LIGHTINGEUROPE
THE VOICE OF THE LIGHTING INDUSTRY

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Position Paper on Artificial Light at Night (ALAN)

Executive summary

- **Importance of Artificial Light at Night:**
  - Essential for human activities (transportation, work, leisure, etc.), enhancing well-being, safety, and economic productivity.
  - Well-designed lighting systems balance human needs with environmental concerns, including impacts on flora, fauna, and energy usage.
- **Legacy Outdoor Lighting:**
  - Many outdoor lighting systems are outdated, with some installations over 40 years old, lacking energy efficiency and ecological considerations.
  - Investment is needed to modernize legacy systems, focusing on energy-efficient solutions that meet local environmental requirements.
- **Regulatory Gaps in the EU:**
  - EU regulations on Artificial Light at Night (ALAN) are inconsistent, with varying rules across countries, regions, and cities.
  - Examples include France's CCT limits, Spain's spectral G-index, and Italy's regional laws,
- **Four Principles of Lighting:**
  - Light should have a clear purpose, be directed only where needed, not be brighter than necessary, and be adapted or turned off when not required.
- **Call for Harmonisation across the EU:**
  - LightingEurope advocates for harmonized EU rules to drive innovation, sustainability, and high-quality jobs through public procurement.

Light is for people

Artificial lighting is a vital part of life and well-designed installations using quality products and control systems are fundamental to providing the right environment be it for transportation, work, play, leisure, sport or other activities. Good lighting facilitates these activities and through it a sense of wellbeing, comfort, safety and security. All of this in turn helps to support and generate the economy.

We light for humans, and their visual spectrum needs and this of course influences the environment. Within all lighting applications the effect on the natural environment including fauna and flora must be considered as well as the effects of obtrusive lighting, sky glow and light nuisance. It is a balance of needs versus concerns and that extends to the materials used whether considering their carbon footprint, circular economy through to energy usage.

Provided lighting is suitably procured, designed, installed, operated and maintained to provide optimum performance the balance between the needs of humans and the environmental demands can be fulfilled.

Outdoor lighting has been used for many decades

Outdoor lighting has existed for over 200 years and particularly in the highway sector installations can have an operational life for over 40 plus years. This means that much exterior lighting is not state of the art in terms of luminaires, optical control, control systems and energy efficient light sources.

Certainly, these installations were not designed to take account of the ecological, environmental and energy concerns that we now understand and look to address.

There is a backlog of legacy outdoor lighting installations where investment should be targeted. This can be on an invest to save approach to bring good energy efficient task lighting that meets the local environment requirements.

Modern outdoor lighting standards (concepts) have evolved to consider ecology

Together with the evolution of technology, product and system design, outdoor lighting standards and guidelines have significantly evolved in the last decade from documents for facilitating orientation and safety for people to consider ecological impacts for flora and fauna. These publications set limits on obtrusive light for instance caused by the direction of light or brightness intensity which do not benefit people and have negative effects on the environment. By promoting the use of controls, precise optics and correct aiming, the outdoor lighting standards and guidelines specify that illumination is used only when necessary and in the correct manner. Furthermore, outdoor lighting recommendations present a coherent message with well-defined and aligned requirements, emphasizing the balance between human needs and environmental concerns.

EU and Member State regulations have not kept pace

Many parts of the EU do not have any regulations to mitigate the adverse environmental effects of ALAN and where regulations are established, they vary between countries, regions and even on city level[1]. This misalignment is not effective in addressing the overall ALAN challenge and does not stimulate the creation of resolutions that can be applied in whole EU. For example, France applies limits to the light source colour expressed in (Correlated) Colour Temperature (CCT) assuming a lower CCT correlates with less amount of blue light in the spectrum. In certain Spanish regions, as well as in recent EU

[1] Science for Environment Policy (2023) Light Pollution: Mitigation measures for environmental protection. Future Brief 28. Brief produced for the European Commission DG Environment by the Science Communication Unit, UWE Bristol.

GPP guidelines on road lighting[2], the amount of blue light is quantified via the so-called spectral G-index. In Italy, laws are set in individual regions, resulting in 18 different sets of requirements. Cities like London and lighting institutions like ILP[3] provide general design guidance to reduce the amount of obtrusive light. The ILP design guidance document[4] references the CIE[5] environmental lighting zones[6] to differentiate limits regarding e.g. Sky Glow and/or façade lighting.

Positively, all existing ALAN regulations do emphasize the need for well-designed lighting products and professional lighting designs and installations. Besides, they also include instructions for end-users to use the lighting systems in a responsible way. Accordingly in October 2023, the City of London published a lighting planning document[7] to ensure "the right light, in the right place at the right time, controlled by the right system".

Recommendation on legislation on outdoor lighting products and systems

Our request: European policymakers, when setting requirements on outdoor lighting to mitigate adverse ALAN effects, should differentiate between product specific and application dependent parameters. Well-designed and high-quality lighting products are a prerequisite of any initiative to mitigate ALAN secondary effects.

Product specific parameters can be validated and measured at product level and are not depending on specific application conditions. Example of such product specific parameters are related to the light distribution, dimmability and spectrum of the applied light sources but also to questions like: Can the light source spectrum and/or distribution be adapted depending on the activity and/or the time of the day or year (e.g. bird migration)?

Application dependent parameters can only be checked and validated when the application conditions are known. Limits for application dependent parameters are typically differentiated according to the environmental lighting zone. In this way, a city centre might allow higher maximum values for building façade luminance and vertical illuminance values than rural areas.

However, from both product/system perspective as well as application point of view, well-designed and high-quality lighting products are a prerequisite. The transition to LED technology has provided lighting designers and end-users much more tools to optimize the lighting system, also from an ALAN perspective. Smaller LED sources give optics designers more cost-effective solutions to design good optics to more effectively control the light distributions, LED light sources can be adjusted more easily than conventional sources. LED spectra can be fine-tuned in any colour or spectrum which gives more options to minimize the adverse effects of ALAN. These adjustments may be in real time to reflect actual conditions or according to a time schedule.

[2] https://green-business.ec.europa.eu/green-public-procurement/gpp-criteria-and-requirements_en
[3] Institution of Lighting Professionals (ILP) UK
[4] https://theilp.org.uk/publication/guidance-note-1-for-the-reduction-of-obtrusive-light-2021/
[5] Commission Internationale de l'Eclairage (CIE)
[6] CIE 150:2017 Guide on the Limitation of the effects of Obtrusive light from outdoor lighting installations, 2nd edition.
[7] https://www.cityoflondon.gov.uk/assets/Services-Environment/lighting-spd-2023.pdf

Recommendation on legislation/guidelines for local authorities to operate lighting systems in accordance with “Four Principles”

Our request: Any requirements or guidelines for local authorities regarding ALAN should ensure that lighting has a clear purpose, is directed only where needed, is not brighter than necessary and is adapted or turned off when not required.

The lighting industry provides the best options to mitigate the adverse effects of ALAN, based on state-of-the-art optics (“right place”), a wide range of control options (“right time”) with the optimized spectrum (“right light”). Regarding the spectrum optimization, colour tunability will also enable that lighting systems can be adapted once new insights, especially regarding biodiversity, will become available.

However, even lighting systems that include the right features to mitigate the negative ALAN effects, still need to be installed in the right way according to the manufacturer’s guidelines and operated in the correct way. This “separation of responsibilities” remains essential also for state-of-the-art lighting products.

Most importantly, the option for remote management of light sources gives the municipalities and end-users the opportunity to adapt and control light sources according to local curfew orders or other public requirements.

When creating the specifications for a new lighting system, sufficient consideration should be given to the purpose of the lighting system to be installed, so that:

- All light should have a clear purpose
- Light is directed only to where it’s needed.
- Light is not brighter than necessary.
- Light is adapted to suit the task activities or turned off when not required.

Recommendation to stimulate accelerated renovation towards lighting solutions supporting the “Four Principles”

Our request: the introduction, in the current EU legislative framework (e.g. public procurement, biodiversity), of a harmonised set of rules regarding light at night, aiming to replace fragmented national regulations, support the implementation of quality outdoor lighting, and address any potential adverse effects on the environment.

LightingEurope welcomes the European Commission's recognition of public procurement as a steering instrument supporting innovation, sustainability, and creation of high-quality jobs in the EU.

Renovation of public and commercial outdoor lighting should be considered an important part of the Commission's efforts to harness the power of the internal market via harmonised rules in public procurement and any other relevant legislation aimed at achieving environmental and energy targets.

The following points should be considered:

1. Tenders for public and commercial outdoor lighting should mandate that lighting should be adaptable in light output depending upon time, ambient light level[8], activities and environmental zone.

   LightingEurope recommends: Luminaires should have the technical capability of being dimmable between 10% and 50% output level according to the application and, when relevant, to the environmental zone.

2. Lighting should be designed to light the space for safety, function and comfort with minimal effect on surrounding areas and with consideration for the environmental lighting zone.

   LightingEurope recommends: Upward light ratio limits according to EN:12464-2 (lighting for outdoor workplaces)

3. Light source spectrum[9] should be considered depending on the environmental requirements. This should balance the needs of people with the needs of nature, based upon the predominant populations and activities. This should also consider changes throughout time of day/year and luminaires with adaptable spectra and brightness should be considered where this would be beneficial.

4. All light installations shall be designed by competent lighting experts/designers, and the installations shall be checked against the designed parameters regularly to show compliance over the lifetime of the installation.

Contact

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[8] The ambient light level describes the level of background illumination that alters the light output of the installation.
[9] Spectral tuning should be pursued only when all other mitigation measures have been exhausted, such as controlling light power, restricting operating times, dimming, and controlling light direction, as it will have the least benefit compared to other measures. (Longcore and Rich 2017). In Travis Longcore, Effects of LED Lighting on Terrestrial Wildlife, University of California Los Angeles, Institute of the Environment and Sustainability UCLA Institute of the Environment & Safety. March 2023.

LightingEurope is the voice of the lighting industry, based in Brussels and representing 32 companies and national associations. Together these members account for over 1,000 European companies, a majority of which are small or medium-sized. They represent a total European workforce of over 100,000 people and an annual turnover exceeding 20 billion euro. LightingEurope is committed to promoting efficient lighting that benefits human comfort, safety and wellbeing, and the environment. LightingEurope advocates a positive business and regulatory environment to foster fair competition and growth for the European lighting industry. More information is available at www.lightingeurope.org.