

# Light Pollution: It Gets Worse

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## What is Light Pollution?

Light pollution is the presence of inefficient, unwanted, inappropriate, unnecessary or excessive artificial lighting and is a result of poorly implemented lighting and especially inadequately planned street lights.

Single offending light sources will often be guilty of one or more of these forms of pollution:

1. sky-glow;
2. direct glare;
3. light trespass; and
4. over-illumination of the task area.

Sky glow is caused mostly by lighting fixtures which emit upward directional light. The light is reflected and refracted by the air molecules, brightening the overall sky from wasted energy. That misdirected light was created from electricity paid for by the local ratepayers.

Glare can be either (i) direct or (ii) indirect but still within the peripheral field of view. It produces a reduced ability to see when confronted with bright light such as direct or reflected sunlight or artificial light such as car. Just as two car drivers in the direct line of sight are dazzled if they fail to dip their headlights as their vehicles approach each other, the direct glare from poorly designed street lighting fixtures, aimed sideways instead of down, will dazzle the eyes.

Light trespass is where a lighting fixture on one property illuminates an adjacent property. In the case of street lighting this means light falling on nearby residents properties.

It is not the job of local councils to use ratepayers money to brightly illuminate front gardens and building facia. It is homeowners responsibility to illuminate (or not illuminate) their own properties (without illuminating their neighbour's property).

Over-illumination is a common design flaw which results in more wasted energy costs. The illumination level across the life-time of the lamp should meet - but not excessively exceed - the average levels recommended in the Australian Standards.

Light pollution is responsible for the loss of the night sky, wasted energy, wasted public money, increased carbon emissions, a false sense of security due to over-illumination and has well-documented negative effects on wild life.

## Street Lighting Principles

The design of good external lighting, including street lighting, revolves around four principles:

1. comply with every relevant Australian Standard;
2. prevent direct glare to the human eye;
3. meet the prescribed average illumination level, evenly spread across the task area; and
4. allow no more than minimal light spillage outside the task area.

## Australian Standards

During my working career as an electrical design engineer I was familiar with the relevant Australian Standards for external and street lighting. Being retired, I no longer have access to those expensive documents but I believe they are now:

AS/NZS 4282:2019	Control of the obtrusive effects of outdoor lighting.
AS/NZS 1158.3.1:2020	Lighting for roads and public spaces.
AS/NZS 60598.2.3:2015	Luminaires for road and street lighting.

## The Local Situation

It's deteriorating fast!

The first street lights were gaslit.

Then, when I was young, the streets where I once lived were illuminated by inefficient 60 watt tungsten light globes. Since then the world has progressed through fluorescent and mercury vapour lamps to highly efficient modern LED lights.

With each new step the lighting levels achieved were increased, so that instead of darkness being the problem, it is now over-illumination and uncontrolled intense glare which have become the issues.

The organisation which maintains our local regional street lighting in Macarthur is *Endeavour Energy*. Their current major task is to phase out all mercury lighting by 2025.

Their choice of replacement fixture is too bright and has no directional control, such as a prismatic lens and internal reflector. The light is sent upwards (which is wasting money) and sideways (which dazzles the eyes and over-illuminates private property).

As I look out from my home at night, I can see the direct lighting source of every visible street lamp, including those that due to the terrain are at the same level as I am. Every one of them is contributing to sky-glow, direct glare discomfort; light trespass; wasted energy; and wasted ratepayers money.

Local councils in Australia have been directly responsible for making light pollution worse than it was previously by not taking leadership and not insisting that their street lighting complies with the relevant Australian Standards.

Councils should be specifying a deeper fixture with a reflector around the lamp source to direct light down and a visor to shield adjacent properties from the direct glare. In a recent phone conversation I had with Endeavour's lighting engineer it became clear that he did not comprehend the basic design criteria of glare elimination!

## The MAS Position

MAS made its position clear back in 2010-11. That was when I drafted the Society's [Light Pollution Policy](#), which was adopted and remains now.

Soon after that, I represented the Society at a meeting with the Director of Development at Campbelltown Council. The purpose was to inform the Council, of the MAS position on light pollution and to request the Council consider reducing light pollution when planning new street lighting or replacing old installations.

It seemed to go well, with the Director grasping the issue of light pollution and glare. He showed interest and promised to install glare controlled street lighting in new developments. I hope he learned something from that meeting but unfortunately he soon moved to a new position and Council as a whole promptly forgot about light pollution.

I realised this four years later in 2015 when MAS held the first public stargazing night at the newly relocated Campbelltown Rotary Observatory. Standing up on the observatory hilltop, looking down at the new street lights in the new suburb of Macarthur Heights, the bright lamps were all shining **upwards** at us like bright stars below. In that moment my heart sank and I knew the meaning of failure.

## Roger Powell

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Almost my entire working life was spent as an electrical design engineer - first in the UK and then in Australia - designing and supervising the installation of electrical systems in and around large complex buildings, which often included external floodlighting and roadway lighting.