting innovation in the lighting industry

Photo: David Thower
PUBLIC PROCUREMENT

The public sector has significant spending power. UK lighting companies bidding for and winning public sector business is a clear mechanism for growth.

Outcomes

1. A public sector that chooses well-controlled, energy-efficient lighting systems that are demonstrably compliant with applicable performance standards and other relevant legislation.

2. Reductions in the impact of lighting on the total electricity supply costs from 18 per cent to just 6 per cent, leading to savings that can pay for new lighting systems or can be diverted to the front line services of public sector organisations such as the NHS.

3. More UK companies, especially SMEs, bidding for and winning public procurement contracts through improved packaging and communication of the opportunities.

4. UK companies as their preferred choice in the supply chain, especially where larger companies win public procurement contracts.

5. A public procurement model that simplifies the bidding and winning process; demonstrates value for money and payback; gives a clear understanding of life-cycle costs, warranties and guarantees, and helps the public sector manage this process.

A retrofit to LED downlights at the Bradford Royal Infirmary in West Yorkshire is cutting energy costs for the NHS Foundation Trust. Public sector procurement like this can help achieve carbon reduction goals, save money and boost the UK’s lighting industry.

Photo: Philips Lighting
Public procurement remains a vital part of business for UK companies such as CU Phosco, the country’s largest street lighting manufacturer, and one that demands teamwork and an ability to demonstrate value for money.

CU Phosco’s P850 LED main road lantern is replacing 20-year-old lighting on the A55 North Wales Expressway, a strategic road skirting the North Wales coastline. The objectives are to reduce energy, carbon emissions and costs, and to avoid all maintenance and repair works on the road during the busy tourist season. North and Mid Wales Trunk Road Agency, a partnership of eight local authorities, stipulated the use of existing lighting columns and brackets. The solution uses new, lightweight, low wind area lanterns that can be dimmed to save energy between midnight and 6am.

The project followed an Invest-to-Save model using capital funding to invest in new lantern assets. CU Phosco tested three possible solutions including traditional high-pressure sodium and new LED lantern options. A Total Cost of Ownership and Payback Period calculation showed the initial capital investment versus relative energy and maintenance costs and savings. The analysis showed that like-for-like replacement offered no advantage while the LED-based solution using the P850 and an integral Central Management System would light the road to the required classes at the existing column spacings and make significant improvements in some areas.

CU Phosco acted as design agent and product supplier through a Contractor Framework tender. It assembled a team with knowledge of road lighting design, product application, carbon reduction and technical support, in addition to legislation, standards and policies relating to highway lighting. The team programmed design works and applied the client’s key processes in the initial design and feasibility stages. It then ran a carbon reduction assessment for a 30km section of the 140km-long dual carriageway A55 with 10 junctions.

Dawnus Construction won the contract for the renewal of 348 lanterns and the installation of the UK-developed Telensa CMS dimming and remote monitoring system. The new lighting on the J16-17 section of the A55 went into operation in April 2013 following a two-week installation period with more on other sections of the road to follow over the next two years. The lead-in time and delivery of equipment was ahead of schedule, which allowed the lighting renewal phase to begin ahead of initial programme. The technical support team had a presence on-site and provided remote assistance throughout the scheme.

Selection criteria for the recent lighting upgrade on the J16-17 segment of the A55 North Wales Expressway included energy efficiency, robustness and very low maintenance.
Customers need to understand the cost of operating their current systems and compare it with industry offers in order to make a clear business case for changing to energy-efficient lighting systems.

**Outcomes**

1. A number of median energy use models (royalty-free) for lighting applications in kWh/m²/yr. For example:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>kWh/m²/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>115</td>
</tr>
<tr>
<td>Schools</td>
<td>82</td>
</tr>
<tr>
<td>University campus</td>
<td>110</td>
</tr>
</tbody>
</table>

   Source: RIBA, CIBSE data, from CarbonBuzz, with reference to LENI and EN 15193.

   We need to establish similar medians for hospital wards, houses, street lighting etc.

2. These models developed to include the cost of purchase and installation, energy use in service, maintenance and end of life.

3. These models made available to customers throughout the industry.


5. Updates of the models as knowledge increases.

6. Independent development and/or verification of the models to ensure credibility with end-users.
COMMUNICATIONS

Communication is the route to success in sharing information across a group, especially today, when we use many media to disseminate our messages.

Outcomes

1. Raised profiles for highly successful UK lighting companies.

2. Shared information and rapid feedback ensuring that stakeholders are engaged.

3. Successful communication of the message that saving energy reduces costs to home-owners and businesses alike. Lighting offers a significant opportunity to reduce carbon emissions, help meet climate change commitments and help protect both the environment and resources.

4. Greater take-up of energy-saving lighting by smaller retailers, through engagement and sharing good practice case studies.

5. Energy-efficient lighting established as ‘green tech’, and improved lighting dashboards that enable users and specifiers to compare like with like.
The lighting industry has long realised that it needs to sell the benefits of efficient lighting directly to end users to help them cut their energy costs, achieve their carbon reduction goals and benefit from an improved lit environment. So in 2011, the Lighting Industry Association partnered with Revo Media to create an exhibition that would showcase the latest technology and, equally important, educate the wider world about lighting.

The annual LuxLive show in London is part of an outreach programme to inform and educate. The event incorporates more than 50 hours of presentations, panel discussions and demonstrations in four dedicated theatres and arenas. Crucially, the content includes exemplar projects in all major sectors where end users have cut their energy use while creating engaging, well-lit spaces.

LuxLive attracted more than 6,500 visitors in 2013 and is complemented by the Lux Awards, which celebrates and rewards excellence in lighting.
GOVERNMENT POLICY

Government policy can be a driver for change; regulation can create markets while deregulation can broaden them. Working in partnership, we need to find the right balance for our sector to thrive and grow.

Outcomes

1. Working with Government partners to reduce red tape.

2. A review of tax incentives, designed to speed the uptake of energy-efficient lighting products.

3. A lighting regulatory group formed to work in partnership on all aspects of lighting regulation.

4. Improved safety and quality, and reduced light pollution and risks to health.

5. Dissemination of the latest research on lighting and health.

CASE STUDY: POLICY

ALL-PARTY PARLIAMENTARY LIGHTING GROUP (APPLG)

The All-Party Parliamentary Lighting Group is a liaison group set up by MPs to inform and educate cross-bench MPs on lighting matters that may be of interest, whether they be related to their constituents or wider issues linked to Government policy. Co-chaired by Joan Walley MP and Tony Baldry MP, the group meets in Westminster. In recent years topics discussed have included the health effects of fluorescent lighting on patient groups such as lupus and migraine sufferers, street lighting switch-off and energy efficiency.

The APPLG is not a lobby forum but a discussion group supported by the LIA and, where appropriate, other lighting-related organisations. The format of the meetings can vary from small focus groups with specific interests to wider meetings that are well attended by both MPs and industry figures.
STANDARDS

Standards are designed to aid access to markets for as broad a range of companies as possible by ensuring that services, processes and products are safe. This may mean meeting independently verified tests. The object is to give consumers confidence in a given service, process or product.

Outcomes

1. A broader range of companies involved in producing and reviewing standards.

2. Greater industry engagement with the National Measurement Office.

3. Greater engagement of companies in market surveillance, policing and compliance. This will require the creation of a working group in partnership with the authorities to improve understanding and interpretation.

4. Development of a ‘Green Tech’ industry standard in the UK similar to the USA’s Energy Star as part of a Government-backed programme helping businesses and individuals protect the environment.

Development of an industry brand mark e.g. Green Tech UK

Applicable to:

- Lighting designs
- People-friendly controls
- Systems information and learning
- Product efficiencies
- System efficiencies
- Off-grid systems
- Warranties and guarantees
- Specification and information sheets
- Decommissioning and recycling systems
- Lighting service supply

5. Lighting system performance standards and lighting controls standards.
Being able to meet or exceed standards is essential in most geographical markets. They are usually laid down by governments or by international bodies but in some cases they are the client’s own.

Dialight – which employs 150 people at its base in Newmarket, Suffolk – recently supplied LED lighting at a state-of-the-art butyl rubber plant in Jurong Island, Singapore, owned by Lanxess, a leading speciality chemicals company. The €400m plant covers an area of 200,000 sqm and processes more than 900,000 tonnes of rubber a year. Its design includes state-of-the-art power management and monitoring, and the Lanxess project team recognised at the outset that lighting would play an important role in saving energy and reducing the plant’s environmental impact.

The challenge was to find suitable light fixtures that were certified for use in the hazardous environment, would deliver reliable lighting in normal and emergency mode operation, and would meet the requirements for reduced energy consumption and reduced maintenance.

The lighting had to meet Singapore Standard SS 531 which recommends lux levels for different areas within a facility, and the Green Mark requirements in SS 530 that define the acceptable power consumption per square metre. During the detailed engineering phase, however, the company also highlighted its special requirements for emergency lighting and Dialight was able to modify the design of the LED lighting fixtures with built-in battery backup.

The original design for the facility featured a mix of fluorescent T8s and metal halide fixtures, but Lanxess gave Dialight the opportunity to propose a new lighting design featuring its LED lighting technology. Dialight enabled Lanxess to convert the conventional lighting for indoors and outdoors areas to LED for both non-hazardous and hazardous applications, thus saving energy while also complying with the SS 531 and SS 530 specifications.

A total of 2,370 LED lighting fixtures were specified for indoor and outdoor process areas and internal roads creating a 55 per cent energy reduction, annual power savings of 1,150,000kWh and a reduction in CO2 emissions of 811 tonnes a year.

The low operating temperature of the LED fixtures also provided a health and safety benefit as it removed the risk of burn injury common with metal halides. Built-in surge protection was also an important advantage: during the rainy season the region is prone to lightning strikes, which can cause unprotected fluorescent ballasts to burn out. Reducing maintenance requirements meant that Dialight could give the installation a five-year warranty.
The UK lighting design profession has been growing in both size and reputation since the 1980s. Second only in numbers to US practitioners, UK lighting consultants have forged a formidable reputation both at home and internationally. Probably the most influential and respected practice of all is Speirs + Major, which has been credited with raising awareness of good lighting design globally. Among a raft of awards and accolades, it has won three Radiance Awards from the US-based International Association of Lighting Designers (IALD), the only firm ever to have done so, and was named UK Lighting Design Practice of the Decade in 2012. The practice has also been part of five RIBA Stirling Prize winning teams.

Speirs + Major has been responsible for an extensive and highly varied body of work, ranging from urban lighting masterplans for sensitive historic city centres such as Durham and Bath, to private commercial developments such as King’s Cross and Greenwich Peninsula in London. Major architectural projects include the lighting of several key airports, including Shenzhen in China, Madrid’s Barajas and Terminal 5 Heathrow, the relighting of the interior of St Paul’s Cathedral and many other major civic projects around the world.

One of its most prestigious appointments was as lighting design advisor to the Olympic Development Authority for London’s Queen Elizabeth II Olympic Park. This was a broad remit that not only involved reviewing and developing the lighting strategy for the park itself, but also considered links to the surrounding urban areas and the role of architectural lighting to the main venues, landscape lighting and art.

Speirs + Major now employs 35 people in its two studios under principals Mark Major and Keith Bradshaw. The firm’s remit has become increasingly wide-ranging in type and scale, and now encompasses all aspects of designing with light: architectural schemes, urban masterplans, strategic branding and innovative product design for projects from Los Angeles to Sydney.

Speirs + Major says of its approach: ‘We believe in the integration of both artificial and natural light to fulfil a range of sociological, biological and emotional needs. We always strive to achieve a symbiosis between light and architecture, and we believe strongly in the power of collaboration to bring about the best design solutions. But for us delivery is as important as imagination – creative ideas count for nothing without the pragmatism to see them realised.’
UK LIGHTING SECTOR STRATEGY

Speirs + Major is a specialist in lighting masterplans, and has worked on Bath, left, King’s Cross, London, above, and the Queen Elizabeth Olympic Park, London, right.

Above:
Speirs + Major’s sophisticated and sensitive design for the relighting of St Paul’s Cathedral in London
SUPPLY CHAINS

In a dynamic and competitive sector, strong local supply chains are vital to a strong and sustainable future.

Outcomes

1. A strong, vibrant and growing supply chain.

2. Confidence among customers that ‘it does what it says on the tin’: the product or service will deliver.

3. Agreed, standardised product specification sheets. The sector must agree and implement standardised specifications through a charter that all can sign up to voluntarily.

4. Consistency on warranties and guarantees that are clear and simple with no ‘small print’. This calls for an industry charter for minimum standards and guidance of users.

5. The service lighting model developed for new markets such as PV/DC lighting.

LIA-member firm Dextra Lighting, based in Gillingham, Dorset, is a leading supplier of commercial lighting products in the UK.
In December 2011 the Secretary of State announced the creation of the Advanced Manufacturing Supply Chain Initiative. Up to £125m was made available through the first two rounds of the initiative to create more competitive supply chains that anchor high value work in the UK, and generate new employment opportunities. Additional funding of £120m for two further AMSCI rounds was announced in the 2012 Autumn Statement to support research and development, skills training and capital investment to help UK supply chains achieve world-class standards, and to encourage major new suppliers to locate in Britain.

Zeta Specialist Lighting is a leading UK developer and manufacturer of LED lighting systems. In 2013, Zeta was awarded an AMSCI grant of £723,000 for a project whose aim is to reshore manufacturing of LED lighting back from China to Bicester in Oxfordshire. A new factory facility has already been built to double production capacity and enhance the company’s LED product range. At present, Zeta’s supply chain is complicated and long, based on several different manufacturers in Asia. This project will allow it to condense the supply chain and use locally sourced components, which in turn will deliver shorter lead times and higher quality, boosting customer confidence in UK manufactured products.

As a result, a new patented LED lit road sign that can be powered by solar power alone will now be manufactured in the UK, as will the Lifebulb, a novel LED lamp that offers the same light output as a traditional 60W bulb with only 8W of electrical power. So far, six new jobs have been created and six more have been safeguarded but the project will eventually create another 18 posts along with new apprenticeships.

‘Funding via AMSCI has transformed our business. It has enabled the company to grow in a way that would be impossible without funding. This project will transform a small innovative company with a good product portfolio into a great company with the ability to perform on a global scale,’ said Zeta chief executive Philip Shadbolt. ‘Funding via AMSCI is a game-changer for us. It has enabled us to develop and grow our business in a way that would otherwise be virtually impossible – or rely on diluting equity.’
EXPERIENCE AND INWARD INVESTMENT

It would be simplistic to suggest that any country could rely on its own indigenous businesses to meet all its supply chain needs. Where gaps exist they can be filled by developing local businesses, importing goods or attracting inward investment. Conversely, opportunities also exist in growing markets that lack manufacturing capability and capacity or have low levels of innovation. The UK can meet their needs by exporting.

Outcomes

1. Increased exports to growing markets, a strengthened UK supply chain and growing SMEs.

2. Increased inward investment to fill gaps in the supply chain that cannot be plugged through developing UK businesses. This increases employment and makes the supply chain stronger and more sustainable in the UK while limiting the impact on indigenous business.

3. A closer working relationship with UK Trade and Investment, and the Foreign and Commonwealth Office, taking advantage of their programmes and opportunities for export and inward investment.

4. Increased trade missions to growing markets and major world sporting venues.

5. Better communication of opportunities in world markets. This can be achieved by sharing good practice and disseminating case studies through industry publications and websites.

CASE STUDY: INWARD INVESTMENT

NVC

Although product manufacturing has often been relocated to countries such as China in the past, there are signs of the flow reversing. NVC Lighting Technology makes a wide range of light fittings, lamps and control gear and with an annual turnover of £600m is the largest lighting manufacturer in China with a bigger share of the Chinese lighting market than any other company. It has grown rapidly since it was founded in 1998 and was listed on the Hong Kong stock exchange in 2010.

So far, the Chinese company has invested £20m in its UK subsidiary, NVC Lighting, based in the West Midlands. The UK firm, still regarded by its parent as being in the start-up phase, began life in 2009 with a handful of employees but now has 100 staff and a base comprising 8500sqm of warehouse, office and showroom space close to the M5 and M42 motorways. Reflecting the skills of its UK workforce, NVC Lighting’s assembly facility not only makes off-the-shelf products but also provides emergency conversions and other product modifications, helping to provide the full range of fittings required on projects.

The parent company has 3,500 outlets selling to the public in China and it is developing a network of retail display shops in Brazil and Russia. In the UK, however, the brand is sold directly to electrical wholesalers through a sales staff of 20 based throughout the UK.

With inward investment from China and assistance from the UK’s Regional Growth Fund, the UK firm plans to develop new £7m raw-metal-to-finished-product manufacturing facilities on the old Rover Longbridge car-making site, where it forms part of the area’s regeneration.
ACDC manufactures specialist long-life architectural LED and cold cathode lighting. Its head office, design and manufacturing facilities are in Barrowford, Lancashire, where it has Europe’s largest cold cathode manufacturing facility, while its demonstration studio is in London.

ACDC won a Queen’s Award for Enterprise in International Trade in 2012 based on outstanding achievement in overseas earnings, having recorded an overall growth of 90 per cent over a three-year period. Its international growth recently prompted the expansion of its Dubai office, which services the Middle East, Asia Pacific, Australia and India. Its distribution network includes more than 60 distributors on five continents. In 2014, ACDC opened a US office serving North America as part of a continuing growth strategy that recognises the importance of the US marketplace in terms of international lighting specifications and projects.

The company actively seeks export opportunities across the world and recently won a contract to supply £5m of lighting to Muscat airport in Oman, pictured above. Working with local and international lighting design practices, its lighting has been specified for many prestigious projects, including the Burj Khalifa, the world’s tallest tower, in Dubai.

To meet rising demand, ACDC has invested heavily in its 2,800sqm manufacturing facility, which has seen a 40 per cent increase in capacity. This involved moving its head office to create additional space for production, along with reducing costs and lead times by implementing the 5s workplace organisation process and purchasing state-of-the-art machinery. It champions British manufacturing and sources a large majority of components from local suppliers.

In 2013 the company entered the Sunday Times Best Companies list as ‘one to watch’.

HRH the Duke of Kent inspects ACDC’s architectural lighting products on a visit to its factory in Barrowford, Lancashire.
SKILLS

No sector can grow without a skilled workforce. The quality and skills of the workforce are critical factors in capturing competitive advantage. It is essential that companies focus on the supply of skilled workers through apprenticeships, support for researchers and the supply of skilled managers.

Outcomes

1. A clear picture of skills shortages and needs.
2. Increased awareness of the industry in schools and among the general public.
3. Finding the means to ensure that the sector has the skills and capabilities it needs to support growth.
4. A diversity of skills across the whole supply chain, from craft to doctorate and business development.

Greater numbers of apprentices to close the skills gaps:
- Craft
- Technician
- Undergraduate
- Graduate
- Post-graduate
- Business management

5. A sector that attracts the very best from schools and ensures that they stay with our industry.
6. Recognition, rewards and celebration of the very best.
7. Best practice shared across all UK sectors that are important to the lighting sector.
8. A closer working relationship with the Lighting Education Trust.
Organised by the Society of Light and Lighting (SLL), the prestigious Young Lighter of the Year competition celebrates its 20th year in 2014. As the name suggests, its aim is to help promote the youthful element of the profession, providing a unique platform for young lighters under 30, whether society members or not. It is also another example of the industry working together, with support from both the Institution of Lighting Professionals and the Lightmongers’ Association, who award Best Written Paper and Best Presentation respectively.

Entrants are selected initially from an abstract and video presentation, with the shortlisted candidates then submitting a full paper on their chosen area of study. Following a second judging process, the finalists give their presentations before a professional audience at the LuxLive exhibition in London, with the winner announced at the Lux Awards. Rachael Nicholls, at the time a lighting designer with Hoare Lea Lighting, won the competition in 2013. Nicholls entered because she saw it as a prestigious accolade and good way to promote both her work and herself as a designer, she says. She had seen previous winners excel and believed it would be a good way to further her career.

‘Both the experience and the award have been invaluable to me – it has increased my confidence in my presentation skills and as a designer, and given me an excellent platform to promote my research,’ she says. ‘I have also used the award to further my career – since winning I have been hired by a consultancy in Australia where I am now working. This is something I have always wanted to do, and my employer cited the accolades on my CV as a strength that appealed to them. I am both proud and very grateful to have won.’

Rachael Nicholls receives the Young Lighter of the Year trophy at the Lux Awards in London. Left to right: Compere John Moloney, Duncan Chamberlain of Philips Lighting, the sponsor, and Kevin Kelly, president of the SLL.
REGULATION

With the ever-increasing complexity of products, markets and systems comes regulation to control dangerous substances, ensure products are safe and that the business playing field is equitable and providing the opportunities for growth.

Outcomes

1. A UK lighting sector that understands, is engaged with and involved in the regulatory process, one that takes action on its own compliance but assists the authorities tackle non-compliance by competitors.

2. Assistance for the UK Government in meeting its regulatory obligations both nationally and internationally.

3. Reduced regulation that is no longer needed and engagement in developing new regulation when it needs strengthening.


5. Improved, proactive market surveillance and strengthened enforcement.

6. Clients, designers, specifiers and producers educated to identify, request and recognise underlying documents, to show compliance.

Alan Tulla, technical editor of Lux magazine, assesses lamps at the publication’s London offices. Market surveillance and standards enforcement has become a big issue in the industry.
STANDARDS AND ENFORCEMENT

Without standards enforcement, products of unknown quality enter the supply chain. This can undermine the confidence of consumers and can lead to dangerous products entering the market.

Outcomes

1. A lighting regulatory group (LRG).

2. Clarification and communication of the UK enforcement and policing process across the supply chain for all relevant standards affecting the UK lighting sector.

3. A working group with the Department for Communities and Local Government, Trading Standards, the National Measurement Office, and the Health and Safety Executive to clarify enforcement of the Building Regulations (including Part L), safety standards, and legislation covering end-of-life products and replacement installations.

4. Expanded, independent product testing for compliance in support of proactive market surveillance and the results publicised in a timely manner.

5. An Energy Star EU equivalent.

6. Effective enforcement in removing non-compliant products from sale in order to protect businesses and consumers.

7. Clients, designers, specifiers and producers educated to identify, request and recognise underlying documents to show compliance.

CASE STUDY: MARKET SURVEILLANCE

LIGHTING INDUSTRY ASSOCIATION

The LIA employs two senior technical managers, with a wealth of knowledge in all aspects of lighting, who represent the interests of members on more than 40 committees nationally and internationally. This includes chairing IEC committees on standardisation and a strong representation in all LightingEurope technical and application committees in Brussels. LIA positions are generated through a variety of technical committees that report to the Technical Board.

One of the key issues of interest to nearly all LIA members is that of market surveillance and the need for a level playing field when it comes to product performance and claims. The LIA works closely with the National Measurement Office, the UK body charged with policing the ErP Directives, and has recently set up a joint project to test more than 60 sets of retrofit LED lamps in the LIA’s fully accredited laboratory. The aim is to roll out this market surveillance to other lighting areas such as luminaires on a regular basis. Matters of safety are referred directly to Trading Standards.
AWARENESS RAISING

Customers need to understand the offer and have the confidence in the performance of new technologies. They also need to understand the benefits of purchasing or specifying products bearing a new ‘GreenTech’ mark. The sector will need to work with the technical committees of international bodies such as the CIE to implement findings on energy efficiency, spectral effectiveness and quality of lighting.

Outcomes

1. Improved public awareness about energy-efficient lighting.

2. Improved end-user awareness of energy-efficient lighting and controls.

3. Education on the balance between energy use and lighting quality, promotion of the wellbeing aspects of lighting.

4. Greater understanding of LED lighting systems, and how to specify and identify appropriate products, including LED street lighting.

5. Technical assistance to national and local authorities.

6. Clients, designers, specifiers and producers educated to identify, request and recognise underlying documents to show compliance.

CASE STUDY: AWARENESS

LUX ENERGY DASHBOARD

The monthly Lux magazine is the official publication of the Lighting Industry Association and a key tool in raising awareness about energy-efficient lighting. It is distributed as a free publication, with readers including end users, engineers, designers, distributors and lighting manufacturers.

Each month, alongside every lighting project that is featured in the magazine, an ‘energy dashboard’ is included. This covers the key metrics of the project and explains how efficient it is in terms of both installed and operational load.

The inclusion of the energy dashboard sends a powerful signal that while the aesthetic values of a lighting design are self-evidently key to its success, of equal importance is how well the installation performs in terms of energy use.

The magazine also explains lighting concepts and terminology, includes a design clinic and conducts independent product testing.
EM P L O Y M E N T

Competing, growing sectors increase the depth and range of employment, ensuring their future is sustainable.

Outcomes

1. Improvements in the diversity and numbers of jobs across the whole UK supply chain.

2. Competition in the areas of supply chain strength and mitigation in the areas of weakness by the introduction and adoption of automation, robotics and lean manufacturing systems.

3. Increased exports into growing markets, leading to more jobs in the UK.

4. The reshoring of manufacturing, where the use of lean manufacturing makes good business sense in order to maintain and improve quality.

5. Improved skills diversity to ensure the sector has the knowledge it needs as it grows and develops, and to improve the sector sustainability.

An employee of Martech UK tests luminaires at the company's factory in Dewsbury, West Yorkshire

Photo: Clare Instruments
Harvard Engineering has just received the Queen’s Award for Enterprise in the International Trade category. It is the second Queen’s Award to be presented to the company in just three years. One of the key factors in Harvard’s success, along with its belief in innovation and technological development, has been in the investment in skilled staff.

Three years ago the directors recognised that developments in technology presented a real opportunity for growth, but in order to achieve that the business needed a larger team with the skills and attitudes to drive it forward. Since July 2011, Harvard has recruited 130 salaried employees – one a week for three years. Together with its team of highly skilled hourly paid employees, that brings the current head count to nearly 400.

The recruitment of new staff has involved every department, but the greatest commitment has been to the R&D engineering and global sales teams, both of which have doubled in size. The expansion has been international with employees not only in the UK but throughout Europe, the USA and Middle East.

The company’s recruitment strategy is based on a number of firm principles designed to maintain its strong and recognisable culture. One of the most important is looking to the future. ‘We’re recruiting for tomorrow, not just today,’ says human resources manager Jo Osborne, who has been instrumental in developing the company’s HR strategy.

An important element of this has been the company’s policy of establishing and developing relationships with UK universities to link with the talent of tomorrow. ‘The engineering skills shortage in the UK is widely talked about and is certainly a challenge for a growing engineering business like Harvard,’ says Osborne. ‘The talent we need to continue seeing our business grow is in short supply, and the aim of our student and graduate schemes is to ensure we continue to have such a strongly skilled team in the future.’ These summer and sandwich placement schemes cover R&D engineering through to manufacturing operations, and sales and business development.

The company also believes that once they have recruited the right employees, it is very important to keep them. That means clear and regular communication with employees, listening to their ideas, offering opportunities for personal development, and a profit-share scheme.

‘Others may be able to recreate our production facility, buy the same machinery and use the same technology systems to design their products, but they’ll never have our people,’ says Osborne. ‘We truly believe that our people are an invaluable asset and we work hard to ensure we invest in them.’

Harvard Engineering now employs almost 400 people, mostly at its manufacturing plant and R&D facility in Wakefield, West Yorkshire.
TECHNOLOGIES

Technologies are often the precursor of change. LEDs are an excellent example but when they are linked with other technologies, this can create additional, previously unattainable market opportunities and solutions.

Outcomes

1. Better use of the opportunities offered by PV harvesting devices coupled with LED lighting and controls to establish off-grid lighting.

2. Greater use made of the opportunities offered by the combination of building systems (intelligent buildings), fire alarms, lighting control, security and access management, to improve lighting and intelligent building controls.

3. Research into the opportunities offered by the combination of PV, LED and DC lighting (using Ethernet).

4. Research into street lighting energy-efficiency measures, and a common approach to public procurement, possibly aided by the Institution of Engineering and Technology.

5. Research and dissemination of a delivery model for public procurement, whole life costs, maintenance costs, payback period and service delivery.

6. Greater research into the application of OLED technology for lighting.

7. Increased research into WiFi lighting controls.

8. Information on developing and developed LED technologies (for example, GaN on GaN).
R&D AND IPR CREATION

Research and development is the future of the sector’s products and services.

Outcomes

1. Greater influence on research spending from the Engineering and Physical Sciences Research Council to ensure that there is a flow of research in new materials and processes to meet the needs of our growing sector.

2. More influence on the Technology Strategy Board to ensure that there is the opportunity for the lighting sector to be engaged in product and process innovation.

3. Greater links with Local Enterprise Partnerships to ensure that there are opportunities for the lighting sector to take advantage of the Regional Growth Fund, the Advanced Manufacturing Supply Chain Initiative and all the local geographical programmes to develop and grow companies.

4. Increased influence in the EU to ensure that there is a flow of research funding into new materials and processes that aid the future development of product and process to power growth, and greater responsiveness to relevant EU funding opportunities.

5. Shared and promoted good practice, to help source and secure funding.

INNOVATION CLIMATE

Innovation, the development of new services, processes and products is the generator for future growth.

Outcomes

1. A better working relationship with the UK Catapult technology and innovation centres relevant to the UK lighting sector.

2. Master classes for design for reuse, recyclability and repair.

3. Ideas on DC demonstrators, solar indoor sun capture and DC circuit breakers.

4. A call for research into integrated light sources, microprocessors and controls.
INDUSTRY ROADMAP

No industrial sector remains the same; change is a normal part of development. The creation of a roadmap will illustrate what needs to be done and in the timeframe required for the UK to best take advantage of the opportunities within this sector.

Outcomes

1. The discovery and exploitation of new and novel materials. The UK should sponsor R&D competitions with the intent of discovering new sustainable materials and fabrication methods (in a similar way to the DoE in the US). Innovations in sustainable design may lead the lighting industry to achieve radical cost reductions that are not possible within our current technology paradigms.

2. Work with the architectural and construction industries to integrate new lighting systems in new building information modelling (BIM), parametric design, digital fabrication and aggressive environmental certification programmes to ensure that the lighting industry develops the technologies needed to support these advances in the construction fields.

3. Technologies designed to fit lifecycle and ‘lightweight’ challenges, to broaden the perspectives of the modern lighting industry and to introduce radical new methods of fabricating lighting systems. These challenges may also open innovation in the lighting industry to secondary partners such as raw-goods manufacturers, equipment suppliers, university research programmes and partners who are not directly capable of meeting a narrowly defined end goal such as manufacturing a more efficient lamp.

4. With its long-term view, the UK Government should continue to challenge and support the lighting industry, acknowledging all the advances we’re currently enjoying, challenging the status quo withsmartly abstracted goals of sustainability to stimulate manufacturers and research organisations to explore dramatically different technical paradigms. The results may lead to unexpected but critically important advances in how we conceive of lamps, luminaires and systems.

5. A greater number of novel technologies from university departments adopted by UK companies, helping to grow UK business and seeing a return for their inventors and universities.
Some 95 per cent of all buildings in the UK that will exist in 2050 have already been built.

None of the lighting systems in service today will exist in 2050.

It is also true to say that currently 18 per cent of all electricity consumed in both commercial and domestic building is consumed by lighting.

The cost of energy will only rise in the future; we are unlikely ever to return to the cheap energy days experienced in the 1970s.

Global market

Some reports from around the world:

‘Worldwide demand for LED lights will soar in 2014 as prices fall and they become more competitive than conventional lighting,’ according to the Central News Agency (Taiwan).

‘The global LED lamp replacement wave has arrived... Global demand for LED lamps (replacing tungsten) and LED tubes (replacing fluorescent) will increase by 86 per cent and 89 per cent in 2014, respectively, from a year ago,’ according to a research paper by LEDinside.

It also noted that McKinsey’s 2012 Market Model has calculated that the LED lighting market share in general lighting is expected to be 45 per cent in 2016 and almost 70 per cent in 2020. In the USA, this is aided by the Energy Star subsidy programme. Elsewhere, bans on incandescent lamps have been implemented successively, spurring LED lighting market development and demand.
TECHNOLOGY CHANGE

Innovation and change means survival. Constant incremental change, developing new unique selling points and meeting customers’ needs are engines of commerce.

What we are likely to see over the next few years:

The phasing out of incandescent lighting in all its forms (some of this has already happened in Europe). This will continue across the world. Most countries will regulate this technology from the marketplace.

The phasing out of technologies that have substances in their manufacture that are hazardous or poisonous to the environment, such as mercury. This may start to be legislated out of the marketplace as technologies are replaced by others that are more efficient and effective.

We are also likely to see the phasing out of technologies that are difficult to recycle and reprocess into new products.

With the rising cost of energy, we are likely to see greater use of daylight as a mechanism for lighting buildings. This can be from a variety of sources and methods, including light wells or light tubes, and the greater use of glass on roofs and for walls. Daylight is free: the challenge is to control it and to reduce the impact of heat.

We are likely to see greater use of controls in buildings, more intelligent controls and greater use of integrated controls across building systems.

We are also likely to witness a reduction in the cost and use of energy for lighting in the public realm with the greater use of DC systems and off-grid systems using PV and wind energy to supply the power, initially in remote locations but eventually across cities. This will also improve security of supply.

The public realm is likely to make greater use of networked lighting systems offering greater flexibility, together with low-energy switching, dimming and the use of absence or presence detection.

Public realm and commercial lighting will move into the managed services sector as lighting becomes more predictable, and building managers and lighting manufacturers share responsibilities, technology updates and energy savings.

With the adoption of PV, it is easy to see the move to DC lighting systems reducing the need for drivers and all the transforming losses associated with AC systems. Coupled with the integration of PV in glass building skins, it is possible that the window will be the PV panel and even city office systems could be off-grid, including computing. This would offer resilience from grid electricity failures and cheaper bills.

As we are already seeing a drop in unit price for LED replacement lighting, we are also seeing the market grow. This will continue, especially as consumer electronics and TV manufacturers with chip-making capacity enter the marketplace. This is already evident with Hitachi, Samsung, Panasonic, Verbatim and Toshiba.

LED has a while to go before it meets its fundamental limits for lighting so it is likely to become the lighting of choice as it is highly controllable and very energy efficient, and will only become even more so in the future.

OLED will have applications in the general lighting sectors if it becomes more robust and efficient and the unit price drops. It may never supersede LED but could become complementary. It may be more widely accepted if it becomes printable using plastic electronics, and research is advancing in this area in the UK.

The lighting revolution is taking place right now and is set to continue. It will be a combination of:

- Not lighting some things we do now
- Using more daylight
- Controlling lighting better
- Replacing light sources and systems with more energy-efficient technologies
- Moving towards DC-based, off-grid systems
- Greater use of AC LEDs
- Locating individual luminaires with GPS to reduce maintenance cost and improve lifetime management
- The development of LED technologies such as GaN on GaN and finding solutions to any public health concerns with AC LEDs
Solid state lighting research at the University of St Andrews takes place in the Organic Semiconductor Centre, and is focused on the development of highly efficient solution-processed Organic LEDs. The factors controlling the efficiency of light emission are studied using a wide range of optical and electrical measurements, enabling improved materials and devices to be made. Facilities available include ellipsometric measurements of photoluminescence and electroluminescence efficiency, scanning near-field optical microscopy, time-resolved luminescence and time-of-flight mobility measurements. Materials development spans both fluorescent and phosphorescent materials, and the very high efficiencies of light-emitting diodes developed are promising for lighting. A detailed understanding of light extraction as a route to improving efficiency has also been developed. An example of innovative work in this development of a near-infrared light source for skin cancer treatment.

The College of Life and Environmental Sciences brings together biology, chemistry, earth sciences, and environmental studies. The centre brings together biology, chemistry, earth sciences, and environmental studies. The centre focuses on the development of photonic materials and devices. The team has developed novel photonic materials and devices, including photoluminescent phosphors for LEDs, photomeric materials, and the very high efficiencies of light-emitting diodes developed are promising for lighting. A detailed understanding of light extraction as a route to improving efficiency has also been developed. An example of innovative work in this development of a near-infrared light source for skin cancer treatment.

The Centre for Chronobiology’s research investigates the biological effects of light on human physiology and behaviour. It is investigating the optimum light parameters (intensity, duration, time of administration, spectral composition) to affect the biological clock and sleep/wake behaviour, with the ultimate aim of providing effective treatments for circadian rhythm disorders (e.g. as suffered by night-shift workers, transatlantic travellers and shift workers). Blinded-controlled laboratory experiments are conducted in addition to field studies in the community. A range of different lights (monochromatic and polychromatic) are given to numerous study groups (e.g. young, elderly, and shift workers). Technologies used to assess the effect of light on non-visual light receptors are the measurement of sleep/wake behavior, motor activity, light exposure, melatonin and cortisol rhythms, mood, and nutritional measures, psychomotor vigilance, heart rate and body temperature.

The Wolfson Centre has a long history of successfully working with industry and academia in the following areas: printing and coating liquids onto substrates. The group also uses this information to synchronise internal body clocks to time of day/year and also to drive a wide variety of applications. The Centre for Chronobiology’s research investigates the biological effects of light on human physiology and behaviour. It is investigating the optimum light parameters (intensity, duration, time of administration, spectral composition) to affect the biological clock and sleep/wake behaviour, with the ultimate aim of providing effective treatments for circadian rhythm disorders (e.g. as suffered by night-shift workers, transatlantic travellers and shift workers). Blinded-controlled laboratory experiments are conducted in addition to field studies in the community. A range of different lights (monochromatic and polychromatic) are given to numerous study groups (e.g. young, elderly, and shift workers). Technologies used to assess the effect of light on non-visual light receptors are the measurement of sleep/wake behavior, motor activity, light exposure, melatonin and cortisol rhythms, mood, and nutritional measures, psychomotor vigilance, heart rate and body temperature.

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Measuring the quantity of light in the environment provides a reliable time of day signal for animals. They use this information to synchronise internal body clocks to time of day/year and also to drive a wide variety of behavioural and physiological adaptations. The Centre for Chronobiology’s research investigates the biological effects of light on human physiology and behaviour. It is investigating the optimum light parameters (intensity, duration, time of administration, spectral composition) to affect the biological clock and sleep/wake behaviour, with the ultimate aim of providing effective treatments for circadian rhythm disorders (e.g. as suffered by night-shift workers, transatlantic travellers and shift workers). Blinded-controlled laboratory experiments are conducted in addition to field studies in the community. A range of different lights (monochromatic and polychromatic) are given to numerous study groups (e.g. young, elderly, and shift workers). Technologies used to assess the effect of light on non-visual light receptors are the measurement of sleep/wake behavior, motor activity, light exposure, melatonin and cortisol rhythms, mood, and nutritional measures, psychomotor vigilance, heart rate and body temperature.

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UK LIGHTING
SECTOR STRATEGY

A development plan for a competitive and sustainable lighting industry

in association with:

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