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# Proposals to reduce light pollution in Ireland

The purpose of this circular is to provide recommendations on how light pollution should be dealt with in Ireland. We kindly request consideration to the recommendations and requests outline herein:

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## Introduction

The main topics outlined in this document cover the following themes:

- Dark Sky Ireland group and its goals
- Definitions and types of light pollution;
- Current concerns on expansion of public lighting in Ireland;
- Recommendations to reduce light pollution through responsible lighting;
- Light pollution in legislation

## Background

In October 2018, Dark Sky Ireland was formed as a national and cross border group<sup>i</sup> following multiple collaborations and partnerships between regional groups on the island of Ireland. Our common goal is to raise awareness of light pollution in Ireland and promote the use of responsible lighting through education and the development of a national policy and strategy in the absence of legislation.

## Light Pollution

There is no doubt that artificial lighting has its place in our world and is invaluable to businesses, homes, roads and recreation. However, when used inappropriately or

excessively, artificial lighting can cause light pollution. This has adverse effects on the environment, our health, biodiversity, and our climate (through energy waste).

Light Pollution takes several forms:

- Glare: Excessive brightness that causes visual discomfort
- Sky glow: Brightening of the night sky over inhabited areas
- Light trespass: Light falling where it is not intended or needed
- Clutter: Bright, confusing and excessive groupings of light sources

Addressing light pollution falls into three areas:

1. Shielding
2. Setting appropriate lighting levels
3. Consideration for lighting colour

Light levels in Ireland have increased by  $\approx 60\%$  over the period 1995-2015<sup>ii</sup> as determined from satellite measurements, mainly due to increased development during boom years.

The Growth of public lighting in the Republic of Ireland is 10x faster than that of Northern Ireland.

## Concerns on Public Lighting

We welcome government commitments to increase energy efficiency through changes in public lighting. However the widespread introduction of Light Emitting Diodes (LEDs) arrives with some unanticipated challenges. Most “white” LED lighting contains significant levels of blue rich light / high colour correlated temperatures (CCT), which is potentially hazardous to human health and wellbeing.<sup>iii</sup>

Blue rich light is also known to increase glare and compromise human vision, especially in the ageing eye.<sup>iv</sup> These lights create potential road safety problems for motorists and pedestrians alike. In natural settings, blue rich light at night has been shown to adversely affect wildlife behaviour and reproduction.

According to the 2016 “World Atlas of Artificial Night Sky Brightness”, street lighting and outdoor lighting retrofits using high (CCT 4,000 kelvin lamps) could result in a factor of 2.5 increase in light pollution.

Outdoor lighting with strong blue rich content is likely to increase skyglow because it has a significantly larger geographical reach.

## Night Sky Heritage Protection

Ireland is home to two internationally recognised dark sky places; Kerry International Dark Sky Reserve and Mayo International Dark Sky Park. Both have been awarded a gold tier for the quality of their night skies, free from light pollution and are important assets of natural night sky heritage.

Other regions in Ireland are also seeking international accreditation for the quality of their natural skies.

Dark sky places offer rural communities sustainable tourism opportunities during out-of-season periods and are sanctuaries of tranquillity for the public to enjoy the benefits of a natural night sky.

Without good design, planning and policy for reducing light pollution, there is a real risk of losing these natural heritage sites across the country.

## Light Pollution as an Environmental issue

UNESCO's Earth Charter states that the prevention of harm before it happens is the best method of environmental protection. When knowledge is limited, apply a precautionary approach:

- a. Take action to avoid the possibility of serious or irreversible environmental harm even when scientific knowledge is incomplete or inconclusive.
- b. Place the burden of proof on those who argue that a proposed activity will not cause significant harm, and make the responsible parties liable for environmental harm.

The introduction of blue-rich LED lighting in public places has evolved with almost<sup>v</sup>:

- No environmental impact assessments
- No definitive studies on human health
- No democratic sanctions, investigation or review of likely effects
- No widely accepted policies or standards on beneficial luminaire design or installation
- No concern for its effect upon night sky heritage

## Recommendations on public lighting:

We request the following recommendations are adopted into public light policy at the earliest opportunity:

1. New LED streetlights should have a correlated colour temperature of 2,700 kelvins or less as a default specification with exceptions justified.
2. Include lighting impacts in environmental assessments. Testing new street lighting ‘in situ’ before new schemes rolled out in wider areas. Involve residents’ response.
3. To include a Light Pollution Policy with the National Planning Framework and all Local Development Plans.
4. To include Environmental Zones with strict requirements in identified dark areas.
5. Set a preference for trimming (part-night lighting) schemes over dimming, in consultation with communities.
6. To ensure all public buildings and car parks lead by example. Lighting only when and where needed, with fully

shielded lighting (correlated colour temperature of <2,700 kelvin).

7. Preserve dark sky areas - Strong presumption against new lighting unless essential, in naturally dark areas.

### Light Pollution in legislation

Some countries in Europe have adopted legislation to deal with light pollution. Most notably, in France where new laws came into effect this month to deal with upward light emission, glare, light trespass and restrictions on the emission of blue rich light.

We currently have no legislation to manage light pollution, however, given the rapid growth of light pollution within Ireland, it may now be time for to reconsider this position.

### Conclusion

We understand the pressure to reduce carbon emissions through energy efficient lighting. However, we believe that implementing lighting nationally with high blue-rich content, may lead to future problems.

The UK's Chief Medical Officer's report for 2017 dedicates a full page to light pollution and health with references LEDs and blue rich lighting with the following comment. "*Local authorities [in the UK] have been replacing mercury and sodium street lights with LEDs. If this is done purely on the basis of energy efficiency and cost, it is possible to end up with installations that may not be fit for purpose.*"

We look forward to receiving a response to the content of this circular at your earliest convenience.

### Dark Sky Ireland

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<sup>ii</sup> Prof. Brian Espey, Astrophysics School of Physics, Trinity College Dublin,

<sup>iii</sup> American Medical Association Council on Science and Public Health Report 2-A-16: "Human and Environmental Effects of Light Emitting Diode (LED) Community Lighting", 2016 (PDF: <http://bit.ly/1UzSqVQ>).

<sup>iv</sup> Lin et al. Model predicting discomfort glare caused by LED road lights. *Optics Express* (2014) Vol. 22, no. 15, 18056-71 [10.1364/OE.22.018056](https://doi.org/10.1364/OE.22.018056)

<sup>v</sup> [https://www.britastro.org/dark-skies/cfds\\_issues.php?topic=bluerich](https://www.britastro.org/dark-skies/cfds_issues.php?topic=bluerich)