

Environment and cost

Nearly all electricity in Australia is generated by burning fossil fuels. In South Australia wasted light from light pollution costs over \$5 million dollars of electricity per year and produces more than 70,000 tons of carbon dioxide emissions.

The cost world-wide runs into billions of dollars and millions of tonnes of greenhouse emissions!

In South Australia, saving the greenhouse emissions from light pollution is equivalent to taking 10,000 cars off the state's roads. Yet the cost returns from changing over to shielded, efficient light fixtures for business, security and public lighting will turnover in just a few years.

Stray light also upsets many types of wildlife and flora by causing disruption to circadian (day-night) rhythms. There is evidence that it can create stress and lowered immunity in humans.

Most bad lighting installations can be remedied by carefully considering what needs to be illuminated and installing energy efficient, properly shielded light fixtures for the purpose.



Good: This box floodlight directs all light below the horizontal. It is excellent for businesses, car yards and parking lots. It minimises stray light and creates quality, low-glare illumination.



Bad: Absolutely no consideration was given to aiming nor shielding of this floodlight. It is excessively glary, and much of the light shines wastefully skyward!



Good: Do-it-yourself standard BBQ floodlight fitted with a homemade tin hood and secured with a 10cm hose-clamp. Avoids light trespass, glare and wasted light.

More information

This brochure:

<http://www.assa.org.au/lightpollution>

International Dark-Sky Association:

<http://www.darksky.org>

Martin Lewicki's Light Pollution Pages:

<http://astronomy.trilobytes.com.au/martin-lewicki>

ASV Light Pollution Notes:

<http://www.asv.org.au>

Light Pollution Awareness:

<http://members.aol.com/ctstarwchr>

Lighting and Crime - some surprising answers:

<http://crimeprevention.rutgers.edu/brochures/lighting2/lighting.htm>

Obtrusive Lighting and Designated Optical Observatories:

http://www.atnf.csiro.au/asa_www/observatories.html

Light Pollution and Breast Cancer:

<http://www.geocities.com/eric74382000/bc.htm>



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Light Pollution

Astronomers world-wide are concerned with the disappearing stars in the night sky due to increasing skyglow from uncontrolled urban uplift.



Adelaide's light pollution halo encroaching into the sky in this star-trail photograph taken 120km north of the city. Photo by Justin Tilbrook.

Light pollution is stray light emitted from poorly designed and aimed lighting installations for advertising, business, security and street lighting. While some light is unavoidably reflected upward from illuminated surfaces, much of it spills outside the area that it is meant to illuminate creating **glare, light trespass** and **skyglow**.

This stray light and the energy generated to produce it is wasted. It unnecessarily contributes to greenhouse emissions, and wastes money. Also, this wasted light does not necessarily contribute to safety nor enhance amenity. Very often it creates a nuisance. We do need outdoor lighting at night but there are better alternatives that save energy and improve the quality of night-time lighting that also help to reduce skyglow and preserve the night sky.

Light pollution is much easier and cheaper to remedy than most other kinds of pollution!

The problem

Glare

A proportion of street-lights, car-yard and security lights are chosen and installed with little consideration for efficiency and aiming. Glare from these lights can shine directly into the eyes creating discomfort. This can make it difficult for the eye to adjust effectively to changing levels of illumination thereby compromising night vision.

Light Trespass

Uncontrolled light that spills outside the area that it is designated to illuminate and onto neighbouring properties. This often creates a nuisance, detracts from amenity and wastes energy and money.

Skyglow

Light that escapes upward from unshielded light fixtures or lights that are indiscriminately aimed upwards. This light is completely wasted, scattering in the atmosphere creating skyglow and detracts from the beauty of the starry sky at night. In particular, growing skyglow is compromising the effectiveness of many of the world's great astronomical observatories that provide for us a window to the universe!

Many constellations as seen from urban areas are disappearing due to escalating light pollution.



Glary globe-lights at a car park waste light sideways and upwards, and contribute to skyglow.

The solution

Streetlights can be replaced with full cut-off fixtures (all light directed downward - no light emitted upward) and fitted with energy efficient lamps. Sign lighting should preferably be aimed down on signs - not upwards. Outdoor security, and display lighting should be fitted with quality shielded flood lights and fitted with efficient lamps directing light at the target area only. Residential BBQ floodlights can be shielded to minimise light trespass and uplight. Also, avoid over lighting where possible. This will save money and energy.

We don't need "more lights". We need more effective lights.

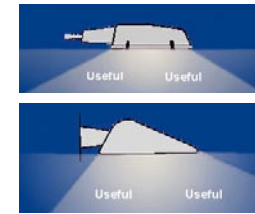
In Australia this will save tens of million of dollars in electricity and hundreds of thousands tonnes of carbon dioxide emissions per year. In addition, efficient, quality, shielded outdoor lighting creates better illumination and contributes to safety. It also helps to bring the stars back to the night sky by reducing sky glow.

Lighting controls are increasingly adopted in many countries around the world with benefits in energy savings, and improved efficacy in lighting. In Australia we have good outdoor lighting Standards. Some councils comply while most business and private installations still ignore them.



Quality full cut-off road lights on Sir Donald Bradman Drive reduce glare and facilitate night vision.

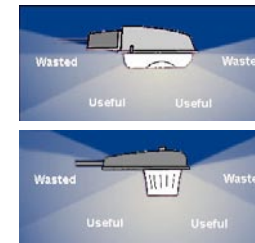
The good



Full cut-off fixtures direct light below the horizontal. At top is one of the standard "cobra head" fixtures fitted with a flat glass. It aims light downward and sideways avoiding uplight and glare that improves the quality of lighting.

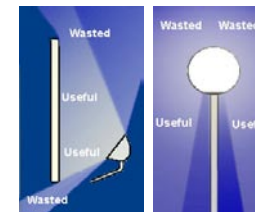
The floodlight (bottom) is mounted horizontally for security lighting and areas such as car yards and parking lots.

The bad



These semi cut-off lights are fitted with droplenses or refractors that emit a greater portion of their light sideways for wider road coverage but create more glare. They also send light upwards that contributes to skyglow. Full cut-off fixtures should be considered as an alternative. Mercury lights (bottom) are a bad choice. They are especially glary and inefficient compared to other lights and their used should be discouraged.

The ugly



Intended to highlight advertising or "enhance" architecture, these globe-type and upward aimed billboard lights can indiscriminately spray light everywhere. Badly aimed sign, business, and architectural lighting are often placed so that a substantial portion of the light completely misses its target and adds to wasted light and sky glow. Posttop lights used for pathway and parkland lighting such as this globe-light waste light skyward. They should preferably be replaced with aesthetic alternatives that direct light below the horizontal.