

Institution of Lighting Professionals – written evidence (ALN0055)

Introduction

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The Institution of Lighting Professionals is a professional body, formed in 1928, to promote, encourage and improve the science and art of lighting for the benefit of the public. We have circa 2000 members, a high proportion of which are professionally qualified with the Engineering Council. Our membership base comprises Local Authority Engineers, National Highways Engineers, Consultants and Professionals in manufacturing.

We work closely with other professional bodies such as the Highways Electrical Association, The Society of Light and Lighting, and the Lighting Industry Association and sit on committees of many other associations.

We aim to deliver excellence in lighting based around the principles of:

Right Light, Right place, Right Time.

We believe we are well placed to submit considered evidence relevant to this consultation.

Summary

The ILP welcomes and supports any research and investigation into the application of light & lighting that leads to an improved understanding of the subject and supports / develops good lighting practice which brings many benefits to users whilst mitigating the impact on the environment, humans as well as fauna and flora.

Unfortunately, there is a great deal of misinformation and social media noise through lobby groups and activists that essentially categorises all artificial lighting as being bad. We have seen this concern increase since Governments have looked to drive forward energy efficiencies which remove all light sources for all lighting applications from the market with the exception of LEDs.

There are applications that just do not suit LEDs and can create adverse impacts on the environment and users. We fully support the drive to Net Zero and reducing energy consumption, but this should not come at the cost of good lighting design or the natural environment.

Our considered response to the consultation looks to cut through this noise and present the facts as they are currently understood. This includes:

- Evidence that in the exterior environment the impact of street lighting is being managed and it is the impact of other exterior and interior exterior facing lighting installations that adversely affect the night-time environment.
- Health effects are still being understood and the greatest impact on humans is through interior lighting installations, poor quality domestic lighting unit with a high flicker, close and long duration exposure to light sources of all types.

We emphasise the requirement that artificial light is correctly considered at all stages of the planning process with due reference to competent lighting professionals.

Evidence

The Royal Commission on Environmental Pollution's 2009 report into artificial light in the environment has been noted by the exterior lighting industry but to some extent neither actioned or ignored.

Within our core membership, reducing the impact of Artificial Light At Night (ALAN) has been central to the objectives of our members. This has been partially due to a natural shift in point of view. Influences such as; improving technology, standards, guidance, healthy competition, collaboration with other Institutions such as the Bat Conservation Trust and general greater awareness. The main driver, however, has been budgetary pressure which has focused minds to dim or switch off to reduce impact on energy revenue budgets. This in turn has had synergy with reducing impact on climate change without further initiatives from central government.

The current energy crisis has exacerbated this further.

We are however still feeling the ramifications of central governments drive for efficiency which created tension in the market. Initially in the UK market was initially flooded with high Correlated Colour Temperature (CCT) LEDs typically circa 5,700K, which have a high level of blue light content. As guided by central government, these were viewed to promote significant energy & maintenance savings compared to conventional lamps.

Whilst well received by finance officers compared with less efficient LEDs with warmer CCTs, we have learned that energy efficiency isn't everything.

The drive for net zero through items such as eco design and efficacy drive, is having a detrimental effect on the environment. This has largely been due to increased quantity of emitted blue light (to meet higher efficacy regulations). Through the groundbreaking work being undertaken with the Bat Conservation Trust, we know blue light can have a significant and proven impact on legislated species and most likely their food chain.

Refer to ILP GN08/23. [Guidance Note 8 Bats and artificial lighting | Institution of Lighting Professionals \(theilp.org.uk\)](#) (Updated from the 2018 version and due for publication March 2023)

There are many areas that are outside of our sphere of influence or require significant investment into proven research. We still have core members who don't believe in the research around harmful blue light and that even some light pollution may have a negative effect on the general population.

Furthermore, we have major problems with perception. Perception around fear of the dark and whether street lighting in general has any effect on crime or safety.

For background primarily our core membership light for road safety and to reduce crime or the fear of crime. However, there are emerging examples of research or statements in the public domain;
[Street lighting may enable rather than hinder street crime | UCL News - UCL – University College London](#)
[Street-Lighting-Policy-Note_Final.pdf \(cambridgeshireinsight.org.uk\)](#)
[Item 6 Street Lighting.pdf \(moderngov.co.uk\)](#)

Referring to Worcestershire County Councils part night switch off (item 6 street lighting.pdf) above, West Mercia Police fed back in point '18. Regarding possible anti-social behaviour and other crimes being associated with the part night switch off scheme. The Lighting Team have been in liaison with West Mercia Police. It is generally viewed that the turning off of street lighting in the majority of areas has little or no impact on crime and disorder, but just occasionally a hot spot occurs.

Some of our membership such as East Ridings of Yorkshire are beginning to report requests to switch off lighting, as residents begin to become aware of impact of the energy crisis, lighting on the environment and climate change.

However, regardless of the increase in evidence around crime and safety, perception continues to be a burden on our membership, and we look to central government to support initiatives to remove some of the embedded perceptions present in the UK.

We are proud to be signatories of the ROLAN manifesto where we teamed up with other institutions to move to protect our dark skies

1. What is the state of the evidence base regarding the causes and impacts of light pollution in the UK as it relates to human health?
 - What are the mechanisms by which light pollution has an impact on human health – for example, by disrupting circadian rhythms? What are the negative impacts it can have?

Public Health England have commented advising that lighting levels provided for public lighting are not sufficient to affect human circadian rhythms, the lighting level, the distance the observer is from the light source and the duration / frequency of exposure are all very low. People

will have a higher exposure when in houses, workplaces, commercial properties as these have much higher lighting levels, their distance from the light sources is less and their exposure to them much longer. Typically from workplace and domestic lighting which emit significant quantities of blue light and also devices such as mobile phones, monitors and TV screens.

The Environmental Protection Act, Supplementary section of the Clean Neighbourhoods and Environmental Bill does mention that "artificial light emitted from premises can be prejudicial to health". We do not consider that street lighting could be considered as being prejudicial to health, we have no case law but if we look at noise case law this would apply if the observer was exposed to flashing / changing lighting installations or lighting installations that may turn on and off fairly quickly i.e. domestic PIR controlled security lighting.

However, we are aware that research papers have been published linking blue light emitted from LEDs to breast and prostate cancer (ref. Evaluating the Association between Artificial Light-at-Night Exposure and Breast and Prostate Cancer Risk in Spain (MCC-Spain Study) | Environmental Health Perspectives | Vol. 126, No. 4 (nih.gov)). This in summary stated; Both prostate and breast cancer were associated with high estimated exposure to outdoor ALAN in the blue-enriched light spectrum. However, the study was flawed as it used subjective personal measurement a) total darkness, b) almost dark, c) dim light, and d) quite illuminated to understand light levels entering properties.

Further papers have been published and are in the public domain.

- Increased risk of pre-term birth <https://lnkd.in/eupBHgyw> - Light Pollution, Sleep Deprivation, and Infant Health at Birth
- Reduced quality of sleep for teens - <https://lnkd.in/eNKiww2x>
- Increased use of sleep medication for adults - <https://lnkd.in/emH8HkyZ>
- Link with Parkinson's disease - <https://lnkd.in/eQ-EtvRN> - Bright light exposure reduces TH-positive dopamine neurons: Implications of light pollution in Parkinson's disease epidemiology

Our local government membership regularly receives complaints from the general population around street lighting. This is often quite simply because street lighting is so visible, the lights are outside people's houses. When this happens, the focus has been reducing light output, shielding and naturally heading towards warmer colour temps and reducing blue light.

LED technology continues to develop, a lot of our members have now moved away from higher bluer emitting LED's ie. 5,700K. Refer to figure 1 below.

However, due to the ongoing consultation on eco design and potential requirements for 120lm/cw and 140lm/cw, current best practice could be limited as the technology available will likely see a backwards step.

Thus, for the foreseeable increasing impact on the environment (evidenced) and also health (to be proven) through the use of greater peaks of blue light again or amber or red lighting being unavailable because of eco design constraints to obtain a UKCA marking.

This cannot happen due to the progress made naturally by the exterior lighting industry and it is recommended that exceptions are made in the guidance for light sources that limit blue light content.

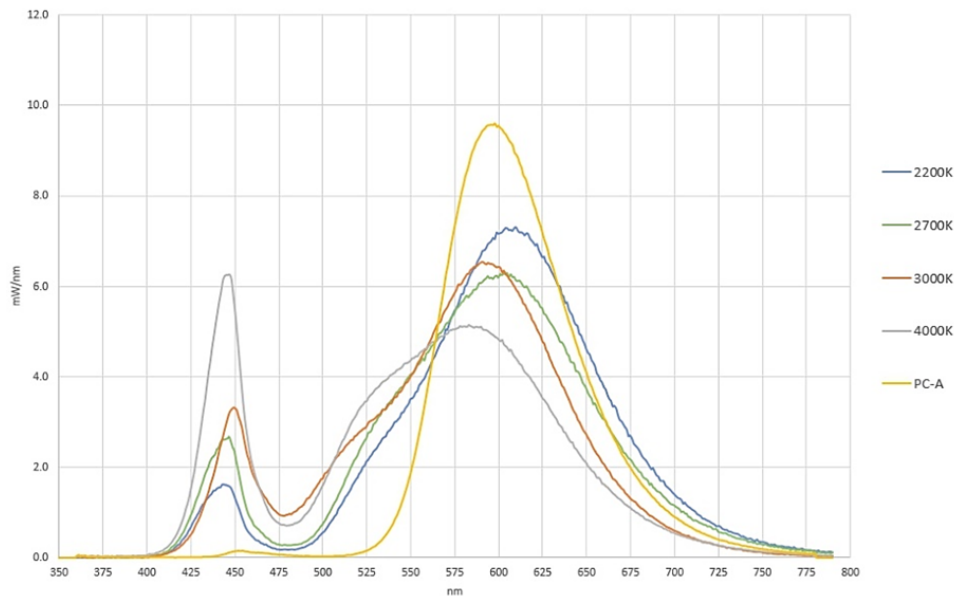


Figure 1. Comparisons of spectral distribution of multiple CCTs (graphic courtesy of TRT Lighting). This illustrates the reductions in blue light peaks possible through use of warmer CCTs

- What are the primary sources of light pollution and how well do we understand them? Is there evidence regarding which types of artificial light, in terms of frequency, duration of exposure, or intermittency, are the most harmful?

The following list is a high-level view on impact by types of exterior lighting on the environment. For more information, please refer to;

[Guidance Note 1 for the reduction of obtrusive light 2021 | Institution of Lighting Professionals \(theilp.org.uk\)](https://theilp.org.uk/guidance-note-1-for-the-reduction-of-obtrusive-light-2021/)

Domestic interior / exterior lighting / façade / lit buildings

Often referred to as private lighting, this is often unregulated and un-enforceable by local planning authorities or councils. It is available at many retailers and is inexpensive to purchase. It is the ILP's view that this is the area of most harmful to light pollution.

It suffers the most from the LED paradox (see explanation later) out of all forms of exterior lighting.

It is increasing the amount of light pollution significantly and is putting critical eco-systems at risk of collapse.

Security lighting

Often referred to as flood lighting, this is often unregulated and not enforced by Local Planning Authorities or Councils. It is the ILP's view that this is as serious an impact on light pollution as the above but could be better controlled if more resource was made available at LPA level and greater quality control / regulations at government level.

Suffers from the LED paradox. It is increasing the amount of light pollution significantly and is putting critical eco-systems at risk of collapse.

Could be reduced by use future technology that doesn't require light to provide security ie. camera technology.

Car headlights

A growing issue for our industry to deal with.

It is the ILP's view that car headlights are the next big threat to the environment and future use of our roads. This because of two primary human centric issues;

1. Car headlights emit high levels of peak intensity which subject viewers to sudden and very bright bursts of light. This temporarily blinds the viewer be it drivers, pedestrians or residents. This can cause temporary vision impairment and is a threat to road safety.
2. There is a disparity between drives for energy efficiency by local governments (when the street lighting is dimmed) road lighting levels are low. Contrast in the local environment increases and the focus becomes solely the car head light. This can move focus away from potential risk and is a threat to road safety.

Further to this there are environmental issues which is proven to harm or potentially kill legislated species such as bats as the high peaks of sudden light can be fatal.

Illuminated Advertising Signs

Are being installed more frequently now, our membership is seeing many issues as the signs typically dominate the areas they are installed in, due to extremely high levels of brightness. They are often moving or flickering between advertisements.

In all environments they can be distracting for drivers and cause serious glare / intensity issues for the general public. In less urbanised environments, even more so.

We have significant concerns surrounding this growth market.

Suffers from the LED paradox.

With better planning, understanding of controls and enforcement by an LPA impact could be reduced.

Industry Lighting

Industry or business lighting often requires high levels of illuminance, so can be major contributors to light pollution. As we are seeing larger growth of business parks, be it distribution depots or data centres in rural areas, these sites are high up on our list. These installations usually remain illuminated all night, irrespective of usage or need.

With better planning, understanding and enforcement by an LPA, impact could be reduced.

Sports lighting

Surprisingly further down the list given the high levels of lighting required to play sports at night. This is a known issue within the industry with good guidance published.

Some to most sites are enforced by an LPA but some slip through due to constraints or resource issues, so unfortunately are still on the list.

Street lighting

Public / street lighting is often quoted as being the worse light polluter, as evidenced above this is not the case anymore. Unfortunately, it's an easy target as there is just so much of it, simply outside most people's houses.

Street lighting impact has been evidenced by a range of research, such as that undertaken by Dr Chris Kyba researcher at the German Research Centre for Geoscience.

Summarised as follows:

Dr Chris Kyba led research to understand the contribution of well-designed and operated street lighting on the night sky and especially skyglow. Using satellites to measure what fraction of the total light emissions were due to streetlights across the city of Tucson, in Arizona. At 01.30 every morning for ten days the city dimmed its streetlights, increasing the percentage dimming each night.

*His light-from-space experiment, **published in the journal Lighting Research & Technology**, showed that most of the artificial light wasted - by being sent upwards into space, rather than illuminating a sign, street or building on Earth - does not actually come from streetlights, but from other sources. Illuminated advertisements, floodlighting installations, lit buildings, facade lighting, parking lots and sports lighting are the types of installations responsible for most of these light emissions.*

Chris advises that "This is really important information for policy makers and light pollution activists," and goes on to say "this does make it more difficult to solve, because there are so many contributors. It means everyone has to get together to decide what lights need to be lit at night, and how brightly."

Considering the question regarding the types of artificial light, in terms of frequency, duration of exposure, or intermittency, are the most harmful. All light sources can be harmful, and the level of harm depends upon the observer proximity to the light source, its spectral power, the length and frequency of exposure to the source at various distances.

This can be reviewed in the UK H&S Guidance for Employers on the Control of Artificial Optical Radiation at Work Regulations (AOR) assessment requirements to determine the photo-biological impact of the lighting on the observers.

- Is there evidence that light pollution is worsening – for example, with the introduction of LEDs and cheaper forms of lighting, or lighting with a different wavelength spectrum?

Yes, it is. There is more exterior lighting than there has been before.

This is in part due to the LEDs paradox: less energy = more light pollution but also reduced manufacturing costs that has seen exterior lighting become more affordable, so application is now more liberal by all users.

There is simply more of it than there has been before.

The implementation of energy-efficient LED technology to reduce energy consumption and carbon emissions (linked with climate change mitigation) has unsustainable, ecologically unfriendly side effects on flora, fauna and humans, and ultimately on biodiversity.

Further to this due to population growth, levelling up and continued investment by Homes England, more houses are being built and more rural areas being developed.

- More houses means less rural areas.
- Less rural areas equal less biodiversity.
- More houses equal more private lighting.
- More houses equal more roads.
- More roads equal more perception for street lighting.

- More street lighting equals more light pollution.
- More light pollution equals more risk (until proven otherwise).
- More light pollution equals more damage to biodiversity.

Light pollution associated with housing development is primarily impacted by private lighting attached to houses but also an increase in the quantity of street lighting. Often our ILP members who look after more rural counties are seeing significant development of green belt land which are intrinsically dark.

Development in areas that are intrinsically dark is the most worrying as they will often be adjacent to areas of environmental conservations, sometime Areas of Outstanding Natural Beauty (AONB) refer to Worcestershire County Council case studies in ILP GN08 Bats and artificial lighting guidance note 08/23. Where this happens even slight increases in light pollution can have drastic effects on legislated species and vulnerable nocturnal animals.

It is the ILPs view that whilst population growth and housing development increases, so will light pollution.

- How reliable is our evidence base for these impacts – are there areas where we are less confident or additional studies that are needed?

The evidence base for humans varies however, there is a worrying trend. Blue light emitted by LED lights can be a risk to health, but it needs categorically proving so that we can work towards removing the risk.

The evidence base for impact on protected species such as bats and their ecosystems is proven so regardless of the findings of impact on human health, we should be looking to reduce quantity of light at night to ensure that biodiversity has a chance to survive.

Science Advances issued on 25th August 2021 featured researched published by Douglas Boyes titled 'Street lighting has detrimental impacts on local insect populations. Insect populations form an integral part of valuable eco systems which are sustaining legislated species. We cannot tolerate a food chain collapse linked to light pollution.

Refer to; <https://www.science.org/doi/10.1126/sciadv.abi8322>

We are aware that satellite imagery has been acquired which clearly shows light pollution increasing across the UK and

Europe <https://www.nightblight.cpre.org.uk/cpre-s-view> refer to; [LED streetlights are increasing blue-light pollution in Europe – Physics World](#)

Further to this as white light is reflected/refracted by water vapour/particulates in the air and, for example, in foggy or rainy conditions, we see the luminaire beam distribution and hence we are more aware of it.

Blue light content emitted by LED lighting is believed to reflect more greatly off-road surfaces than conventional lamp based technology which had greater orange or red light content.

- Does the UK have a sufficient research base? Who are the main organisations conducting research into light pollution and how are they funded?

In short as evidenced above, no.

The research often used by our members is potentially out of date (ie. View on crime, safety, ecology etc) and the institution has minimal funding and most of the work is undertaken by volunteers.

We still produce ground-breaking guidance which is used around the world but it takes time due to the reliance on volunteers. If we were funded partially by central government, we could put greater quantity of guidance at a higher rate.

We work with other Institutions and professional bodies;

- The Society of Light and Lighting
- The International Commission on Illumination
- Sheffield University
- University College London
- Dark Skies Association

As hard as we try, collaboration is difficult and many of us still work in silos.

- 2 Where does light pollution intersect with public policy in the UK? Is the existing regulatory regime effective?
 - Are the Government agencies, departments, or local authorities currently responsible for monitoring and regulating light pollution appropriately resourced? Is there sufficient expertise within organisations charged with regulating or enforcing regulations on artificial noise?

Essentially no, in part the departments (planning, environmental and lighting) with authorities etc are not joined up and planners and environmental people do not tend to refer to lighting specialists for support.

When lighting specialists within local government are referred to, they often do not have the time or resource to feedback.

Local planning authorities are often under significant pressure to deliver schemes and do not have the time or resource to co-ordinate across multiple disciplines.

We also have an issue that trends in lighting come and go and currently we are seeing an increase in domestic security lighting and presence lighting, most of these installations do not require planning permission and residents are free to purchase and install what they wish with

essentially no consequence. This is not helped by the retailers who do not stock lighting equipment / luminaires that are really fit for purpose, the majority are all sources of obtrusive light and the current trend for up / down lighting as source of sky glow. These installations make up a considerable number of lighting nuisance complaints that our members deal with. The ILP have published guidance for domestic security lighting, refer back to our priority list refer to;
<https://theilp.org.uk/publication/guidance-note-9-domestic-exterior-lighting-getting-it-right/>

The suppliers of equipment should look to provide equipment that is right for purpose, Government could legislate product design and installation.

- Have there been any changes to Government policy following the Royal Commission on Environmental Pollution's 2009 report into artificial light in the environment? Have these been adequate?

No.

- What role should LPAs play in determining plans or restrictions on light pollution? Are the current guidelines on light pollution set under the Government's advice for planning authorities adequate?

The impact of artificial light at night is not well understood by LPA's.

They have a key role to play in the process of ensuring application of good practice is adhered to.

A good start would be to establish the requirement to light, based on crime and safety.

Then adopt the recognised lighting Environmental Zones (ILP GN01) within their authorities, these would immediately bring into plan a wide range of obtrusive lighting and sky glow prevention measures.

As a lighting industry we were disappointed that due consideration and requirements for lighting at the planning stage PPS23 which although developed was not carried through to the final planning requirements and published as a requirement. The work we trust still exists and it should not take too much investment to ensure it is updated to current documentation, light sources etc, and then it should be published.

- 3 What recommendations would you make for changing Government policy on light pollution?
 - What are the possible interventions that could be deployed to mitigate the effects of light pollution and how well understood are their effects?

Reduce blue light content from future eco-design parameters, create tension to develop light sources that create less impact on the environment. Do not just focus on efficacy to reduce energy consumption.

Moves to protect rural areas as dark sky zones should be prioritised to limit the damage that has already been done.

As we move into a critical phase of net zero and we understand the risk to human health and proven impact on biodiversity, ALL exterior lighting should be enforceable by a local planning authority.

ALAN needs to be taken seriously by planning departments and lighting needs to be considered earlier on in scheme considerations with the first question being should we light.

Planning, ecology and street lighting teams in local government should see greater levels of investment from central government.

We need to push on changing mindsets and evidence that there are misconceptions around the requirement to light. To do this we must prove categorically that lighting does or doesn't have an impact on;

- Human health,
- Biodiversity.

Increased levels of responsibility and integrity need to be adopted by all involved in exterior lighting.

Guidance and standards exist but they need a holistic review with other industries such as;

- Domestic / architectural and security lighting manufacturing
- Automotive manufacturing

If we consider the Environmental Protection Act, Supplementary section of the Clean Neighbourhoods and Environmental Bill then it lists the lighting installations associated with the following premises as exempt:

- an airport
- harbour premises
- railway premises
- tramway premises
- a bus station and any associated facilities
- a public vehicle operating centre
- a goods vehicle operating centre
- a light house
- a prison

The basis for these exemptions is not understood and with the exception of lighting needed for safe navigation of marine and air transport all these installations can have well designed lighting that meets all of the obtrusive light / skyglow requirements whilst providing the right lighting levels.

These exemptions should be removed.

3 March 2023