

## The Benefits of LEDs

*By Robin Day, Managing Director, EcoLEDLighting Ltd*

In general, current lighting is achieved by the use of common filament or fluorescent bulbs or tubes and this process has barely changed in more than 100 years. The technology and systems are fully understood and the common applications are endless. Most people have been comfortable with both the range available and associated cost implications.

Costs and efficiency of conventional lighting have not been questioned until recently because most people are unaware of any alternative means of lighting. However, environmental awareness can no longer be ignored and change in attitudes made by education and in law have meant that new alternatives in lighting technology are more necessary than ever.

The emergence and continuing improvements of Light Emitting Diodes (LEDs) over the past 10 years has helped the technology break through into the general lighting market, and this trend will continue as purchasers become aware of the substantial benefits LEDs have when compared to conventional lighting.

Initially the LED lighting industry had targeted the commercial and military aerospace industries where the benefits of applying LED lighting technology have already achieved substantial energy savings. These savings are compounded by a massive reduction in maintenance costs. The application of LED lighting is now commonplace in both retrofit and new build aircraft. (See Case Study box)

LED lighting represents a major contributor to reduced running costs both to exterior and interior lighting of private homes, public and commercial premises - where the cost of conventional energy (i.e. mains electricity) is high or not available in remote locations.

The application of LEDs to create light offers many opportunities to make not only substantial savings in cost of general lighting but also a significant reduction in environmental impact over conventional mains power generation.

The main benefits include:

**Lower Total Cost of Ownership (TCO):** A cost effective, long term, outright cost of ownership with minimal initial system outlay if this application is used as a replacement light supply using reduced voltage mains power (110Vac or 240Vac converted to 12Vdc or 24Vdc). If applied using 'solar' power technology, then the savings are considerably greater simply because sunlight is free and the fully developed technology to convert that to electrical power is available – off the shelf.

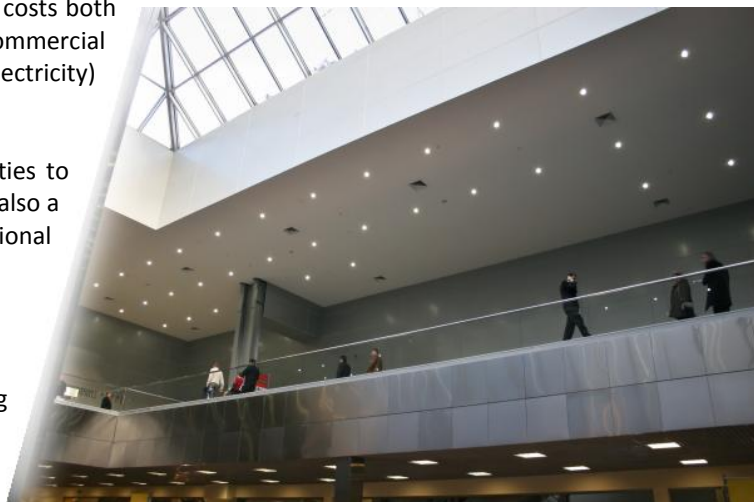
**Wider range of working voltage options:** LEDs only require tiny amounts of power to operate efficiently which is ideal when considering systems to be run from solar or wind generated power. There is also the option of running LED lighting systems from mains generated power (110Vac or 220Vac) via conventional transformers at vastly reduced running costs.

**Reduced power consumption:** When compared to conventional mains powered lighting solutions, savings of 80% - 95% are common in many LED applications by using low voltage DC power from either solar or mains power as described previously.

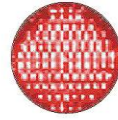
**Increased Life and Decreased Maintenance:** The typical total life of 100,000 hours (10+ years) per unit with minimal degradation of light output, eliminates the cost of periodic re-lamping and regular maintenance. LED units are also tamper/vandal proof.

**Low Heat Output:** Maximum LED operating temperatures are typically 60°C rather than the 300° - 450°C operating temperatures of conventional lighting solutions. Heat pollution is therefore reduced offering savings of secondary interior systems such as air conditioning.

**Eliminating Light Pollution:** Light Pollution is virtually eliminated as light output from LEDs is directional, only directing light where it is required. This is highly efficient as no light is wasted when compared to conventional lighting where light is typically omni-directional from bulbs or tubes. Beams are available from 2° - 135° for specific light guidance from light source.



# EcoLEDLighting



**Quality of Light:** The quality of the 'White' light available can be tailored to suit the human eye – eliminating eye strain, which in certain working and living environments can have adverse and costly implications, together with Health and Safety issues. LEDs do not produce ultraviolet light and can be perfectly matched to a specific 'Colour Index' for industrial and regulatory standards requirements.

**Reducing Carbon Emissions:** LED lighting systems are environmentally and ecologically friendly. Other than the massive reduction in use of conventionally generated energy, there are no poisonous elements used in component manufacture, such as Mercury and other noxious and polluting gases. For every 10kWh of useable energy generated by a solar panel, 7Kg of Carbon Dioxide gas is saved from being produced and entering the atmosphere.

**Dimmable Control:** Instant On / fully dimmable illumination with colour lighting options are available with DMX software control.

**Shock Resistant:** Unlike typical conventional light sources, LEDs are not subject to sudden failure or burnout as there are no filaments to burn out or break. In LEDs, the light emits from fully encapsulated silicon diodes immersed in phosphor, which can be energised from a very low voltage input.

## EcoLEDLighting and LEDs

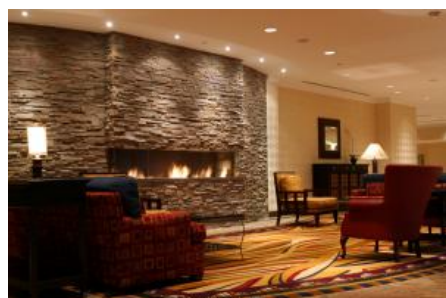
EcoLEDLighting was established to design and manufacture state of the art, solid state LED lighting solutions specifically for the environmentally friendly, solar powered global marketplace and are also able to offer a range of direct replacement lighting solutions.

EcoLEDLighting initially targeted the Security, Emergency and Exterior Lighting applications marketplace as this was an ideal application of LED lighting technology using solar/wind power. It was here that conventional lighting was regarded not only as a wasteful and costly requirement, but where ongoing maintenance costs continue to be high and a continuous supply of mains power is not guaranteed. EcoLEDLighting felt they had a unique product where their 'Battery Back Up' system was not dependant on mains power – something that is still not guaranteed in many Developing Countries.

There are other features of the EcoLEDLighting's specific product design which make for an ideal application of LED lighting technology in both solar (12 and 24 Volt) and mains (110 and 220 Volt) power systems.

More recently, EcoLEDLighting has diversified into the mains powered LED industry, as we have realised a number of potential applications for this technology. In the present environmentally aware climate and due to ongoing legislation, the company specifically designed Part L compliant MR16 replacement downlighters, incorporating many of the design features that the company had previously developed in terms of light and thermal management issues.

EcoLEDLighting realised that production of durable, high quality lighting components was seriously flawed and did not offer the potential available if the technology was applied correctly.



EcoLEDLighting products are specifically designed and manufactured in conjunction with our technology supply partners to apply all the benefits of continued high output lighting and durability to the maximum predicted component life and as such many elements of our designs are patented and copyrighted.

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## Case Study – Airbus A380

In designing the new Airbus A380 aircraft, designers were sensitive to profit implications from weight of fuel versus carried payload: More flights were to be completed for less fuel cost and increased cargo payload.

By choosing LED Lighting and the consequential 80% reduction from conventional lighting cabling mass, the low voltage requirement meant that ¾ ton of on-board generators were not needed. Fuel usage will also drop by as much as 6¼ tons per trip (typically 240 tonnes required for the Sydney/LA flight) or 7 tons of additional passengers/cargo.

The principal saving will be the reduced cost of running the power generation sub systems and air conditioning but with the added value of the elimination of ongoing of maintenance costs.