



Lighting Guidelines

This good lighting guidance has been compiled by the Commission for Dark Skies: Protect the Night. Following the advice in this leaflet will improve the night-time environment for wildlife, lessen harmful effects on human health, reduce greenhouse gases and enhance everyone's view of the inspiring night sky. Also, good lighting can improve your safety.



Summary - advice for efficient lighting

- **Lights should shine only *where* needed**
 - With the exception of guidance lights i.e. aircraft runways, lighthouses etc., lights should always shine **downward**, towards the target. Up-lighting should be avoided wherever possible.
 - Lights should be shielded from shining into neighbouring homes, to avoid causing nuisance and the risk of a range of health problems
- **Lights should shine only *when* needed**
 - Lighting is simply not needed in the vast majority of areas currently lit all night.
 - Often, not a single person will pass by a light between midnight and 5am.
- **These guidelines should be applied everywhere**
 - Poorly directed lighting in either urban or rural locations will have an impact visible for many miles
 - Wasted light is wasted money – approximately £1 bn per annum is wasted by inefficient lighting in the UK alone, and the wasted energy increases CO2 emissions
- **Apply the Earth Charter precautionary principle* avoiding environmental harm**
 - Respect biodiversity – unnecessary lighting has a devastating impact on nocturnal wildlife such as moths, owls and bats.
 - Any white lighting should be warm white in order to protect wildlife, human health and dark skies.

** The Earth Charter is a global consensus statement of values and principles for a sustainable future and has been adopted by many international organisations. Section II.6 states 'Preventing harm is the best method of environmental protection and, when knowledge is limited, apply a precautionary approach'.*

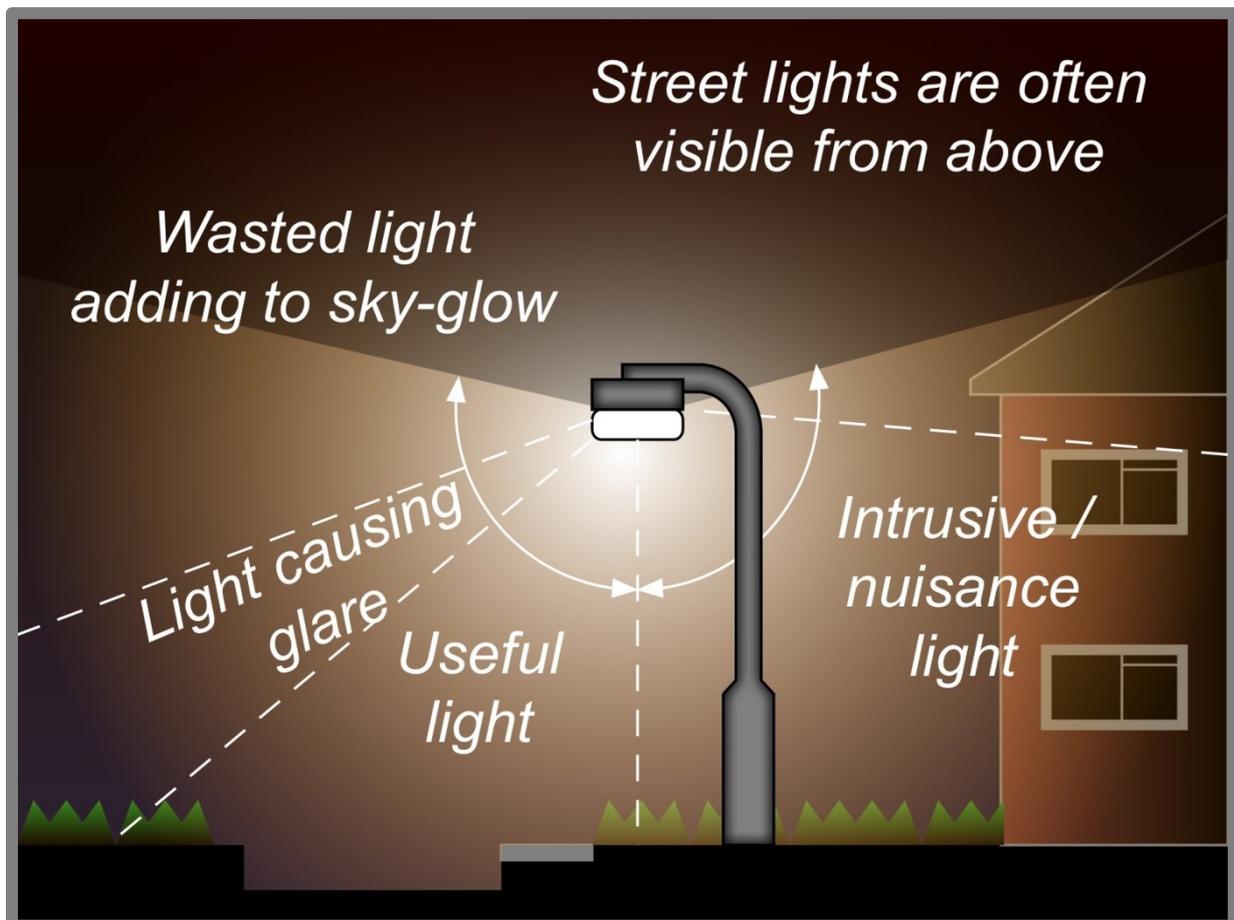


Poor Street Lighting

Poorly directed street lighting is a main contributor to light pollution, shining into people's homes and into the sky, causing the orange / grey smog (sky-glow) that hangs over urban areas, and can be seen far away in the countryside.



Only Full Cut-Off (FCO) lights should be used for lighting streets. These provide excellent spread along the street, and prevent light being wasted into the sky. Because they are better directed, it is often the case that fewer FCO lights are required compared to lighting with lenses. The effects of non-cut off street light are illustrated below.



Good Street Lighting

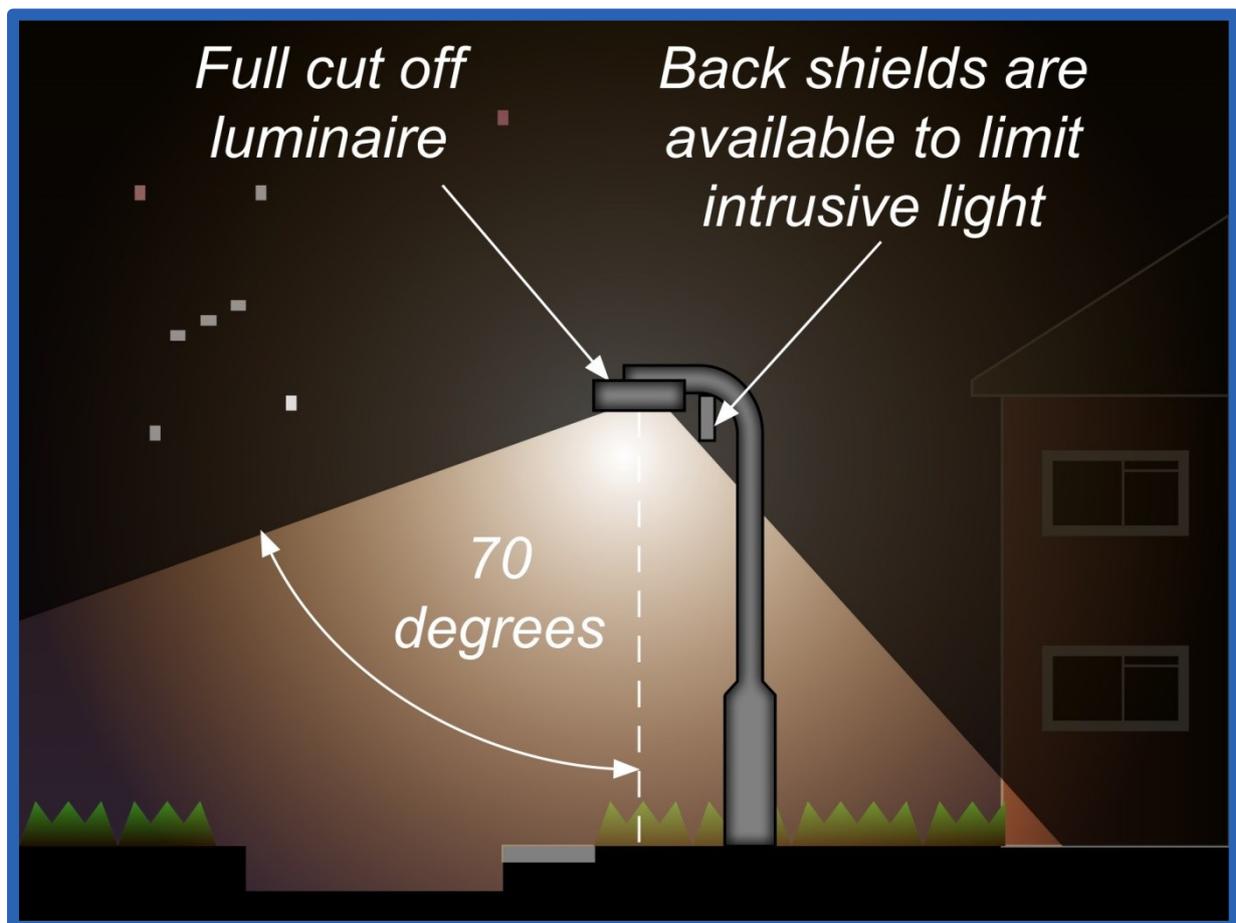
Street lights should be shielded to prevent light spilling:

- into people's homes and properties
- sideways and above 70 degrees from the vertical

In areas where part-night switch off is not done, street lights should be dimmable overnight, when few (if any) cars or people are around. Such technology also allows newer (cleaner and brighter) lights to be run at lower power.

In testing*, significant dimming (over 30%) and energy savings were achieved without being noticeable to the public.

Below: Typical well directed full cut-off street lighting, with shields



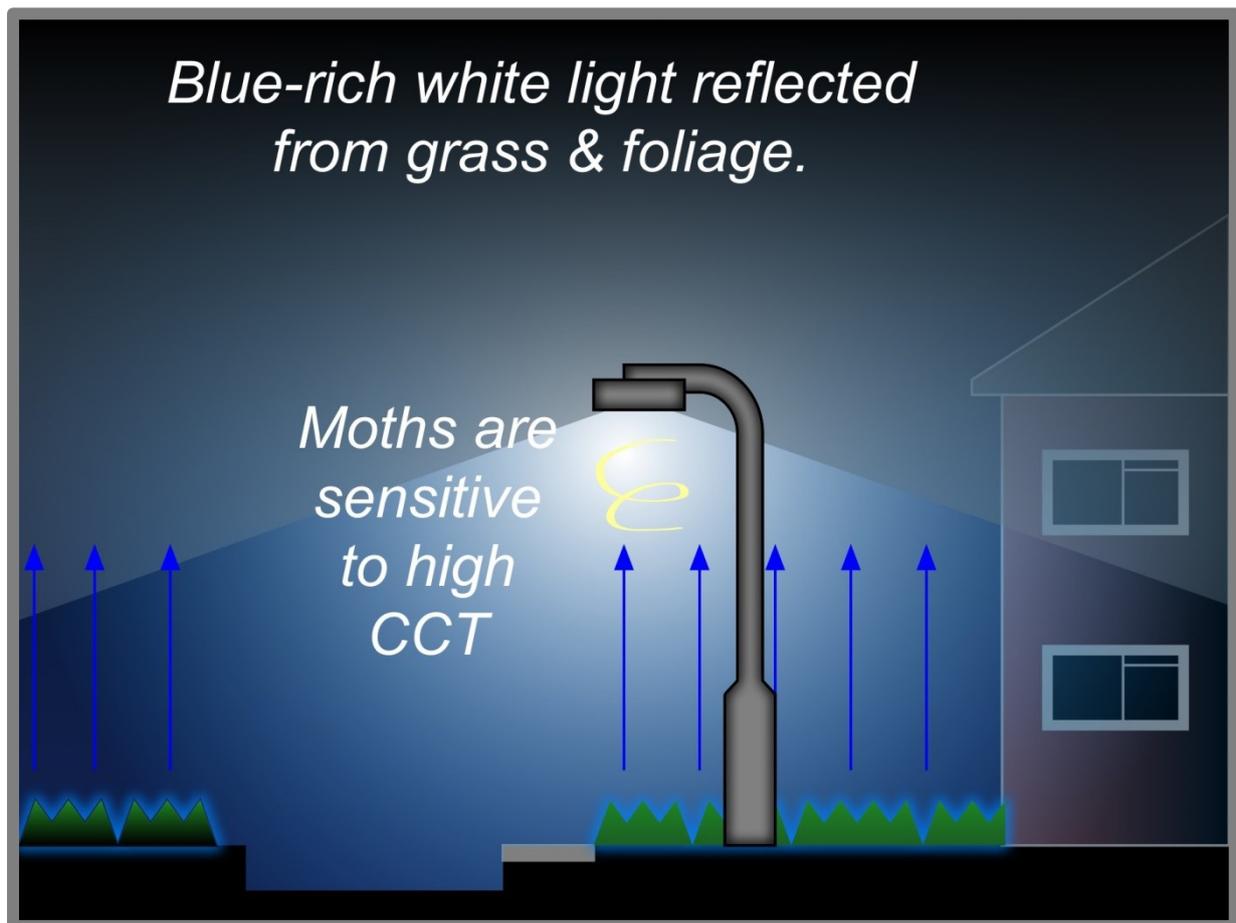
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Blue-rich white lighting

White light comprises all colours in the spectrum from violet-blue (380-495nm) to red (620-750nm). The proportion of blue in the white light mix is quantified by the Colour Correction Temperature (CCT) index; higher CCT equals more blue light relative to other colours.

Recent widespread introduction of blue-rich white lighting is causing concern among environmentalists and astronomers. New and existing white light sources can have very high colour temperatures in excess of 5500K. This harsh blue-white light reflects from grass and foliage and scatters high into the atmosphere, causing more than **five times more sky-glow** than current low CCT sodium based lights. Good FCO shielding is counteracted by high CCT.

To avoid sky-glow, all lights should have a colour temperature less than **3000K** as a default specification. Exceptions must be justified.



Home & business floodlighting

Floodlights are expensive to run and very inefficient, shining light over a wide area rather than just where it is required. Their intense glare can hide criminal activity. While 500W may be suitable for a sports field, it is 10-20 times that required in a typical domestic setting.

If floodlighting is unavoidable, ensure that the light shines downwards, only to where the light is required, and not onto roads, neighbouring homes and property.

According to the UK Government Crime-prevention website, the popularity of floodlighting is "...unfortunate, as in many locations it is inappropriately installed and other forms of lighting could make for a better choice". Poorly aimed floodlighting has been implicated in fatal accidents caused by glare.



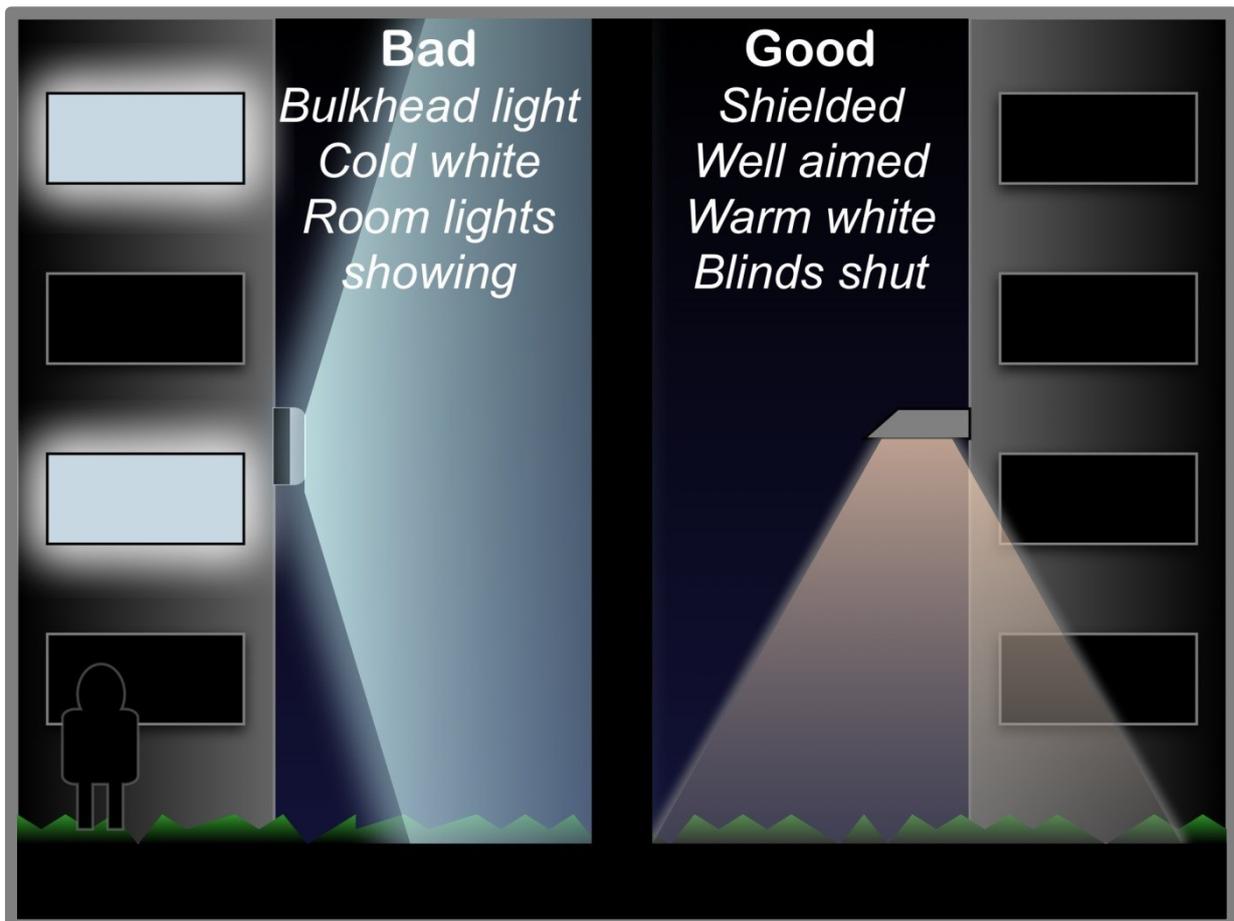
Business lighting

Unshielded bulkhead lighting (wall packs) should be avoided, since the majority of the light actually shines into people's eyes, causing glare which can actually make an area less visible. This is especially dangerous near moving vehicles, and criminals have broken into buildings directly beneath such lights, using the glare to conceal their criminal activity.



Bad security lights on commercial building - photo Ron Arbour

For safety, security and economy use shielded bulkhead lighting that shines light down only where needed



CfDS: Protect the Night

CfDS Recommendations

- ✓ **Luminaire** - modern 70 degree full cut-off, energy efficient lights, fitted with shields where light trespass is an issue (1)
- ✓ **Colour** - warm white or orange colour lights with CCT of less than 3000K (2)
- ✓ **Control** - remotely controllable lighting technology allowing lights to be dimmed or turned off completely if local conditions and policies permit (3)
- ✓ **Brightness** - the minimum luminous intensity consistent with relevant codes of practice taking care not to over-specify; for example, due to maintenance and colour rendering factors
- ✓ **Design** - lighting schemes should be designed by lighting professionals given the brief to minimise sky-glow both locally and into the surrounding country
- ✓ **Community** - householders and businesses can use the guidance shown in preceding pages to get star-quality results by taking extra care when installing flood and other lighting
- ✓ **Wildlife** - consider allocating space for dark areas and corridors, particularly near water, to give nature a chance.

Adopting these lighting principles can lead to dramatic decreases in both running cost and the amount of light pollution produced. Security can improve and harm to wildlife is reduced.

Notes:

- 1) Benefits are mostly local
- 2) Benefits mostly at distance
- 3) Bright lighting levels are simply not needed throughout the entire night. In a recent experiment in York City Centre, only 5% of respondents to a survey correctly observed that street-lights had been dimmed. No crimes were reported around the dimmed lights during the trial period.



Galloway Forest Park Dark Skies
by James Hilder – we can all share these beautiful skies if we act together to cut sky-glow



Contact the Commission for Dark Skies: Protect the Night

<http://www.britastro.org/dark-skies> Page 8 of Publication: CfDS1420_E_Good_Lighting