

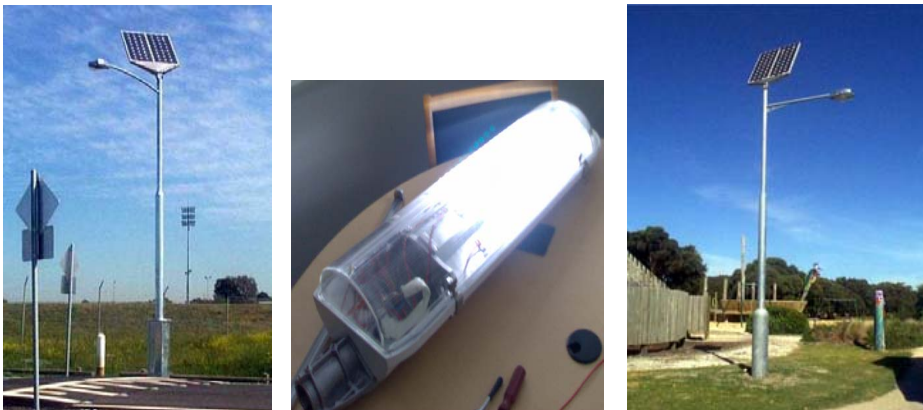
“SUNFIRE” LED STREET LIGHT & SUNBURST AREA FLOODLIGHTING

CobraComms Ltd and Barnett Engineering, UK run companies are in the forefront of Alternative power and energy solutions.

CobraComms has finally released the most technically advanced LED solar street light and area floodlight available in the world today. This latest addition to our product line offers consumers the brightest light for low power, a distinct advantage when it comes to low power consumption high performance lighting. The lights were originally designed to provide area security lighting for mobile operators cellular sites.

“The LED light provided a high quality security area lighting whilst enabling us to lower our electricity power consumption, not to mention the servicing and replacement of bulbs. Previously we were having to replace the halogen or HPS lights every 6 or 12 months or whenever they were vandalised by kids throwing stones, now we have a lower power bill, no maintenance or bulb replacements because there aren’t any”. Chief Operations Officer Weblinks, Caribbean.

The Photovoltaic lighting systems are a uniquely designed, enabling the customer a range of turn-key solutions from a simple street or municipal building security light to the ambitious high wattage AC mains powered street light all using the LEDs, PV solar panels or AC mains.



The LED lights can be powered either from mains power or solar mounted onto the poles.

MARKET OPPORTUNITIES

Reducing power consumptions, lowering carbon emissions & reducing Operational Costs (OpEX) has become a number 1 priority for governments worldwide. Countries throughout the world have set targets in reducing carbon emissions to help combat the effects of global warming.

One of the easiest ways in helping to reduce power consumption and reduce the power requirement on fossil fuel power plants to help relieve the pressure or burden of carbon emissions is the switch off lights where possible, unfortunately this isn’t possible however it is possible to



reduce the power consumption by using more efficient and less power hungry lights such as the SunFire LED street light.

Why LED lighting???

In the world today there is a distinct lack of fossil fuels, with the ever increasing fuel price or price per kWatt of supplied electricity increasing between 10 – 30% each year, the cost of running massive amounts of lighting systems for road or street lighting is becoming extremely expensive. Therefore it only seems logical that we use an alternative that provides us with the same or better lighting but using less power or what natural resources are available to us that are **free**, “the sun”.

Cutting edge companies across the world are now accepting that the LED light is the way of the future, same or better light levels can be achieved with benefits of lowering the overall power consumption as well as dramatically reducing servicing costs.

Today LEDs are marketed on the ability to save the consumer money by not having to replace them for 50,000 – 100,000 hours or longer. If we take this time and break it down to the average dark hours (10 hours per day) then this equates to the LED reaching its 70% light output between 13.7 – 27.3 years depending how hard the light is driven and the light operating temperatures. This sounds great, but what of the other benefits.

A standard EU B Class High Pressure Sodium of 35w will actually require 43 – 44watts to run because of losses in the electrical circuits within the light. On start up the HPS can use up to 7 times it's power whilst warming up, this means that AC ground cables need to be sized accordingly to ensure it can carry the current to the lights, this includes all circuit breakers. LED lights don't have this problem as the light is instantaneous and reaches full intensity within milliseconds.

The equivalent LED streetlight to the 35W HPS streetlight would be the SunFire 1 operating at less than 55% (20watts) of its full adjustable power, the LED provides more foot candles per lumen on the ground than conventional amber SOX or SON fixtures.

The standard streetlight bulbs are inefficient in getting all of the light to the ground or target area, this can mean up to 40% of the light bounces back within the fixture or is unable to stay on the ground. A LED light of approx 1,850 lm is equivalent to a standard HPS bulb providing approx 6,000lm.

Colour resilience between the standard amber to bright white light is another major factor to be considered. The human eye can see far better at night with white light than amber, this is because the light uses a blue-green part of the light spectrum that human eyes/brains can react to more efficiently.

There are advanced benefits by using LED Solar lighting. Solar enables the company responsible for paying the huge power cabling infrastructure and running costs to maximise their profits by lowering their capital and operational expenditure. It also enables to add a single or a small string of poles to an area without huge costs or disruption to roads or pedestrian areas.



Solar street lights are designed to run totally independent from the power grid, maintenance free with some on going power operational costs. (Battery changes)

Applications for our SunFire Streetlight range

- B Class roads (Residential streets, small 2 lane roads)
- A Class roads (Main roads, highways, roundabouts, junctions, dual carriageways motorways)
- Perimeter security fencing
- Tunnels
- Paths

Applications for our SunBurst Area & Security lighting range

- Housing security lighting
- Business or governmental securing lighting
- Military compounds
- Car parking or area lighting
- Shopping precincts
- Forecourts
- Municipal building floodlighting or security lighting
- Lighting shopping areas, military installations, docks airports etc..
- Sports Grounds/Stadiums, Concert Venues
- Tunnels, Mines
- Industrial Estates
- Garages, Service Stations
- Storage Facilities, Warehousing
- Railway/Bus Stations
- Sports Grounds/Stadiums, Concert Venues
- Tunnels, Mines
- Industrial Estates
- Garages, Service Stations
- Storage Facilities, Warehousing
- Railway/Bus Stations

Benefits of LED street lighting

Low or No energy running costs

The lights are powered instantaneously without massive start up current. The light is fitted with a redundant PV light sensor that switches on the light on low light levels, the light intensity increases as the ambient light becomes darker until it reaches it's pre-set upper threshold. As the ambient light becomes lighter the light automatically decreases in power and light intensity until it reaches its lower ambient set threshold where it turns off. By enabling the light to



intensify as it becomes darker and visa versa as the ambient light becomes brighter this reduces the dramatically reduces the amount of power the lights require.

When running the light from Solar or Wind the light requires no cabling or power from the grid. The system is run by the system battery during the day, the battery is charged and recharged by the solar properties of the sun or wind enabling the lights to run once installed free of charge.

Comparative capital expenditure

Implementation of Shore power AC lighting requires the user to plan and run masses amounts of infrastructure work to dig trenches or duct to lay the huge amounts of power cabling, this cabling is susceptible to damage by reworks or people/business trying to tap into this power cabling system to obtain free power.

This system requires large construction and logistical support to roll out a lighting system for roads.

The solar street light is individually powered and only requires the street pole to be erected.

However, if using AC mains powered lights, the cabling and circuit breaker requirement is somewhat lower as the initial surge of power to light the standard SOX lights isn't experienced with using the SunFire LED light.

Long Life

The current and most popular lights are the "Sodium or compact florescent lamps", these require replacing between 2 – 3 years 4,000 – 10,000 hours. Long lasting LED (Light emitting Diodes) lighting means that lamp failures are a thing of the past. LED lighting life (to 70% efficiency) will vary between 50,000 - 100,000 hours depending on the current driving the LEDs and the operating heat of the LEDs. In a typical European night time light coverage situation, this equates to approximately 13 – 26 years. (to 70% efficiency only the light will continue to function)

Reliability

LED's as electronic devices, offer superb reliability over conventional lamps. With LED lights they come in clusters of many LED light bulbs to provide the amount of light required, if a single LED light was to fail then this still allows the lamp to function as normal with no real visible reduction in the overall performance, however alternatively if a standard SOX or florescent light is used then one light damaged or not working will result in no light being emitted from that lamp post until resources are sent out to replace the bulb, this becomes expensive not for the replacement bulb but for services to replace and replenish systems.

We have added the "self healing" light function to our lights. The lights are fitted with many features and fail safes such as, if one LED fails the light continues to operate the lose of one LED or a pair of LEDs has little affect to the overall output of the light. If a driver fails for a single strip the self healing function takes affect where the other strips increase their power to make up for the lose of power to the failed strip, this increases the light output to make up for the failed



strip. Another feature to ensure longevity is the temperature monitoring of the LEDs, this means that when the LED driver board reaches a set temperature the current to the LEDs decreases slightly until the temperature is reduced on the board, this helps to ensure that the LED's last the maximum life.

Maintenance free operation

Little to no routine maintenance is required to ensure continued performance, this again helps to reduce costs and avoid the possibility of missed maintenance.

An optional function is for our lights to report back to an operations centre the lights serial number if it fails to work, this way there is no requirement for someone to aimlessly drive around in the day or night to see which lights fail to work or continue to work in the day.

The other function is light diagnostic interrogation / testing remotely. By remotely connecting into the light head via IR (infaRed) secure link from the bottom of the pole a diagnostic report or picture of the light can be obtained. This can save time and resources by only having to physically open and test lights that are under performing.

On solar powered street lights the system isn't reliant on shore power, in times of power outages the solar lights will continue to provide light to the areas required and will remain totally unaffected by the blackouts.

Energy efficient

With our innovative LEDs luminaries design, energy efficient operation is ensured. Other LED lights currently cannot provide enough power to a single LED diode to produce the amount of output power required to compete with the SOX or florescent lights. Our lights not only compete but surpass these with our high lux brilliant white high watt extremely low energy consumption LED light array (5,000 – 10,000K). Tests have shown that the SunFire range can operate at less than 55% power compared with the SOX light.

Environmental benefits

Lamp disposal problems are eliminated due to the long life of LED lights. In today's society each company or government organisation has the responsible to reduce the fuel/power consumption. Because of the increased colour resilience lower lumens or lux levels that can be provided by the white light a reduction in power can be achieved between 45 - 60% +. A major environmental issue is waste from spent bulbs (end of life), this will be almost a thing of the past with less waste with light lasting 10 -15 times longer and the LED lamps being made by materials that are almost 100% recyclable.

Safety

The SunFire range are powered by low voltage DC (direct current) power between 10 – 28Vdc. The power the lights from the standard AC mains an AC to DC transformer is added either at the top of the pole (for existing lights) or at the bottom of the pole for new lighting. If for some reason the pole was to callapse due to an impact with a vehicle the power travelling up the pole



would be low voltage, the auto power cut of on impact system can be added if required to this system.

Savings

The light has been designed to be able to adjust the output watts by an adjustable pot, the LED is intended for a replacement for all HPS, SON, Halogen, Filament lights, for which it will **save between 45 - 60% +** on your present costs and power consumption. For example: Our LED light set at 75watt output uses 84w - 87 watts, and the equivalent HPS 100watt HPS uses about 130watts with ballast. More importantly each light will save approx 241kWh of power per light per year, imagine how much power could be saved country wide.

A basic cost comparison.

SOX 35W (43watts)

Average run time of 10 hours per day x 365 days = 3,650 hours

3,650hrs x 43 watts = **1,569Kwatts** x 10p or cents per watt = £156.95

Over 6 years 2 services @ £40 per light replacement and service a Grant Total = £550.85

LED Light

Average run time of 3,650 hours

3,650hrs x 17watts = **62Kwatts** x 10pence or cents per watt = £62.00

Over 6 years no bulb replacement or service, a Grant Total = £62

A saving of £488.85 per light. If using solar then a saving of £550.85.

More importantly it is a saving of 1,507Kwatts, just imagine 1,000,000 of these lights in residential areas that would be a saving of **150.7GigaWatts** per year.

Mains Power Light Comparisons

SunFire 3 light set to 100watt output consumes 100watts, this would be equivalent to the SOX 225watt light output. Because we are driving the light at its lower power threshold it helps to increase the light expectancy between 80,000 – 100,000 (18 – 23 years) to its 70% output light performance not to light failure, this will be well over 100,000 hours.

Example:

Assumptions:

- Based on an average of 10 hours of lighting required per 24hour period
- Based on the light power consumption of 80watts compared to a SOX of 225Watts



SunFire LED Light

80 watts x 10 hours = 800watts

An annual power consumption of - 292kWatts.

Services for LED lights in 10 years – 1 (Remote interrogation)

Replacement bulbs for LED lights in 10 years - 0

SOX Light

SOX light 225watts x 10 hours = 2,250watts

An annual power consumption of – 821kWatts

Services for SOX lights in 10 years – 3 minor 1 major

Replacement bulbs for SOX lights in 10 years – 3

Comparative savings

SunFire LED light saves **64%** of current power.

SunFire LED light saves 2 minor and 1 major servicing.

LED light head

The light fixtures (SunFire or SunBurst) come in a various high flux LED power outputs depending on the application 10w – 320w, with the advanced reflector and high luxeon lights it provides up to 93%, more actual viewing lighting capacity than the standard SOX light.

The light is made from the highest grade materials to ensure the longest life span. Ingress protected to IP66 with a specialised and unique heat sink fins to ensure that the heat produced by the LEDs is dispersed to avoid a lower performance and lamp life which can be a common problem with some LED lighting systems.

The light is mounted onto the support arm provided to the end customer, this support can also support the PV panel.

Light Controller

The SunFire and SunBurst controlling board is in built to the light and provides the following functions:

- Manually adjustable output to meet output lumen demand. Normal operational output set at 70% capacity for increased longevity.
- Fault tolerant design

- Self healing, logic sensing technology.
 - Loss of an LED pair compensated for by increased output of remaining LEDs on the board.
 - Loss of a complete board compensated for by increased output of remaining boards.
 - Duplicated power feeds.
- External level ambient light sensing
 - Each array monitors the intensity of neighbour lights.
 - On failure of a unit, neighbouring lights increase power.
 - Auto light level increase in foggy conditions.
- On board diagnostics (*Optional*)
 - Accessible from a hand held terminal at ground level via a secure infra red link.
 - Notification of board level failure.
 - Upgrades can be made via flash software upgrade.
- Intelligent radio interface (*Optional*)
 - Lights form a meshed network.
 - Data from each light passed via mesh to hub.
 - Hub connection sends SMS status report as pre-set (daily, weekly, monthly or on light or board failure).
- Light Temperature diagnostics
 - Temperature monitoring on MCPCB boards. When the temperature reaches the pre-set limit the current automatically reduces to lower the temperature within the light housing on the MCPCB board, this helps to increase light longevity

Anti theft Data Logging circuitry

All lights supplied come with an inbuilt individually registered chip that is recorded onto a restricted licensed data base held within the UK and a copy of this data base is provided to the supplier. This provides the end customer peace of mind, if the lighting systems were to be stolen, this system enables the customer to be able to identify the light by simply scanning the item with a handheld device, this instantly indicates the serial number and all the information relevant to the equipment proving beyond a doubt as to the owner of the equipment.



Lighting Range:

Streetlights:

SunFire 1 (1,280 – 2,176 lumens - 24watts – 70watts) Will replace the 35w – 150watt SOX light)

SunFire 2 (2,560 – 4,352 lumens – 48watts – 144watts) Will replace the 100w – 200watt SOX light)

SunFire 3 (3,840 – 6,528 lumens – 60watts – 216watts) Will replace the 150w – 300watt SOX light)

Area or Floodlighting:

SunBurst 1 (1,280 – 2,176 lumens - 24watts – 70watts) Replace 50 – 200w halogen or SOX flood or area light

SunBurst 2 (2,560 – 4,352 lumens – 48watts – 144watts) Replace 100 – 300w halogen or SOX flood or area light

SunBurst 3 (3,840 – 6,528 lumens – 60watts – 216watts) Replace 250 – 750w halogen or SOX flood or area light

SunBurst 5 (6,400 – 10,880 lumens – 60watts – 360watts) Replace 500 – 1,500w halogen / SOX flood or area light